CAPITOL CORRIDOR
JOINT POWERS AUTHORITY

CAPITOL CORRIDOR JOINT POWERS AUTHORITY
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Date: November 10, 2016

To: Capitol Corridor Joint Powers Board Directors

From: David B. Kutrosky
Managing Director

Subject: Supplemental Materials for the CCJPA Board Meeting - November 16, 2016

Please find attached for your review:

- Annual Performance Report (FY 2016) [Item V.1]
- Vision Implementation Plan [Item V.4]
- Managing Director's Report – [V.7]
- Monthly Performance Report: (FY 2016 – 2017) [Item V.7]
- Marketing Activities [V.8.c.]
- Encumbered Contracts and Purchase Orders (FY 2017)

If you have any questions or comments, please do not hesitate to call me at 510/464-6993.

Sincerely,

David B. Kutrosky
Managing Director

Enclosures

DRAFT – 2016 Performance Report
CAPITOL CORRIDOR JOINT POWERS AUTHORITY

WELCOME ABOARD!

Once again, FY 2016 was a record-setting year for the Capitol Corridor, which is also celebrating its 25th Anniversary of service this December 2016. Capitol Corridor shattered records across the board for ridership, revenues, and system operating (farebox) ratio. For FY 2016, ridership and revenues were up 5.8% at 1.56 million passengers, and 6.7% at $32 million, respectively, over FY 2015. The FY 2016 farebox ratio of 55% is an all-time high in the history of the service, and can be attributed to lower fuel prices, reduced operating expenses, and actual ridership and revenues that exceeded budget forecasts. The Capitol Corridor Joint Powers Authority (CCJPA) has steadily grown ridership while building a solid record of financial and operational success. In FY 1998, annual ridership was just 463,000; 18 years later, ridership and revenue have more than tripled.

For service reliability, Capitol Corridor once again held the top spot out of 47 Amtrak routes nationwide, with a FY 2016 On-Time Performance (OTP) record of 94%, making it seven consecutive years in #1 position. The superior punctuality of the Capitol Corridor reflects UPRR's strong partnership with the CCJPA to provide the safe, reliable movement of Capitol Corridor trains along a rail corridor shared with high-priority freight trains.

Customer satisfaction is also at an all-time high, with 89% of customers stating that they are "Highly Satisfied". These results, rated through Amtrak's Customer Satisfaction Index, are now collected via electronic surveys sent to riders in real-time after they finish their train trip. The 89% "Highly Satisfied" overall rating is the highest score in the history of the service.

For FY 2016, service levels remained at 30 weekday trains with 22 trains on weekends and holidays. This high frequency service level represents the most weekday trains for state-supported Amtrak routes in the nation and provides expanded choices to the traveling public passengers along the route. These achievements were made possible by focusing on operational efficiency, safety and security; collaborative planning and partnerships; a commitment to superior customer service; and the adoption of new technologies to make the passenger experience safe, enjoyable and convenient.

OUR VISION

The CCJPA's priorities and guiding values are described in our Vision Statement. We exist to:
• Provide high-quality passenger rail and connecting bus service that is safe, frequent, reliable and affordable;
• Develop rail service as the preferred means of travel connecting the three Northern California metropolitan regions (Sacramento-San Francisco/Oakland-San Jose/Silicon Valley);
• Deliver cost-effective expansion of superior passenger rail service; and,
• Build on constructive relationships with our partners: riders, local communities, National Railroad Passenger Corporation (Amtrak), Union Pacific Railroad (UPRR), Caltrain, and the State of California Department of Transportation (Caltrans).

SERVICE OVERVIEW

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Capitol Corridor intercity trains operate along a 170-mile corridor between San Jose and Sacramento/Auburn with stops at 17 train stations and a bus connection to San Francisco. The Capitol Corridor route operates on tracks primarily owned and dispatched by UPRR, and a small two-mile segment in Silicon Valley owned by Caltrain. The CCJPA manages the service through an operating agreement with Amtrak.

Trains provide direct connections with 19 local public transit systems and five passenger rail or rail transit systems, including BART, VTA, ACE, Caltrain, Sacramento Regional Transit, San Francisco Muni, and Amtrak's national train network. To supplement the train service, dedicated feeder bus and local transit routes serve communities south of San Jose (Santa Cruz, Monterey, Salinas, San Luis Obispo, Santa Barbara); north of Martinez (Vallejo, Napa, Santa Rosa, Eureka); and east of Sacramento (Truckee, Colfax, Reno, South Lake Tahoe). Together, these transit systems serve the second largest urban area in the western United States.

WHERE WE'VE BEEN

FY 2016 SERVICE PLAN HIGHLIGHTS

Despite limited state and local funding sources supporting intercity passenger rail, the CCJPA has successfully moved forward with several Capital Improvement Projects, including:

- Funded the completion of several state-of-good repair projects performed by Union Pacific Railroad that continued the high reliability of the Capitol Corridor trains;
- Completed, with Caltrans and Amtrak, the early phases of an On-Board Information System (OBIS) for deployment on all California Intercity Trains, and are preparing to test the system prototype;
- Adopted the final Environmental Impact Report for the proposed Sacramento-Roseville 3rd Track Project;
- Conducted the discovery and analysis process for the Vision Implementation Plan, which is phase 2 of the Vision Plan Update process;
- Received an award of $9 million in FY 2016-17 California Cap and Trade funds to complete the funding plan of $79 million for the first phase of the Sacramento-Roseville 3rd Track Project, which when complete will allow for two additional round trips between Roseville and Sacramento/Bay Area. This grant will also advance the installation of wayside power cabinets for the Oakland Maintenance Facility (to reduce diesel engine emissions, decrease ambient noise levels, and reduce fuel consumption), and initiate a service optimization plan for Northern California Passenger Rail services;
- Completed the final design and construction schedule for the $10 million FY 2015 Cap and Trade Travel Time Savings Project with Union Pacific. This project is expected to be completed in FY 2017; and,
- Implemented the Weekend Optimization Plan in August 2016, the biggest schedule change since 2006, which allows for late night service from the new Golden 1 Center in Sacramento, as well as additional peak-hour service to Silicon Valley/San Jose in the morning and from the Bay Area to Sacramento in the evening.

EQUIPMENT

• Positive Train Control (PTC) Collision avoidance signal system – PTC equipment is now installed on all 17 locomotives and all 19 cab cars, and are being kept up-to-date. Software installation and testing of rail vehicles, and implementation of a remote server to communicate the train's position to the host railroad dispatch center expected to be completed in spring 2017, making way for PTC testing to follow on Capitol Corridor trains. Union Pacific has already begun testing on their freight trains in our service area.
• Initiated testing plan for using renewable diesel, which would determine the viability and feasibility of using such alternative fuels on the locomotives with the intent to reduce lifecycle greenhouse gas emissions.

SAFETY & STATION UPGRADES

• Safety continued to be a major priority; passenger injuries decreased from 12 in FY 2015 to 5 in FY 2016. Unfortunately, trespasser fatalities rose from 18 to 22.
• Security Cameras at Capitol Corridor Stations –installation has begun for camera and surveillance equipment at the Auburn, Rocklin, Roseville, and Suisun stations.
• E-lockers – established access agreements with local municipalities to complete installation requirements for bicycle e-lockers at most Capitol Corridor stations.

TECHNOLOGICAL IMPROVEMENTS

• Website navigation update – Redesigned Capitol Corridor website with new platform, allowing for smoother mobile access, tighter security, and easier navigation. Site now displays service alerts in real-time, and features a newly-created "First Time Rider" section.
• Established daily train ridership and performance data feed and used business intelligence platform to better monitor and plan service performance.
• Launched a new onboard Wi-Fi website, which includes real-time train status, station information, and latest Capitol Corridor news, entertainment content, and promotional offers.

MARKETING & COMMUNICATIONS

CCJPA's FY 2016 marketing efforts focused on promoting off-peak ridership, primarily using social media and online channels to increase brand awareness of Capitol Corridor throughout the Northern California region.

• Renewed the popular "Take 5 for $5 each" offer for small groups on weekends, and the Seniors Ride Half Off Midweek offer to boost off peak ridership, with each bringing nearly 2,000 monthly riders on average for the duration of the offers.
• Carried over the Friends and Family 50% off discount, also targeted at small groups for every day of the week.
• Continued partnerships with the Oakland Raiders, Cal Football, Oakland Athletics, Sacramento River Cats, and other large sports and entertainment events.

• Coordinated marketing communications for the Super Bowl 50 game at Levi's Stadium, for which Capitol Corridor carried over 1,000 passengers, a single-day record for the Santa Clara/Great America station.

WHERE WE'RE GOING

FY 2017 SERVICE PLAN HIGHLIGHTS

With limited new capital funds—and additional rolling stock not expected to arrive until 2017 through 2021—the CCJPA will focus on maintaining the 30-train weekday (and 22- train weekend) service plan and improving service performance and reliability. Programs planned or underway will allow for the following improvements in FY 2017:

• Exploring partnerships to support the start-up of folding bicycle rentals at selected stations
• Evaluating opportunities to increase on-train bicycle storage systems to expand bicycle storage density;
• Security Cameras at Stations – Install security cameras at Auburn, Rocklin, Roseville, Suisun and stations;
• Renewable diesel fuel testing to be conducted in FY 2017;
• Adoption of Vision Implementation Plan and initiation of third phase of Vision Plan Update process, the Vision Communications Plan;
• Prototype installation and testing of the OBIS system scheduled to begin by end of FY 2017;
• Sacramento/Roseville 3rd Track Phase 1, which includes construction in Placer County, is scheduled to begin during FY 2017;
• Travel Time Savings Project improvements, funded in part by 2015 Cap and Trade TIRCP funds, will begin winter 2016 with completion by mid-2017, to reduce travel time by up to 10 minutes for trains traveling between Sacramento and San Jose;
• Several state-of-good repair track projects will be completed with our partners at Union Pacific;
• Richmond Station Platform Improvements: installation of a flashing light/beacon to facilitate transfers for passengers connecting from BART to Capitol Corridor, and the installation of a Clipper Card Parking Validation Machine (PVM), have target completion dates in spring 2017;
• Standby Power at Auburn layover site – construction underway of a standby power system that will allow shutdown of the locomotive's diesel engines during overnight layover servicing, saving diesel fuel and reducing diesel emissions and ambient noise levels, to be completed in December 2017;
• Signage – Begin a program of upgrades to the safety and information signage at Capitol Corridor stations by installing a new standard information display sign system;
• Positive Train Control –Final implementation of this control system will await coordination with the Capitol Corridor's railroad partners - Union Pacific Railroad and Caltrain. Each of those partners is working hard to implement Positive Train Control. For Capitol Corridor, minor programming issues and other necessary upgrades such as installing a landside server, and developing a safety plan are scheduled to be initiated this fiscal year;

• Receive initial order of new Tier 4 locomotives that will reduce pollutants and improve fuel efficiency; and,
• Equipment: door overhaul and replacements to be done in 2017, dining car overhaul to take place summer 2017.

MARKETING & COMMUNICATIONS

As Capitol Corridor celebrates its 25th year of service, staff will continue to build marketing programs to increase brand awareness and ridership throughout the Northern California megaregion. Partnerships pairing digital (online, mobile, social media) and traditional media (radio, TV) will promote the Capitol Corridor as a convenient travel option. This media mix of digital and traditional allows for a cost-effective and trackable means of increasing brand visibility and customer engagement. Promotional discounts will bolster ridership in key markets and during weekend/off-peak periods.
Additional marketing endeavors may include:
• Develop new creative campaign that features Capitol Corridor's many unique amenities for riders, and touting the service's convenience compared to congested freeways;
• Targeted promotions to boost ridership on select segments with capacity, such as service to/from sports and entertainment centers such as Golden 1, Oakland Coliseum, and Levi's Stadium;
• Explore new fare offers for niche markets, to further boost off-peak ridership; and,
• Improvements in delivery of train status information to customers through a variety of channels, and transmission of Service Alerts across Twitter and other media.

THE 2017 LEGISLATIVE AGENDA

FY 2016 ACCOMPLISHMENTS

• The CCJPA has been working with the other California intercity passenger rail (IPR) agencies to raise awareness for continued and sustained investment in the state's intercity passenger rail program.
• State Legislature approved and the Governor enacted a $126 million budget to support the operation of the three California IPR services, including the Capitol Corridor.
• The Legislature provided a one-time supplemental allocation of $135 million in the Cap and Trade Transit/Intercity Rail Capital Program (TIRCP) as part of the State FY 16-17 Budget, which are available via a competitive grant process to state public transport agencies like the CCJPA.

FY 2017 ACTION PLAN

The CCJPA will seek to leverage limited State and federal funds to advance projects that will create jobs, and expand and improve service that in turn will reduce vehicular congestion and corresponding greenhouse gas (GHG) emissions in the Northern California mega-region. The CCJPA will work with legislative, transportation and finance officials to:

• The CCJPA will continue its efforts with the other California intercity passenger rail (IPR) agencies to include dedicated annual funding for the state's successful IPR services as part of any state legislative proposals to fix the state's transportation funding deficit;
• Ensure that the State transit funding levels continue to support the operation of the three California IPR corridors that conform to the requirements of Amtrak pricing methodology set forth in the Passenger Rail Improvement and Investment ACT (PRIIA) Section 209 Policy;
• Pursue and secure federal, State and other funds to finance the capital infrastructure investments to meet the CCJPA's goal for expanded train service to San Jose and Roseville/Auburn; and,
• Seek funding to implement and complete projects to enhance system safety and security to protect employees, passengers and facilities, including Positive Train Control (PTC).

CLOSING MESSAGE

Capitol Corridor will celebrate 25 years of service in December 2016, and it is our hope to sustain its success and growth into the future. The ongoing success of the Capitol Corridor service is demonstrated by a high level of customer satisfaction and consistent overall growth in ridership and revenues over the past sixteen years. A steady base of frequent weekday and weekend riders continues to keep the Capitol Corridor as the third busiest route in the Amtrak system, thanks in large part to the high-quality, reliable, and customer focused operation of the trains.

We continue to work on projects that will further enhance the safety and security of our trains, and ensure that we meet sustainability and clean air goals for the State of California.

Our goal remains to improve the quality of life in the communities we serve by providing safe, convenient, affordable, reliable, and environmentally friendly passenger rail service. We thank our partners, taxpayers and customers for the ongoing support of the Capitol Corridor intercity passenger rail service.

CAPITOL CORRIDOR JOINT POWERS AUTHORITY
BOARD OF DIRECTORS
Placer County Transportation Agency
Jim Holmes

Susan Rohan
Keith Nesbitt (Alt.)

Sacramento Regional Transit District
Steve Miller
Phil Serna
Steve Hansen (Alt.)

San Francisco Bay Area Rapid Transit District

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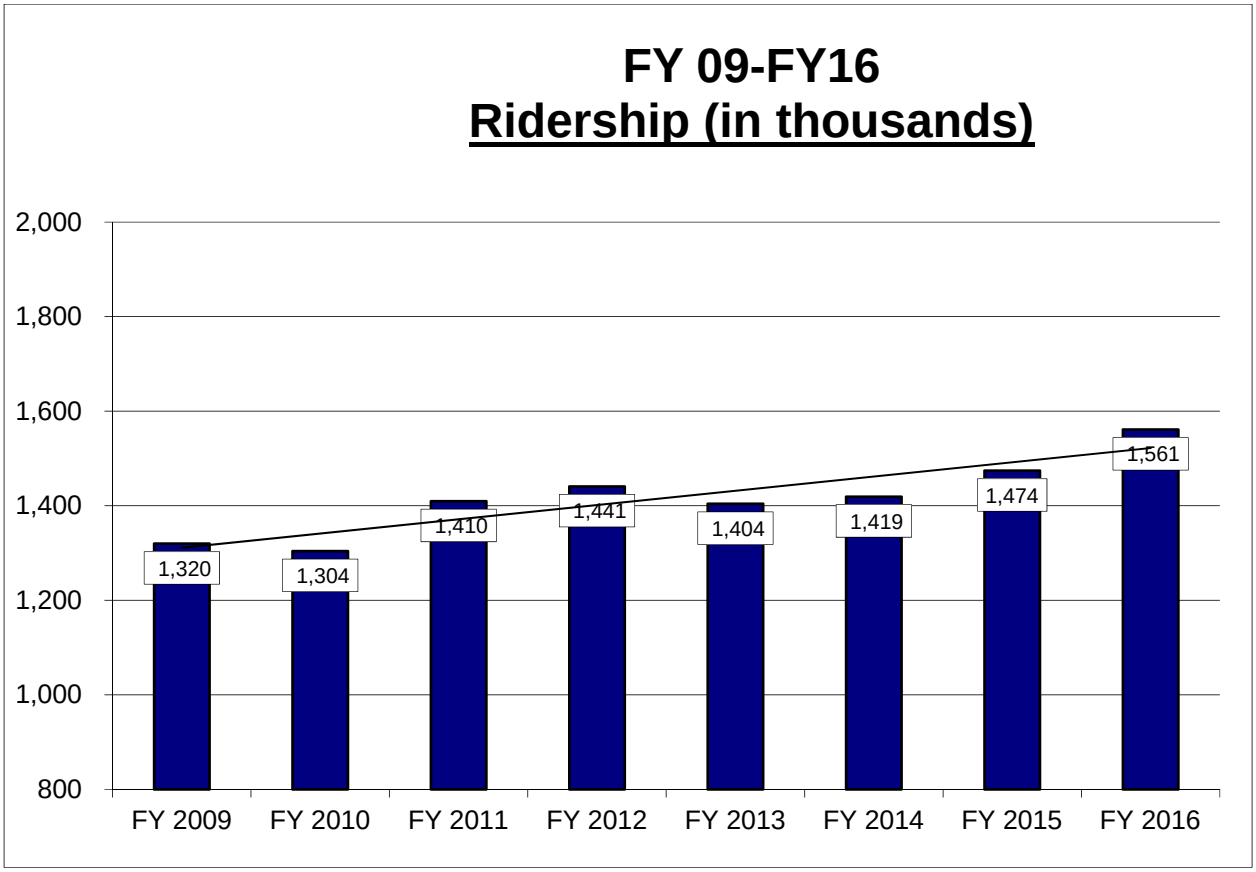
2016 PERFORMANCE REPORT, ADOPTED NOVEMBER, 2016

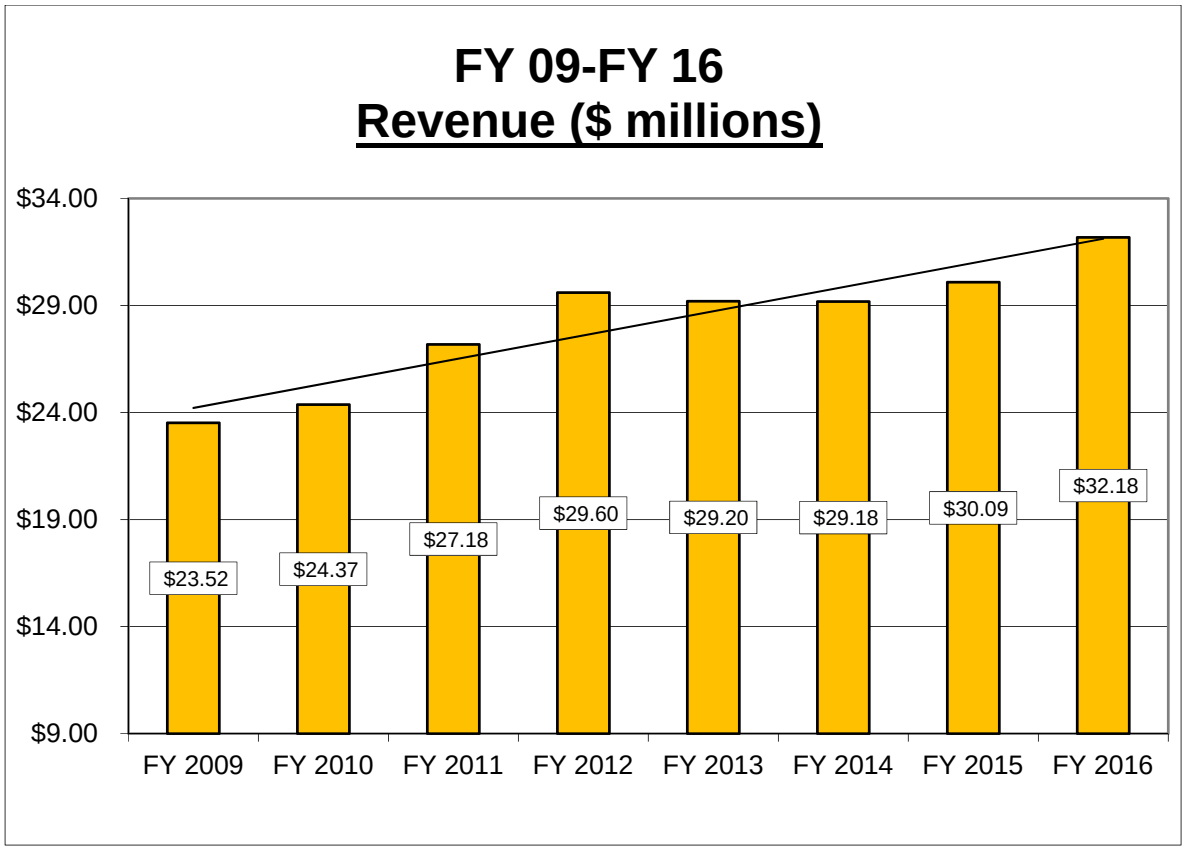
FY16 Performance Charts

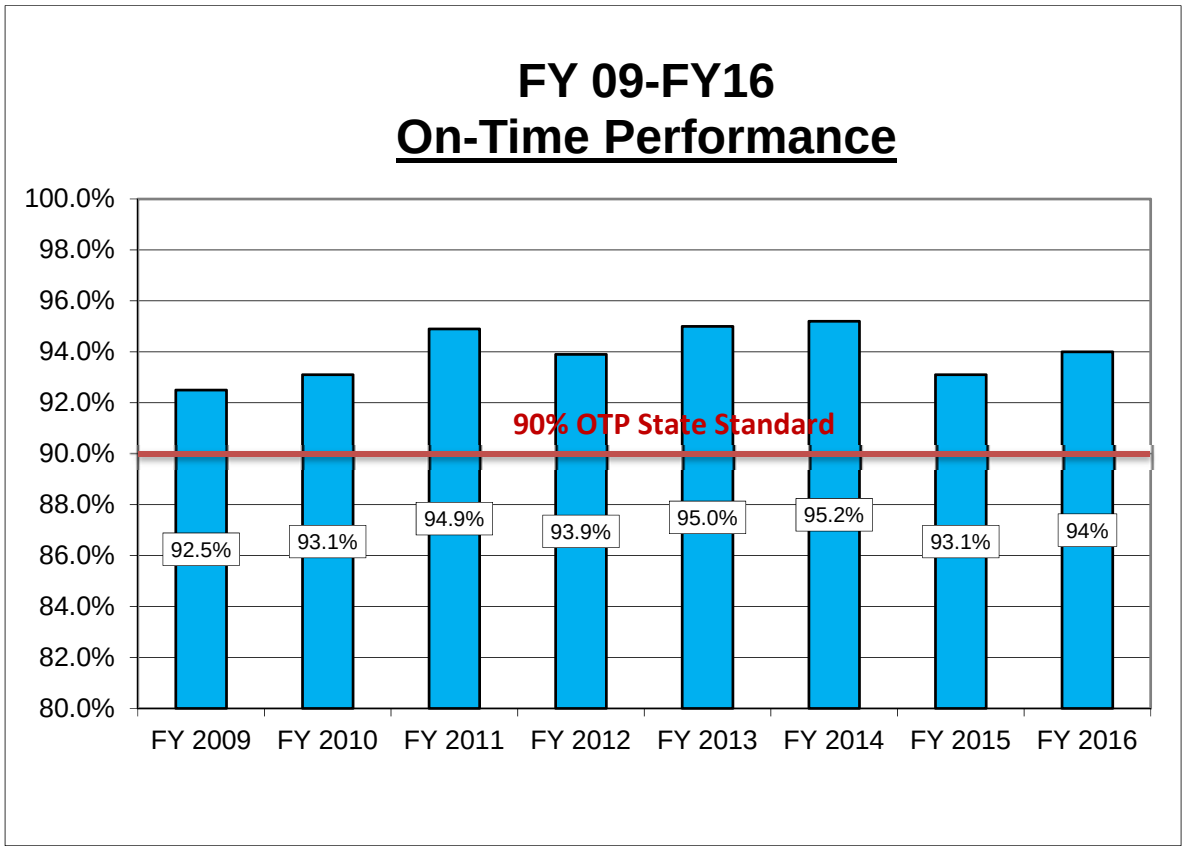
PERFORMANCE

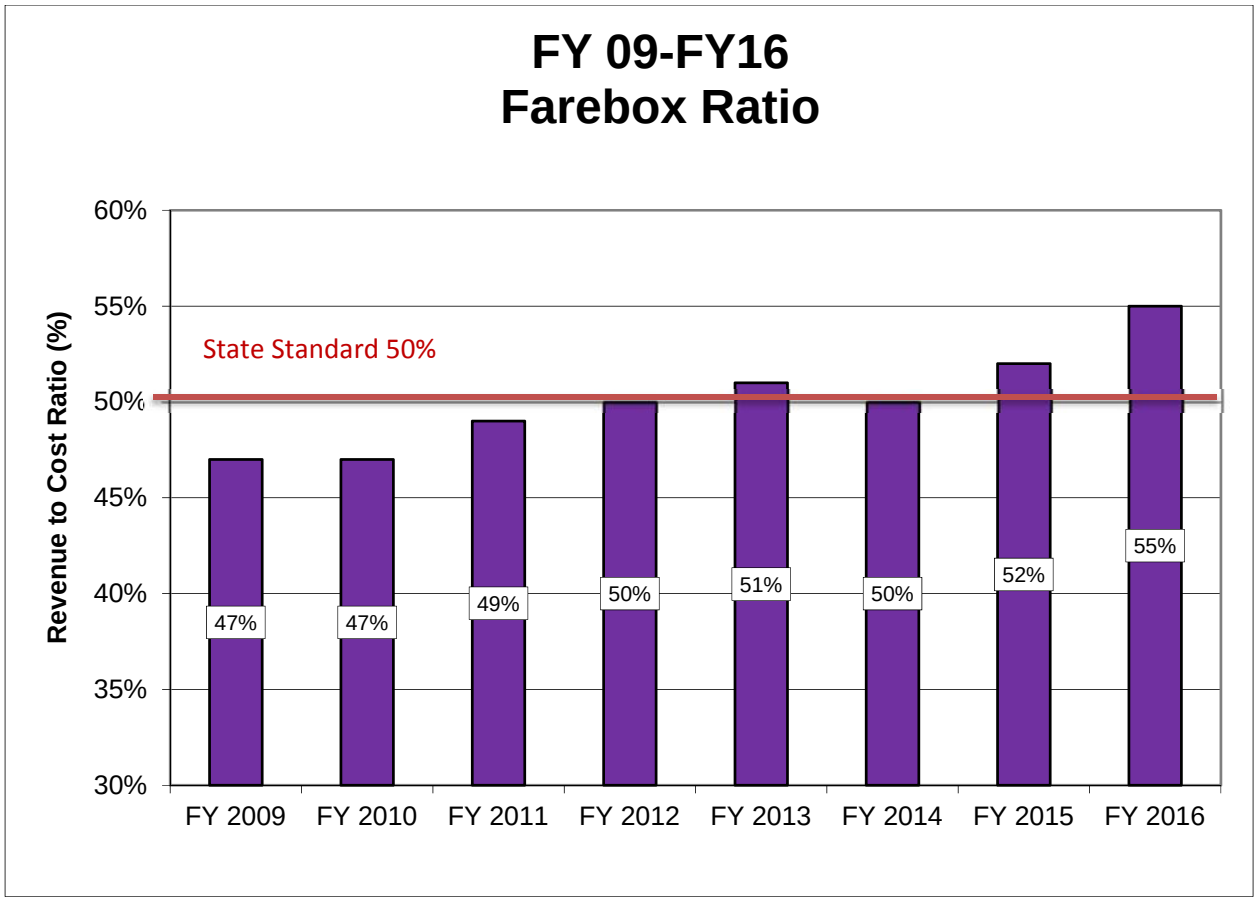
Fiscal Year	Service Level	Ridership	Revenue	Revenue To Cost Ratio
FY 2016	30 Daily Trains*	1,560,814	$32.1 Million	55%
FY 1998 (PRE CCJPA)	8 Daily Trains	463,000	$6.3 Million	30%
18 Year Improvement	275%	237%	414%	83%

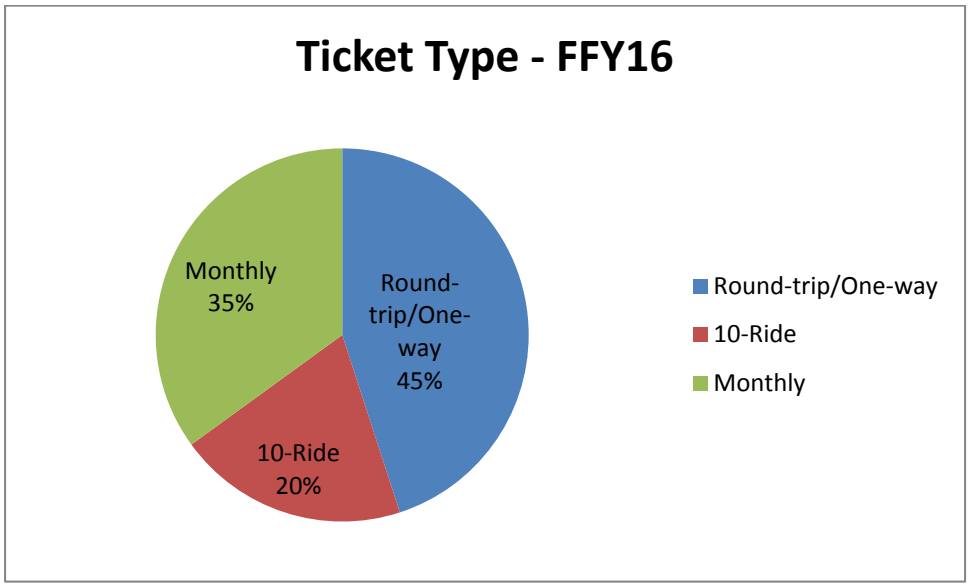
*30 Daily Trains effective August 13, 2012

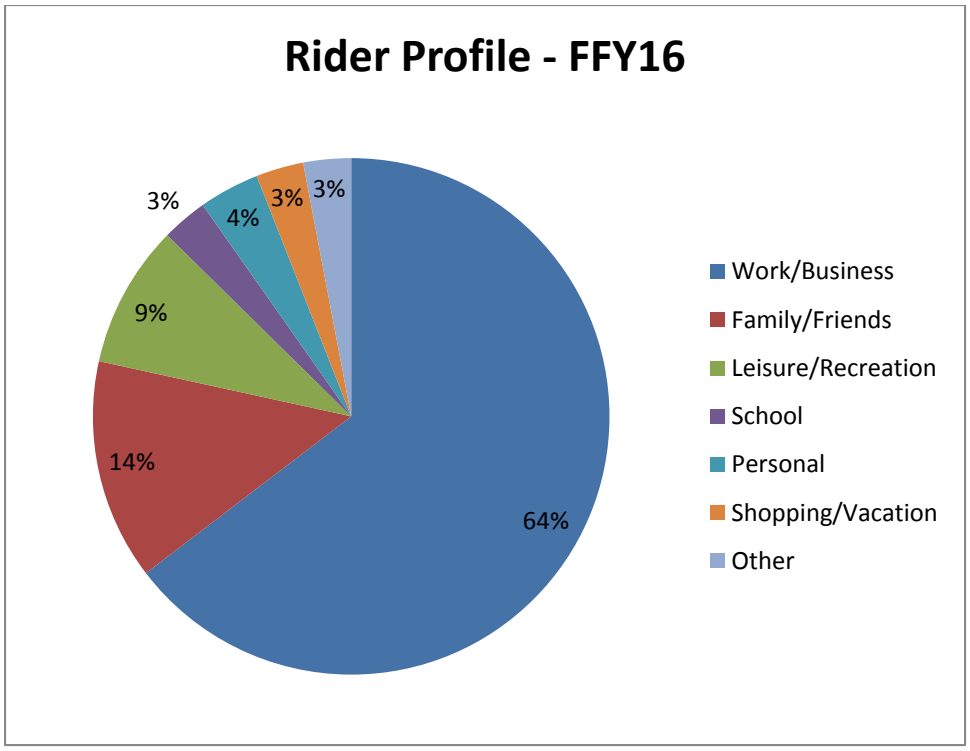


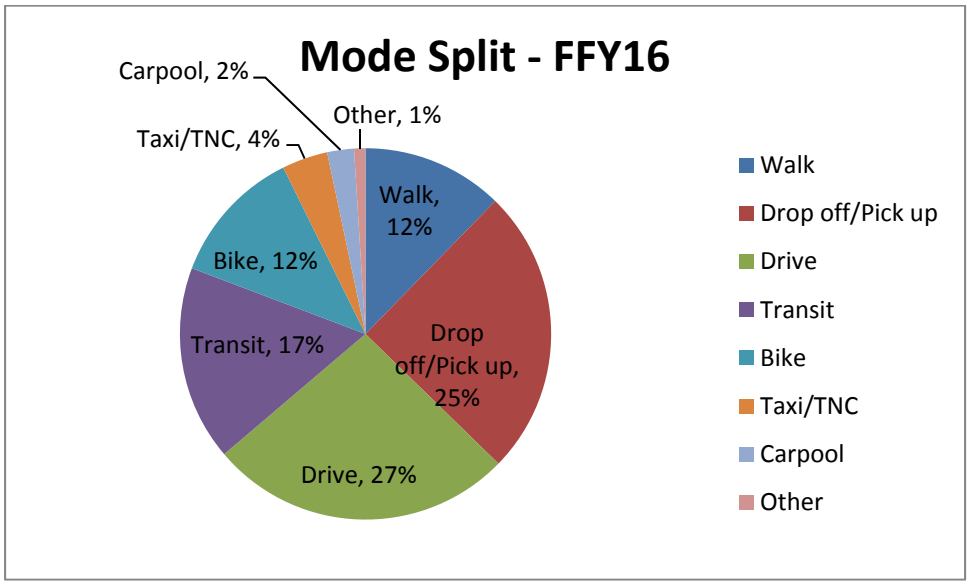

FY 09-FY 16
Revenue ($ millions)
$34.00
$29.00
$24.00
$19.00
$14.00
$9.00
$23.52
$24.37
$27.18
$29.60
$29.20
$29.18
$30.09
$32.18
FY 2009
FY 2010
FY 2011
FY 2012
FY 2013
FY 2014
FY 2015
FY 2016


FY 09-FY16
On-Time Performance
100.0%
98.0%
96.0%
94.0%
92.0%
90.0%
88.0%
86.0%
84.0%
82.0%
80.0%
90% OTP State Standard
92.5%
93.1%
94.9%
93.9%
95.0%
95.2%
93.1%
94%
FY 2009
FY 2010
FY 2011
FY 2012
FY 2013
FY 2014
FY 2015
FY 2016


FY 09-FY16
Farebox Ratio
Revenue to Cost Ratio (%)
60%
55%
50%
45%
40%
35%
30%
State Standard 50%
47%
47%
49%
50%
51%
50%
52%
55%
FY 2009
FY 2010
FY 2011
FY 2012
FY 2013
FY 2014
FY 2015
FY 2016


Ticket Type - FFY16
Monthly
35%
Round-
trip/One-
way
45%
10-Ride
20%
Round-trip/One-way
10-Ride
Monthly


Rider Profile - FFY16
3%
4%
3%
3%
9%
14%
64%
Work/Business
Family/Friends
Leisure/Recreation
School
Personal
Shopping/Vacation
Other


Mode Split - FFY16
Carpool, 2%
Other, 1%
Taxi/TNC, 4%
Walk, 12%
Bike, 12%
Transit, 17%
Drop off/Pick up, 25%
Drive, 27%
Walk
Drop off/Pick up
Drive
Transit
Bike
Taxi/TNC
Carpool
Other

CAPITOL CORRIDOR

VISION IMPLEMENTATION PLAN

FINAL DRAFT

NOVEMBER 2016


2012
2012

INTRODUCTION TO THE VISION IMPLEMENTATION PLAN

This report describes the Capitol Corridor Vision Implementation Plan, or VIP. The VIP is the second step in a three-step process to define a long-term vision for the rail line. Building on the design principles and conceptual alternatives developed in step one, the Vision Plan, the VIP defines an "initial study corridor" for further study – a package of preferred engineering alternatives in each segment of the line. It does not include the additional steps necessary to make a business case for the investment, including detailed economic and ridership analysis. These, along with public outreach, will occur in the third and final step, the Vision Communications Plan or VCP.

WHAT IS THE CAPITOL CORRIDOR VISION IMPLEMENTATION PLAN?

The **Capitol Corridor** is a passenger rail line between the Sacramento area and the San Francisco Bay Area.

Depending on the segment, it currently makes between one and 15 round trips per day. It takes a little over three hours to travel between San Jose and Sacramento, a distance of about 131 miles, and another hour to travel 37 miles to Auburn in the Sierra Foothills. It is part of the Amtrak system, although it is managed by a "joint powers authority" (the Capitol Corridor Joint Powers Authority, or CCJPA) made up of representatives of different transportation agencies in the corridor.

The **Vision** is a policy adopted by the CCJPA Board of Directors – an official goal to work toward – calling for a future Capitol Corridor that is faster, more frequent, more reliable, cleaner, quieter, and better connected to other public transit lines. The Vision looks out toward service changes that may be required to serve the transportation and economic needs of the Northern California megaregion over the next 40 years.

The **Vision Implementation Plan** or VIP is a detailed plan for implementation of the Vision, including the capital improvements that are needed (such as new tracks or stations) and a strategy for funding and construction. It also includes estimated travel times, conceptual schedules including frequencies and span (or hours) of operation, preliminary cost estimates, research on possible funding sources, and improvements for freight trains that currently share tracks with the Capitol Corridor. (Again, it does not include analysis of benefits including economic and ridership gains – this analysis will occur in the next phase of the Vision process, the VCP.) The VIP recognizes that passenger and freight trains sharing the same tracks presents limitations for both. A renewed era of investment in the combined rail network in Northern California will be necessary to overcome the conditions that constrain both passenger and freight service today.

WHAT IS THE CAPITOL CORRIDOR?

To understand the Vision and the VIP, it is necessary to first understand what the Capitol Corridor is today, and how it got to be that way.

When it began in 1991, the Capitol Corridor made just three round trips per day. Over the next two decades it grew and grew, to 15 round trips in its busiest segment, between Sacramento and Oakland. Ridership grew even faster, as the Capitol Corridor offered an alternative to driving on congested Interstates 80 and 880.

But the Capitol Corridor was limited in how far it could grow. This is because it does not own the tracks on which it operates – all but a couple of miles in San Jose are owned by the Union Pacific Railroad, the freight train operator. And UPRR limits how many passenger trains can be on its tracks, in order to keep its own trains running on time and preserve capacity for Port of Oakland-bound cargo, something that is vital to the regional economy.

HOW IS THE CAPITOL CORRIDOR GROWING NOW?

There are still some ways the Capitol Corridor could grow, working in cooperation with UPRR, and some of them are already proceeding.

- CCJPA is currently adding tracks so that it can add increase service between Downtown Sacramento and the suburb of Roseville from one to three daily round trips.
- CCJPA is making improvements to tracks that will reduce travel times by 10 minutes each way between Sacramento and San Jose.
- Under a previous agreement with UPRR, CCJPA could make improvements between Oakland and San Jose that would allow it to add four daily off-peak round-trips each way to the current total of seven in that segment.

These sorts of improvements, however, only go so far, and funding for them has nearly disappeared in recent years. The Capitol Corridor has gone just about as far as it can on its current path. And increasingly of late, it has seemed like more dramatic changes may be called for -- especially with California's population expected to grow by roughly 28 percent, or nearly 11 million, by 2050. In contrast to the freeway

SOURCE: STEVE BOLAND + SESE INGOLSTADT

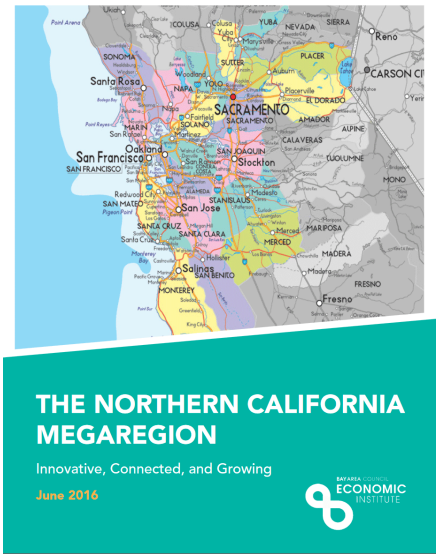
system, which is largely built out and will only see ever greater congestion, passenger and freight rail have unrealized potential to transform mobility and drive economic growth in Northern California

WHY WAS A VISION NEEDED?

Before this current Capitol Corridor Vision was adopted in 2014, CCJPA had an earlier, more incremental Vision – adopted in 2005, before the State adopted a plan to combat climate change, before California High-Speed Rail was approved by voters, before both the Bay and Sacramento regions adopted their first Sustainable Communities Strategies, before the State established a new State Transportation Agency (CalSTA) tasked with developing a statewide rail plan, and before the Bay Area Rapid Transit system – BART – began seriously contemplating a second Transbay Tube.

2005 was also the year in which per-capita vehicle miles traveled by Americans peaked; even with recent increases driven by low gas prices, VMT has only returned to 1998 levels. The reasons for this are debatable, but it seems clear that the travel preferences of Millennials are different from those of previous generations.

There are other emerging trends. One is climate change. Sea level rise could affect the Capitol Corridor in two ways. First, it could affect it directly – much of the rail line is already just a few feet above the water at high tide, especially between Hercules and Martinez, where it winds along the shoreline. So solutions to protect the corridor from rising waters will be needed. But second, public transit like the Capitol Corridor has an important role to play in reducing carbon emissions and lessening climate change. A sustainable future may include electric, autonomous vehicles, but unless we're going to keep widening I-80, which is already constrained by adjacent homes and businesses, there will only be so much room for cars – and there will still be a place for high-capacity transit that is time-competitive with driving.



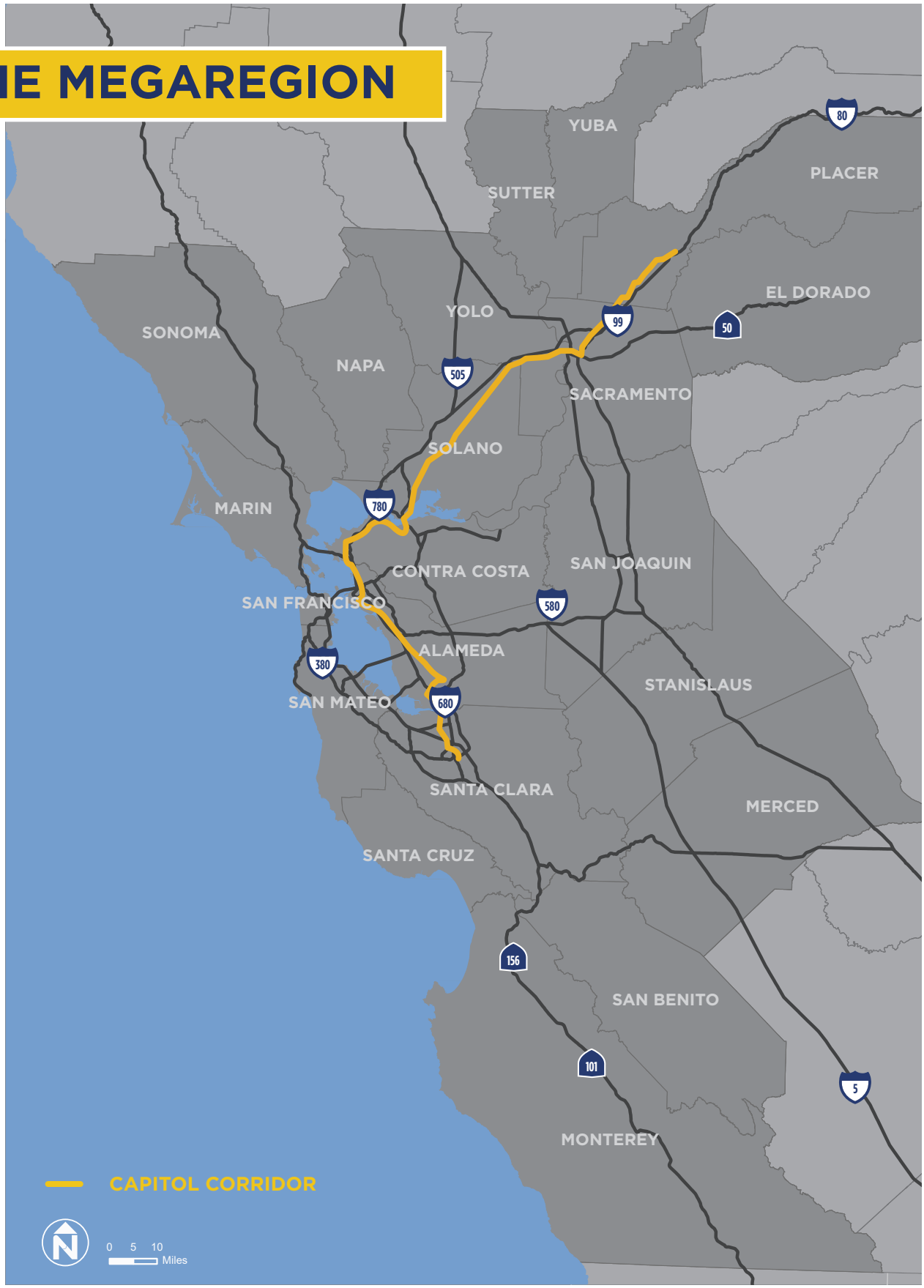
Then there's the globalizing economy, and its local impacts. Northern California, of course, is the epicenter of the tech world: Silicon Valley, at the southern end of the corridor, is the headquarters of most major computer-related companies, but many of them now have offices throughout Northern California. Increasingly, the Bay Area and Sacramento region are growing together into a single economic "megaregion." As high housing costs in coastal areas have pushed more people and businesses inland, it has only increased the economic and social ties between the areas, which have long been closely linked, separated only by a few miles of farmland. And only one transit line connects the entire megaregion: the Capitol Corridor. (The report shown here, by the way, is by an organization representing Bay Area businesses.)

All of this suggests that the Capitol Corridor can't go on forever making just 15 daily round trips, at an average speed of less than 45 miles per hour.

As the only transit line between adjacent metropolitan areas with a combined population of 12 million – and growing – it has to evolve with the times.

FINAL DRAFT

THE MEGAREGION



WHAT IS THE VISION?

So if the Capitol Corridor is to go in a new direction – what should that direction be?

To develop the updated Vision, the Capitol Corridor's staff and consultants first looked across the country and around the world to see what intercity rail lines like the Capitol Corridor look like in places with higher rail ridership. For one, they are more modern. While the Capitol Corridor uses the same technology that has been used by most American railroads for decades – trains pulled by diesel-powered locomotives – trains in other locations are often now powered by overhead electric wires. These trains are not only cleaner and quieter, but they can accelerate and decelerate faster. This is why Caltrain, the rail line between San Francisco and San Jose, is planning to electrify.

Another thing that East Coast, Western European and East Asian trains are is faster (the Capitol Corridor's top speed today is 79 mph). And we're not just talking about high-speed trains – that technology, as we've learned, is very expensive, but it's possible to operate trains at speeds up to 125 or 150 mph for far less money, as curves can be tighter and grades can be steeper, requiring less new right-of-way and fewer tunnels and bridges.

SOURCE: JOHN GRAY

Another common element of modern intercity rail lines is greater frequency. Even at its most frequent, the Capitol Corridor runs only every 40 minutes, a limitation of sharing the freight corridor. Even in the Bay Area, Caltrain, a commuter rail line using the same technology as the Capitol Corridor, runs up to five trains per hour (every 12 minutes average), and will run up to six trains per hour once it is electrified.

Finally, there is a long list of additional things that the Capitol Corridor could do differently, and better. Along with offering faster and more frequent service, it could be made more reliable, less subject to freight trains in its path or the century-old drawbridge it uses to cross the Carquinez Strait. It could be more seamlessly integrated with connecting transit, allowing for easier transfers, including timed transfers like those BART makes between its trains in Oakland. It could connect to BART in central Oakland, enabling quick trips into San Francisco. It could have raised platforms level with train floors so that passengers could walk (or roll) right onto or off of trains, rather than having to climb stairs – and this would speed up the boarding process, further reducing travel times for everybody. And its schedule could be based on easier-to-remember "clockface" headways, with departures and arrivals every 15, 30 or 60 minutes (and departures from major stops on the hour or half-hour).

This, in essence, is the Vision that the CCJPA Board adopted in 2014 – a series of guiding principles based on international best practices and global standards in modern railroading. But there were also a few additional details.

When the Capitol Corridor Board adopted the updated Vision in 2014, it also advanced a series of conceptual alternatives designed to serve as a starting point for analysis in the VIP.

VISION ELEMENTS

SPEED

FREQUENCY

RELIABILITY

CONNECTIVITY

ELECTRIFICATION

LEVEL BOARDING

CLOCKFACE HEADWAYS

WHAT WERE THE VISION ALTERNATIVES?

Starting with a long list of options – different alignments and a range of capital improvements – Vision planners completed preliminary assessments of cost and engineering feasibility and of ridership potential.

This allowed them to "screen" or narrow the options down to a small number of alternatives, which were advanced to the VIP. Preliminary analysis of travel times was then completed, and ridership was estimated for the alternatives using a model, to confirm that faster, more frequent and more reliable service would actually result in much greater ridership, and was really worth pursuing.

Each step in the process could further be described as follows:

- **Based on screening, between one and three alignments were advanced in each segment**: San Jose-Oakland Coliseum, Central Oakland, Oakland-Richmond, Richmond-Suisun/Fairfield, and Suisun/Fairfield-Sacramento (Sacramento-Auburn, where there is less service, was not included in this phase).
- **Travel times were estimated.**
- The different alignments in each segment were packaged into **corridor-level alternatives**.
- **Conceptual schedules were developed for each alternative** based on the travel time estimates and a common service plan including express service and service every 15 minutes during peak periods.
- Using the Amtrak model, **ridership was estimated for each alternative**, and compared to estimated ridership without the improvements.

The Amtrak model has its limitations: It is designed to gauge impacts from incremental improvements to service, not major changes such as new alignments, much faster service and new transit connections. Nonetheless, the results it generated suggested that the Vision alternatives were worthy of further analysis: ridership increases in the 170 to 200 percent range.

The alternatives advanced from the Vision Plan to the VIP in each segment are described in the following pages. In each segment, an overriding factor was the need for dedicated passenger rail-only right-of-way allowing for capacity and service levels to be expanded beyond the current limits, allowing for greater reliability and enabling electrification.

San Jose-Oakland

Between Oakland and Diridon Station in Downtown San Jose, several possible rights-of-way already exist. Each is a freight corridor, and the Capitol Corridor currently uses segments of two of them. If the Capitol Corridor had exclusive use of any of the alignments – with existing freight relocated to another right-of-way – then service could be greatly expanded prior to electrification and other improvements to speed up service.

The potential alignments are shown in the map on the following page. The Capitol Corridor currently uses the Niles Subdivision north of Fremont and the Coast Subdivision south of Newark, along with the Niles Cutoff connector between them. The Vision analysis found that:

- **Alternative A**, the Coast Subdivision alignment currently used by the Amtrak Coast Starlight, would be faster than either the current alignment or a modified version of it (Alternative C), but would bypass existing stops in Hayward and Fremont (a stop could be added near the Dumbarton Bridge on the Fremont/Newark border). Both this alternative and Alternative C would require double-tracking of the existing single-track segment through the Alviso Wetlands at the southeastern tip of San Francisco Bay.
- **Alternative B**, the inland alignment – a combination of the Niles and Warm Springs subdivisions – would be fastest, but it would bypass Fremont as well as two existing stops in Santa Clara, a jobs-rich area near the center of Silicon Valley.
- **Alternative C**, the hybrid alignment, would use the Oakland rather than the Niles Subdivision and a new Niles Cutoff tunnel replacing the slowest segment of the existing alignment; while it would remain the slowest of the three alignments, it would maintain all existing stops.

All three alternatives were advanced to the VIP for further analysis.


ALTERNATIVES JOIN IN EXISTING ROW
OAKLAND
ALAMEDA
DANVILLE
FINAL DRAFT
(Alt C)
OAKLAND SUBDIVISION
SAN LEANDRO
DUBLIN
(Alt B)
NILES SUBDIVISION
HAYWARD
(Alt A)
COAST SUBDIVISION
UNION CITY
92
SAN FRANCISCO BAY
(Alt C)
NILES CUTOFF
FREMONT
NEWARK
880
(Alt A + C)
COAST SUBDIVISION
84
(Alt B)
WARM SPRINGS SUBDIVISION
PALO ALTO
MILPITAS
237
MOUNTAIN VIEW
680
SUNNYVALE
SAN JOSE AIRPORT
CALTRAIN RIGHT-OF-WAY
280
SANTA CLARA
CUPERTINO
DIRIDON STATION
SAN JOSE

Jack London

The single greatest bottleneck on the existing alignment is in Downtown Oakland, where trains run down the middle of a city street, Embarcadero, through the waterfront Jack London district. An elevated viaduct would increase noise and visual blight and would almost certainly be rejected by neighbors and the City. Tunneling, meanwhile, would be complicated by several factors, including constraints to both the north and south (the West Oakland Yard and Lake Merritt Channel) – but the greatest challenge is the relatively shallow depth of the Posey and Webster Tubes auto tunnels under the Oakland Estuary. Here as in other segments between Oakland and Sacramento, service cannot be expanded, at all, in the existing right-of-way shared with freight; UPRR could agree to allow more passenger "slots," but this segment provides mainline access to and from the busy Port of Oakland. Increased passenger service here would come at the expense of goods movement.

The map on the next page shows various possible alignments for a tunnel.

SOURCE: PAUL SULLIVAN

The Vision analysis found that:

- The existing Embarcadero right-of-way could be grade-separated and the Posey and Webster Tubes could be avoided, but it would require a shallow trench capped by a raised berm. Embarcadero would be closed, restricting access to businesses fronting it, and there would be a visual barrier along the Oakland waterfront.
- It might be possible to tunnel under Fifth Street, thereby avoiding the Posey and Webster Tubes, and connect to a new viaduct alongside the BART tracks through West Oakland – but this would require further analysis, including analysis of whether a new viaduct could "thread the needle" between columns supporting the Interstate 880 viaduct. A new viaduct in West Oakland would also require some property takings.
- A long tunnel from just east of Jack London to just south of Emeryville Station would pass directly beneath the core of Downtown Oakland, and a new station there could connect to the 19th Street/Oakland BART Station, but this would be very expensive, on the order of several billion dollars for roughly three-and-a-half miles of new tracks.

One non-tunnel concept – construction of a viaduct in the median of Interstate 880 – was considered but was not advanced to the VIP.

Because more detailed engineering analysis was required to determine the feasibility of the Fifth Street alternative, all three alternatives were advanced to the VIP for reasons of cost and engineering feasibility. For purposes of estimating travel times and ridership, an Embarcadero alignment was assumed in all three Vision alternatives.


SAN FRANCISCO BAY
ALTERNATIVES JOIN IN EXISTING ROW
TUNNEL UNDER DOWNTOWN OAKLAND
5TH STREET SUBWAY/ NEW VIADUCT IN BART ROW
EMBARCADERO TRENCH/BERM
I-880 ROUTE
ALTERNATIVES JOIN IN EXISTING ROW
BART WEST OAKLAND STATION
BART 19TH STREET STATION
JACK LONDON
LAKE MERRITT
OAKLAND INNER HARBOR
80
980
580
880
POWELL
FINAL DRAFT
SAN PABLO
TELEGRAPH
BROADWAY
MARKET
GRAND
14TH
WEBSTER
HARRISON
3RD
0
0.5
1
Miles

Oakland-Richmond

In this segment, there is no feasible alternative from a cost or engineering perspective other than the existing right-of-way. There are no other rights-of-way available – no parallel railroads or freeways other than I-80, which is constrained by the Bay on one side and development on the other – the area is heavily urbanized, and a tunnel from central Oakland to North Richmond, where development begins to recede, would be roughly 13 miles long. Because an elevated viaduct would itself be prohibitively expensive (and would likely encounter community opposition), widening of the existing right-of-way by between 20 and 30 feet would be necessary to accommodate passenger-only tracks. This would require some eminent domain or takings of properties. In most of this segment, adjacent land uses are light industrial.

Richmond-Suisun/Fairfield

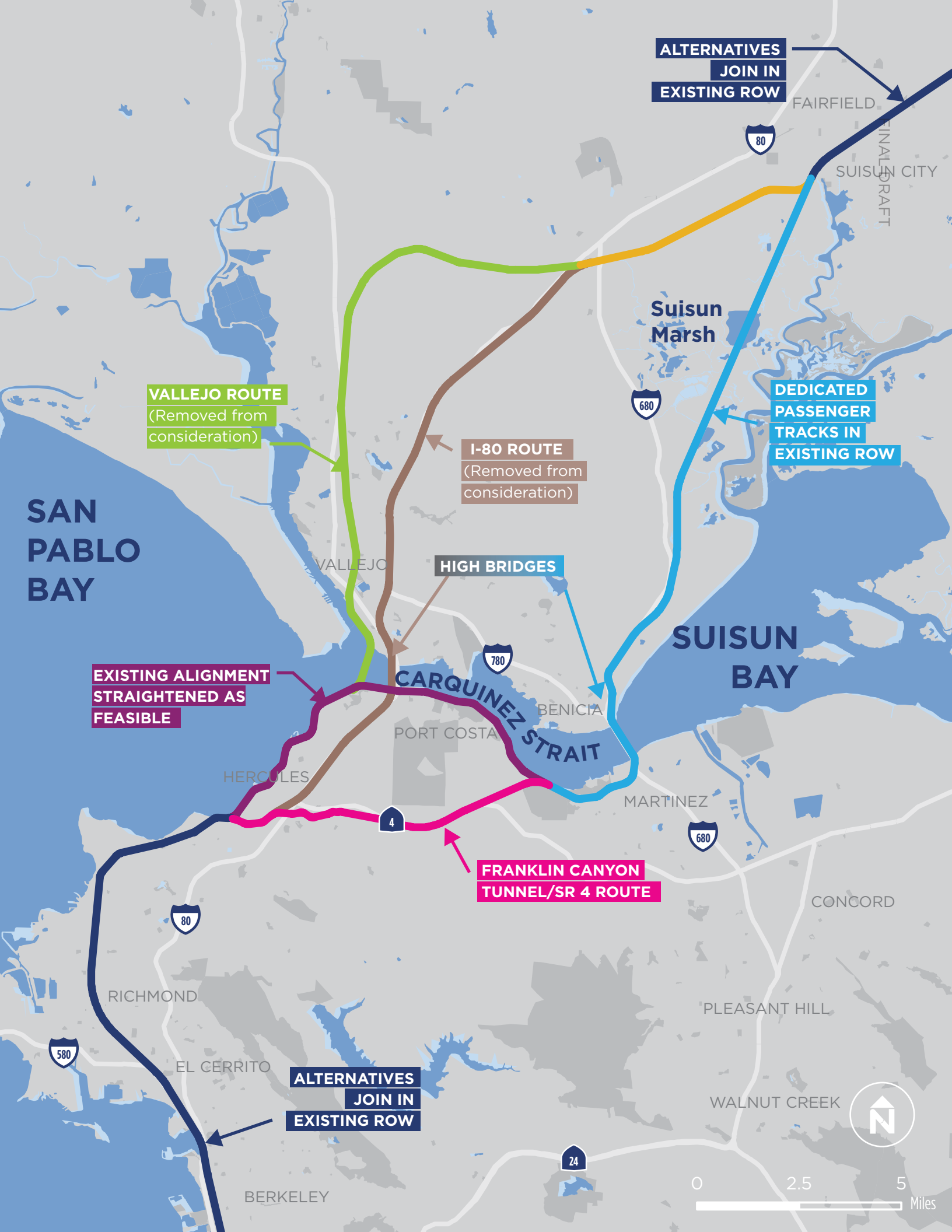
Between Richmond and Suisun/Fairfield Station, numerous paths are possible. The map on the following page shows alternatives that were advanced as well as options that were screened out for cost and engineering feasibility reasons. The latter category includes I-80 as well as an existing rail right-of-way through Vallejo and American Canyon. The I-80 alignment would require reconstruction of a series of freeway overpasses, while the rail right-of-way includes a segment in Vallejo that is extremely narrow and runs through residential neighborhoods, with homes coming within a few feet of the tracks.

Ultimately, two alternatives were advanced:

- The existing alignment with the following modifications to the curving shoreline segment between Pinole and Martinez:
  - Widening the right-of-way to provide passenger-only tracks
  - Raising the tracks to protect against sea level rise
  - Straightening curves wherever practical

  This alternative would have the lowest cost but would also net the least travel time savings – and perhaps more importantly, it would result in environmental impacts to San Pablo Bay and the Carquinez Strait requiring extensive review, permitting and mitigation.
- A new alignment deviating from the existing right-of-way just south of Pinole onto a freight corridor owned by the BNSF Railway. The alignment would follow this right-of-way inland through Hercules to a new tunnel in Franklin Canyon, roughly paralleling State Route 4. From there it would continue onto a viaduct and new elevated station on the Martinez waterfront. While costly, this would provide a more direct alignment, reducing one-way travel time by several minutes.

Each alternative assumes a new high crossing of the Carquinez Strait near the existing 1920s drawbridge. Both alternatives were advanced to the VIP.


ALTERNATIVES JOIN IN EXISTING ROW
FAIRFIELD
SUISUN CITY
FINAL DRAFT
Suisun Marsh
VALLEJO ROUTE (Removed from consideration)
I-80 ROUTE (Removed from consideration)
DEDICATED PASSENGER TRACKS IN EXISTING ROW
SAN PABLO BAY
VALLEJO
HIGH BRIDGES
SUISUN BAY
EXISTING ALIGNMENT STRAIGHTENED AS FEASIBLE
CARQUINEZ STRAIT
BENICIA
PORT COSTA
HERCULES
MARTINEZ
FRANKLIN CANYON TUNNEL/SR 4 ROUTE
CONCORD
RICHMOND
PLEASANT HILL
EL CERRITO
ALTERNATIVES JOIN IN EXISTING ROW
WALNUT CREEK
BERKELEY
80
680
780
4
580
24
N
0
2.5
5
Miles

Suisun/Fairfield-Sacramento

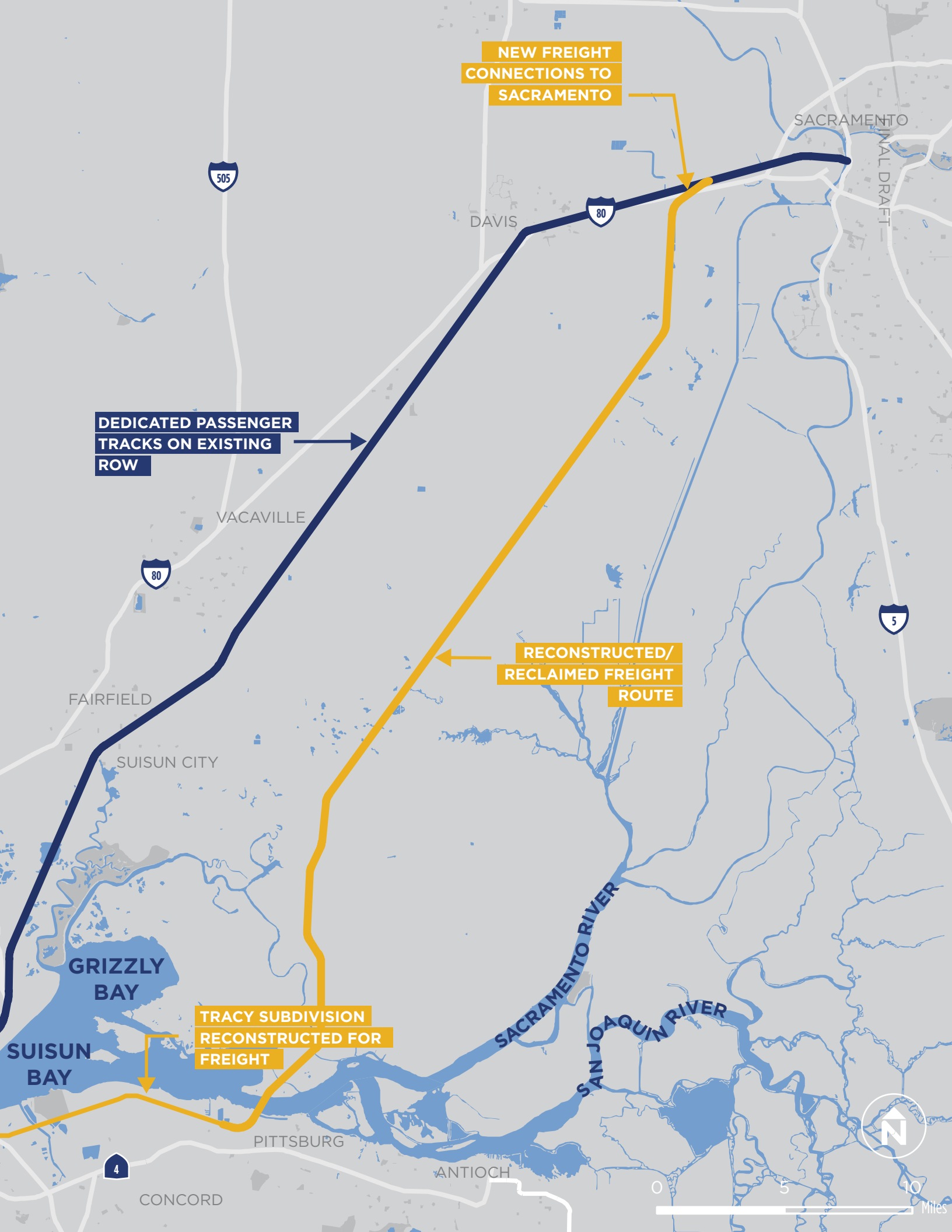
In this segment, unlike the circuitous and built-up segments to the south, high speeds could be achieved at relatively low cost – the existing right-of-way is nearly flat and remains straight over long stretches as it crosses the Central Valley. It also provides access to a series of cities within the I-80 corridor. However, it is shared with freight trains, limiting passenger capacity to the current 15 daily round-trips.

The solution, then, might be to make the existing alignment passenger-only by providing freight with an alternative right-of-way. Fortunately, while there is no existing parallel railroad, there is right-of-way remaining from an earlier railroad – the Sacramento Northern, on which freight trains operated until the 1960s. Much of the alignment still exists between Suisun Bay and the community of Saxon, 11 miles southwest of Sacramento. With connections via the Tracy Subdivision used by freight as well as Amtrak San Joaquin trains between Martinez and Pittsburg, a new Delta crossing just east of Suisun Bay, and new right-of-way connecting to the existing right-of-way in West Sacramento,a brand new freight railroad could be built in the Sacramento Northern right-of-way, as shown in the map on the following page.

Sacramento-Auburn

This segment was not evaluated as part of the Vision process, but was included in the VIP process described in the following pages.

SOURCE: JEREMIAH COX


NEW FREIGHT CONNECTIONS TO SACRAMENTO
SACRAMENTO
505
80
DAVIS
DEDICATED PASSENGER TRACKS ON EXISTING ROW
VACAVILLE
80
5
RECONSTRUCTED/ RECLAIMED FREIGHT ROUTE
FAIRFIELD
SUISUN CITY
GRIZZLY BAY
SUISUN BAY
TRACY SUBDIVISION RECONSTRUCTED FOR FREIGHT
SACRAMENTO RIVER
SAN JOAQUIN RIVER
PITTSBURG
4
ANTIOCH
CONCORD
N
0
5
10
Miles

HOW WAS THE VISION IMPLEMENTATION PLAN DEVELOPED?

As part of the Vision planning process, conceptual alternatives to achieve the Vision principles were identified.

In some segments, however, up to three alternatives remained at the end of the process. Additional, more detailed analysis was needed to narrow down the alternatives to define a single cost-effective and viable "initial study corridor" that could serve as a basis for future segment-level planning processes – the feasibility studies, alternatives analyses and environmental reviews required to advance recommended alternatives into final design and construction. In addition, a deeper assessment was needed of a variety of operational considerations, such as station modification and rolling stock needs. This was the primary purpose of the VIP. Analysis of benefits including ridership and economic impacts will occur in the next phase of the Vision process, the VCP.

The initial study corridor is briefly described in the following chapter, and is described in more detail in the appendices to this document. Below, the process for developing the initial study corridor is described. In short, the VIP was developed by "working backwards" from the ultimate vision, identifying steps along the way.

The process was driven by more detailed engineering analysis, informed by a collaborative planning process guided by a number of principles. These included the Vision service and physical design principles described earlier – the goals of faster, more frequent, more reliable, cleaner and quieter service, along with more seamless transit connectivity, level boarding and clockface

VISION ALTERNATIVES ADVANCED TO THE VIP

SAN JOSE-OAKLAND

- Coast Subdivision (Coast Alignment)
- Warm Springs Subdivision (Inland Alignment)
- Oakland Subdivision/Niles Cutoff Improvements (Hybrid Alignment)

JACK LONDON

- Embarcadero Trench/Berm
- 5th Street Subway/West Oakland Viaduct
- Downtown Oakland Tunnel

OAKLAND-RICHMOND

- Widen Existing ROW

RICHMOND-SUISUN/FAIRFIELD

- Improve Existing Alignment
- BNSF ROW/Franklin Canyon Tunnel

SUISUN/FAIRFIELD-SACRAMENTO

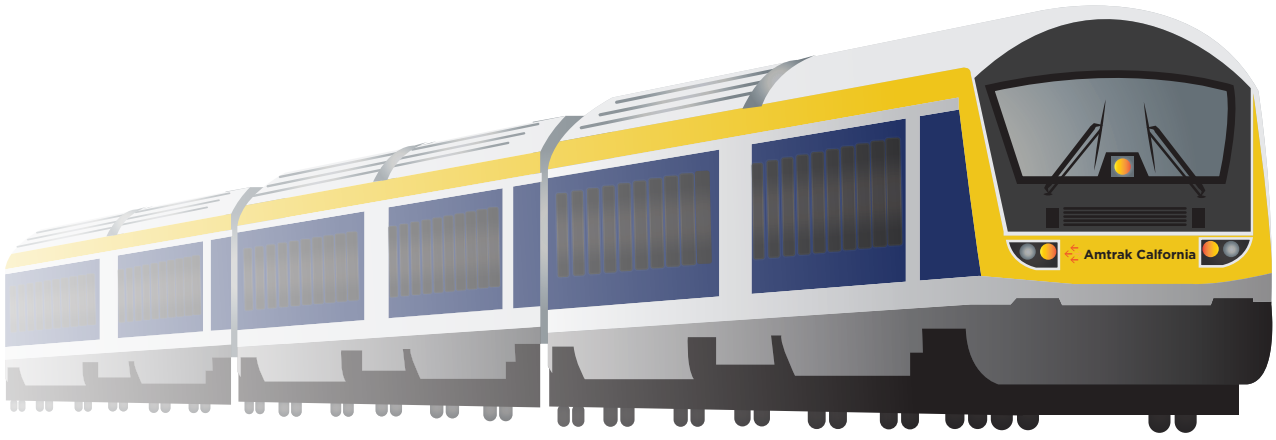
- Purchase Existing Alignment/ New Freight ROW

SACRAMENTO-AUBURN

- (to be evaluated in VIP)

headways. The decision-making process was also guided by cost concerns – as described later in this document, the recommendations would be relatively expensive, but costlier alternatives such as long segments of new, grade-separated right-of-way and extensive property takings were rejected as infeasible. In each segment, related improvements were developed for freight trains that would no longer share tracks with passenger service, in order to "keep freight whole" and, in so doing, support goods movement and the regional economy. Finally, protecting the corridor against future sea level rise was a core concern. *(One thing the VIP alternatives do not attempt to do is to make recommendations for other passenger rail operators. Separate design efforts will be needed to address connections with BART, high-speed rail and other systems, as well as future service on other commuter and intercity rail lines such as ACE and the Amtrak San Joaquin.)*

The actual decision-making process consisted of analysis by CCJPA staff and consultants of the Vision alternatives for each segment (and, in some cases, development of new alternatives based on new information – see the Jack London section in the next chapter), narrowing down of the alternatives to a single alternative in each segment, further design development to confirm the cost and engineering feasibility of the desired direction, and presentations of draft recommendations for each segment to an Ad Hoc Committee of the CCJPA Board. The entire process took about a year-and-a-half, and finally culminated in adoption of the initial study corridor by the full CCJPA Board in November 2016.



THE VISION IMPLEMENTATION PLAN

THE INITIAL STUDY CORRIDOR

The initial study corridor is a package of proposed capital improvements or construction projects that would allow Capitol Corridor service to, one day, operate in its own, electrified right-of-way at higher speeds and increased frequencies. While it defines a vision for the Capitol Corridor, it is not cast in stone – before any of the projects described in the following pages could proceed, a series of additional project-specific studies would need to be completed, studies that could take the Capitol Corridor in an entirely different direction. The initial study corridor itself could also change as part of future Vision Plan updates. Finally, negotiations with the UPRR could result in changes to plans.

However, the initial study corridor can provide a basis for these future planning and design efforts – in particular, for the projects envisioned for the segment between San Jose and Oakland, which are proposed to proceed within the next few years and replace the previous plan to make incremental improvements to the existing right-of-way in the segment.

The following corridor-level and segment-by-segment descriptions are focused on the passenger-only right-of-way; these are followed by descriptions of proposed improvements to freight rights-of-way. More detailed descriptions can be found in the appendices to this document.

Corridor

The following major improvements would be made in all segments between San Jose and Auburn:

- Electric train infrastructure would be added, including overhead wires and substations as well as new electric multiple unit (EMU) vehicles.
- Signaling systems would be upgraded to allow trains to safely run closer together.
- Curves would be straightened and grades leveled to enable faster speeds (up to 125 mph north of the Carquinez Strait, with lower maximums in the Bay Area).
- Existing stations would be retrofitted to provide high center-island platforms for level boarding, as well as other enhancements such as expanded access facilities (e.g., new bus bays).
- Grade separation of all at-grade intersections, to be planned and funded in collaboration with local partners (some minor intersections would be closed).

San Jose-Oakland

In this segment, the proposed Capitol Corridor right-of-way would consist of the Oakland Subdivision through East Oakland, the Coast Alignment from Oakland south to Santa Clara, and the existing Caltrain-owned alignment south to San Jose – essentially, Alternative A from the Vision Plan (see previous chapter). The Coast Subdivision north of Newark Junction is currently used by the Amtrak Coast Starlight, and is currently the primary southbound freight route out of the Port of Oakland. Most freight trains would be relocated to the Oakland and Niles Subdivisions (freight trains could continue to serve local destinations overnight), and improvements would be made for them there (as described in the following pages). The Coast alignment is more direct than the current alignment, and while it would bypass existing stations in Hayward and Fremont, it would retain service to the center of Silicon Valley, and allow for a new station near the Dumbarton Bridge, potentially with bus rapid transit connections to Palo Alto and nearby cities. It would serve as a western “express” alternative to the Oakland-San Jose BART line farther east, which will include more stops, and would provide a variety of timely connections to Silicon Valley job centers.

From south to north, major proposed improvements include:

- A new storage and maintenance facility near Tamien Station, south of Diridon Station and Downtown San Jose.
- Improvements to Diridon Station to allow it to serve as a high-capacity hub for Capitol Corridor, Caltrain, California High-Speed Rail and VTA light rail trains. These improvements would largely be funded by and take place as part of the CAHSR project and would include high platforms for level boarding of Capitol Corridor trains.
- Additional tracks in the segment shared with Caltrain and high-speed rail near Diridon, to accommodate more trains.
- Reconstruction of the existing stations in Santa Clara.
- Double-tracking of the existing single-track right-of-way through the Alviso Wetlands. This is an environmentally sensitive area, and the project would need to be carefully planned and carried out in collaboration with partners from various permitting agencies. As part of the project, the existing berm on which the Capitol Corridor's tracks run could be replaced by an open bridge, improving tidal flow and circulation, and the tracks could be raised, protecting against sea level rise.
- A new station at or near the Ardenwood Park-and-Ride Fremont/Newark border. The park-and-ride is served by Dumbarton Express bus routes to Menlo Park and Palo Alto, and SamTrans has recently proposed improvements to transit in the corridor including bus rapid transit service to Redwood City. Timed connections here could effectively extend the reach of the Capitol Corridor into San Mateo County and onto the San Francisco Peninsula.
- Double-tracking of remaining single-track segments north to Oakland.
- A new viaduct in the Oakland Subdivision right-of-way in East Oakland, adjacent to the existing BART viaduct, with a new intermodal Oakland Coliseum Station providing direct connections to both BART and the BART to OAK shuttle train to Oakland International Airport.

Shifting from the existing alignment to a mostly passenger-only Coast Subdivision, with most freight relocated to another right-of-way, would mean that trips would no longer have to begin or end in Oakland due to capacity constraints to the south. This would allow the Capitol Corridor to immediately increase service between Oakland and San Jose from seven to 15 daily round trips, equivalent to the current level of service between Sacramento and Oakland, or potentially more. For this reason, shifting to the Coast Subdivision is the first priority of this plan. Remaining projects to further increase capacity and speed in this segment are recommended to occur around the same time, as they would allow for fast, frequent service between Oakland, Newark, Santa Clara and San Jose as a complement to the BART service farther east. However, they could be completed later.

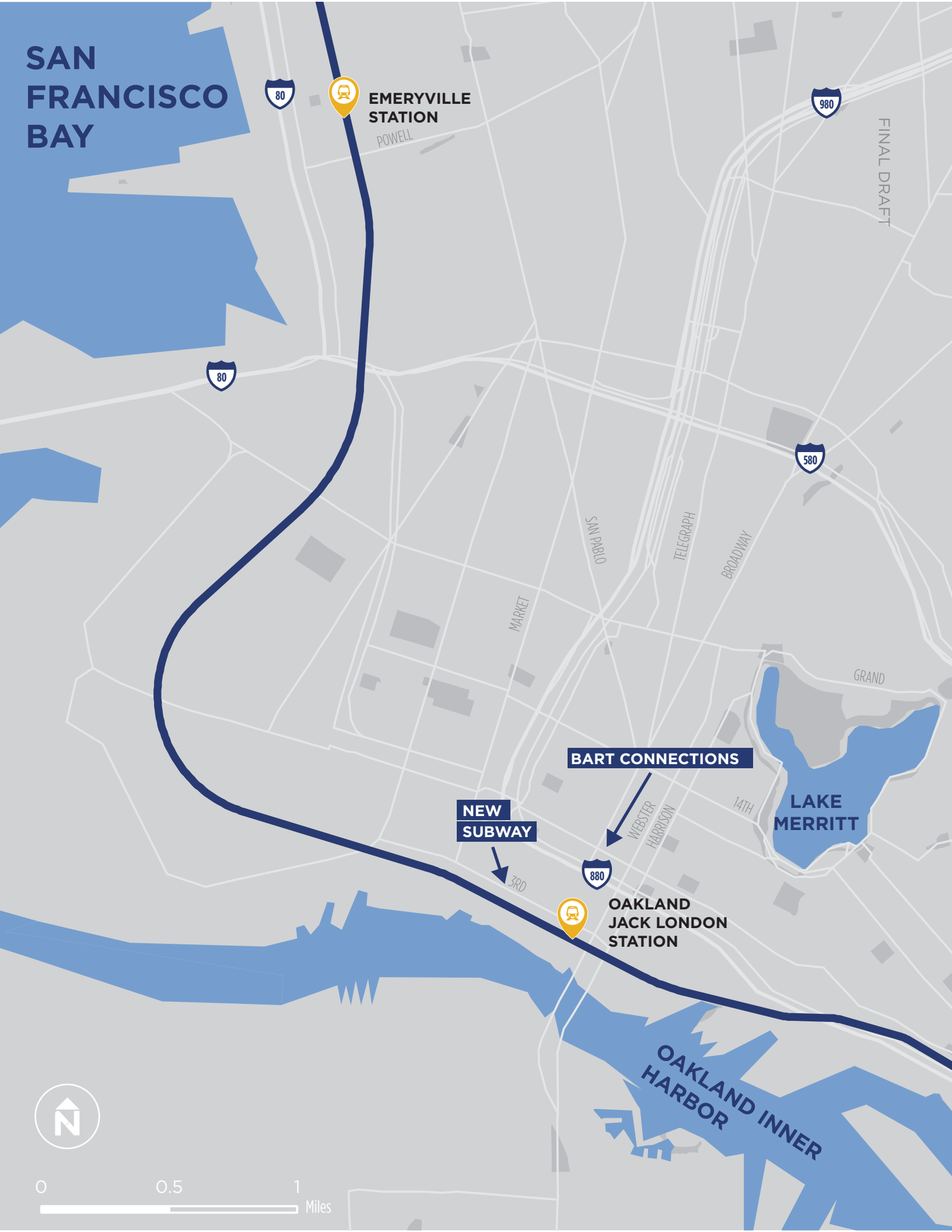

OAKLAND
DANVILLE
NEW VIADUCT
NEXT TO BART
ALAMEDA
OAKLAND
COLISEUM STATION
SAN LEANDRO
DUBLIN
HAYWARD
UNION CITY
BRT CONNECTION
TO PENINSULA
92
SAN FRANCISCO BAY
FREMONT/ NEWARK
STATION
FREMONT
NEWARK
880
NEW BRIDGE OVER
WETLANDS (REPLACES BERM)
84
PALO ALTO
MILPITAS
237
SANTA CLARA/ GREAT
AMERICA STATION
MOUNTAIN VIEW
680
SUNNYVALE
HIGH-SPEED RAIL
CONNECTIONS
SANTA CLARA/
UNIVERSITY STATION
280
SANTA CLARA
CUPERTINO
DIRIDON
STATION
SAN JOSE
TAMIEN STATION

Jack London

Jack London was identified during work planning for the VIP as an especially challenging segment that would require special attention, and an all-day workshop was held early in the VIP process with members of the project team as well as staff from the City of Oakland to review design concepts. The earlier Vision alternatives included a partial trench that would result in a raised berm along the Oakland waterfront; a short tunnel leading to a viaduct that might not be physically possible due to constraints, and would require property takings in West Oakland; and a long, expensive tunnel from East Oakland to Emeryville. Prior to the workshop, Caltrans staff provided the project team with construction drawings of the Posey and Webster Tubes. These drawings indicated that the upper segments of the Tubes serve as ventilation ducts and that the Tubes could be modified in order to allow for a deeper trench than previously thought possible – essentially, a tunnel completely below-grade with the exception of a short (two-block) segment in which street level would need to be raised a few feet The recommended improvements for this segment, then, consist of:

- A roughly half-mile passenger rail tunnel below 2nd Street, potentially accompanied by a freight rail tunnel below Embarcadero, thereby removing all trains from the street and from the surface (alternately, the passenger tunnel could be located between Embarcadero and 2nd, allowing the raised segment to be located off-street, where new buildings could be erected on top of it).
- A new subway station, ideally with a direct connection to a new BART station to be built as part of the second Transbay Tube project, which is now in early stages of planning (and could include standard-gauge tracks directly connecting to the Capitol Corridor to the north or south of Jack London, thereby allowing direct service to San Francisco; nothing in this plan would conflict with that). The location of this station would be dependent on the BART project. A connection to BART in Jack London would effectively extend the reach of the Capitol Corridor into San Francisco, and Downtown Oakland BART stations would be a short train ride away.

During the workshop, a number of non-rail but related projects were discussed, including the possibility of replacing the Posey and Webster Tubes with a pair of bridges over the Oakland Estuary (an auto-oriented extension of Adeline Street, along the edge of the Port of Oakland's Howard Terminal redevelopment site, and a transit- and pedestrian-oriented crossing at the foot of Broadway), thereby allowing the Jack London tunnels to be entirely below-grade.


SAN FRANCISCO BAY
80
EMERYVILLE STATION
POWELL
980
FINAL DRAFT
80
580
SAN PABLO
TELEGRAPH
BROADWAY
MARKET
GRAND
BART CONNECTIONS
NEW SUBWAY
WEBSTER
HARRISON
14TH
LAKE MERRITT
3RD
880
OAKLAND JACK LONDON STATION
OAKLAND INNER HARBOR
N
0
0.5
1
Miles

Oakland-Richmond

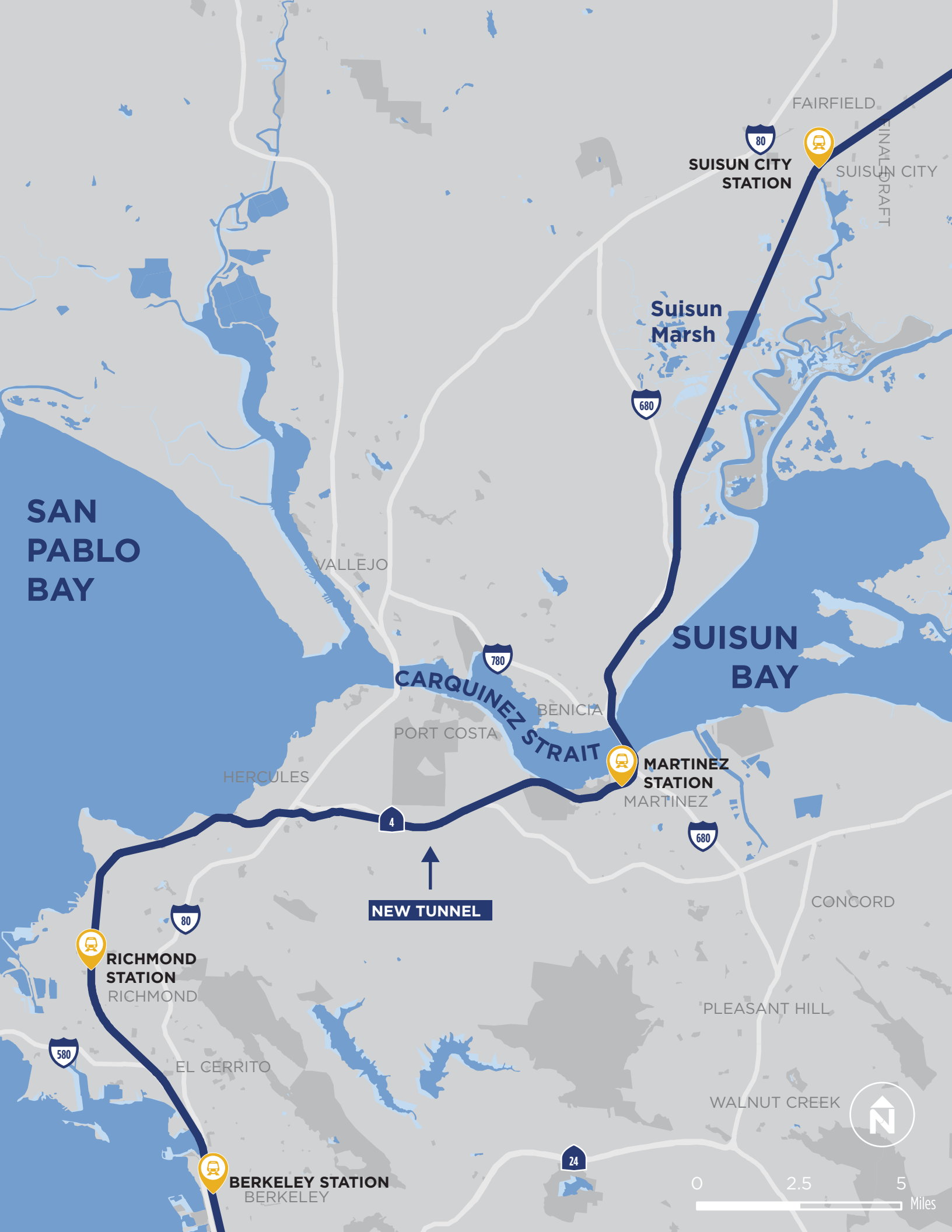
In this segment, the existing right-of-way would be expanded to accommodate new passenger-only tracks, as identified in the Vision Plan. The resulting capacity would be more than enough to accommodate the four trains per hour identified in the Vision Plan, and either the Capitol Corridor or another operator, such as BART, might provide additional service to the major employment and retail center of Emeryville (for example, a "short line" between Richmond and Oakland) as well as additional stops not served by the Capitol Corridor, such as a new stop near the University of California Richmond Field Station site. Existing stations would have to be rebuilt, including the existing hub for Capitol Corridor and other Amtrak trains at Emeryville.

Richmond-Suisun/Fairfield

In this segment, the earlier Vision Plan identified two alternative alignments: upgrades to the existing circuitous right-of-way along the shoreline of San Pablo Bay and the Carquinez Strait, or a new, more direct alignment featuring a five-mile tunnel in Franklin Canyon, between Hercules and Martinez. For the initial study corridor, the latter was selected – while it would cost more, it would reduce travel time by several minutes per trip (including trips on Amtrak San Joaquin and Coast Starlight trains, which share the Capitol Corridor right-of-way between Oakland and Martinez) and would avoid the environmental impacts associated with the shoreline alignment. This alignment would require partial use of an existing segment of BNSF right-of-way, new right-of-way alongside SR 4 and a new, elevated station on the Martinez waterfront.

The initial study corridor also includes a new, high-level crossing of the Carquinez Strait.

While a station at this location is not included in the initial study corridor, it would be possible to add a station at the existing Hercules Transit Center near the interchange of SR 4 and I-80.


FAIRFIELD
80
SUISUN CITY STATION
SUISUN CITY
FINLEY DRAFT
Suisun Marsh
680
SAN PABLO BAY
VALLEJO
780
CARQUINEZ STRAIT
SUISUN BAY
BENICIA
PORT COSTA
HERCULES
MARTINEZ STATION
MARTINEZ
4
680
NEW TUNNEL
CONCORD
80
RICHMOND STATION
RICHMOND
PLEASANT HILL
580
EL CERRITO
WALNUT CREEK
N
24
BERKELEY STATION
BERKELEY
0
2.5
5
Miles

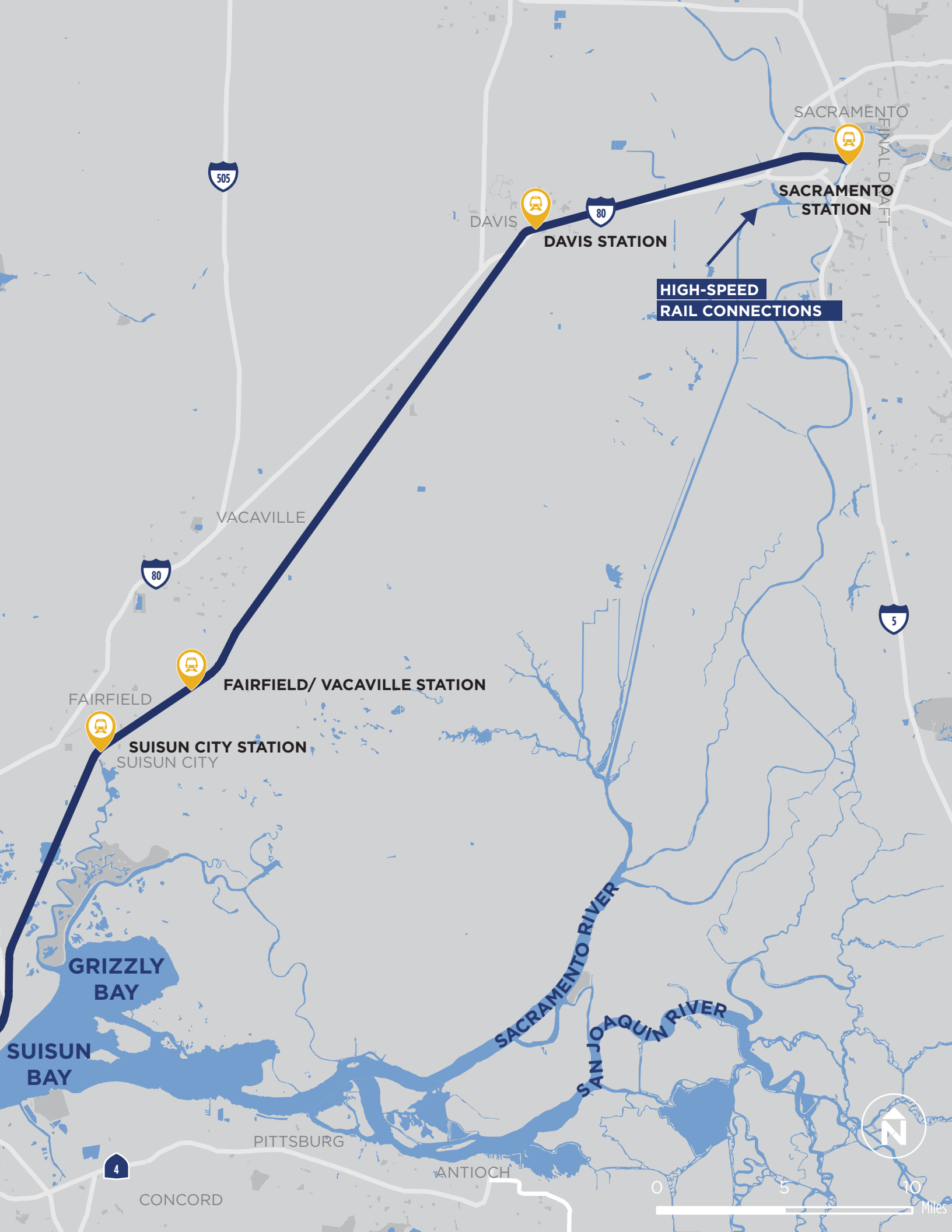
Suisun/Fairfield-Sacramento

In this segment, as in the segment between Oakland and Richmond, the Vision Plan identified a single alternative: passenger-only use of the existing right-of-way (the Martinez Subdivision), and construction of a new right-of-way for freight farther east (described in the following pages).

As part of the VIP, a new element was added in this segment: a possible tunnel under Downtown Sacramento, to be shared with and partly funded by California High-Speed Rail. The tunnel would connect to new underground platforms at Sacramento Valley Station, and would allow Capitol Corridor and high-speed trains to avoid both street crossings as well as elevated viaducts. In the interm, Capitol Corridor trains could continue to access the station across the I Street Bridge.

Sacramento-Auburn

This segment was not evaluated as part of the Vision Plan. However, the initial study corridor includes passenger-only right-of-way featuring additional tracks to further expand service levels beyond the expansion currently being implemented between Sacramento and Roseville. There would also be a new elevated station in Roseville. Between Roseville and Auburn, it includes new passenger-only tracks, potentially along an existing alternative alignment, as well as a new station in Rocklin and relocated station in Auburn.


SACRAMENTO
FINAL DRAFT
SACRAMENTO STATION
DAVIS
DAVIS STATION
HIGH-SPEED RAIL CONNECTIONS
505
80
VACAVILLE
80
5
FAIRFIELD/ VACAVILLE STATION
FAIRFIELD
SUISUN CITY STATION
SUISUN CITY
GRIZZLY BAY
SUISUN BAY
SACRAMENTO RIVER
SAN JOAQUIN RIVER
PITTSBURG
4
ANTIOCH
CONCORD
N
0
5
10
Miles

San Jose-Salinas

This segment is not currently part of the Capitol Corridor. However, the Transportation Authority of Monterey County (TAMC) has been planning for some time to establish new passenger rail service between Salinas and San Jose via Castroville, Pajaro/ Watsonville and the existing Caltrain right-of-way in southern Santa Clara County (Salinas is currently a stop on the Coast Starlight, but it served just once daily in each direction). As currently planned, this service would be initiated with two daily round trips, eventually expanding to six. Discussions have been held with the CCJPA Board of Directors about operating the service as part of the Capitol Corridor, but greater frequency between Oakland and San Jose would be needed to permit further extension of Capitol Corridor service to Salinas.

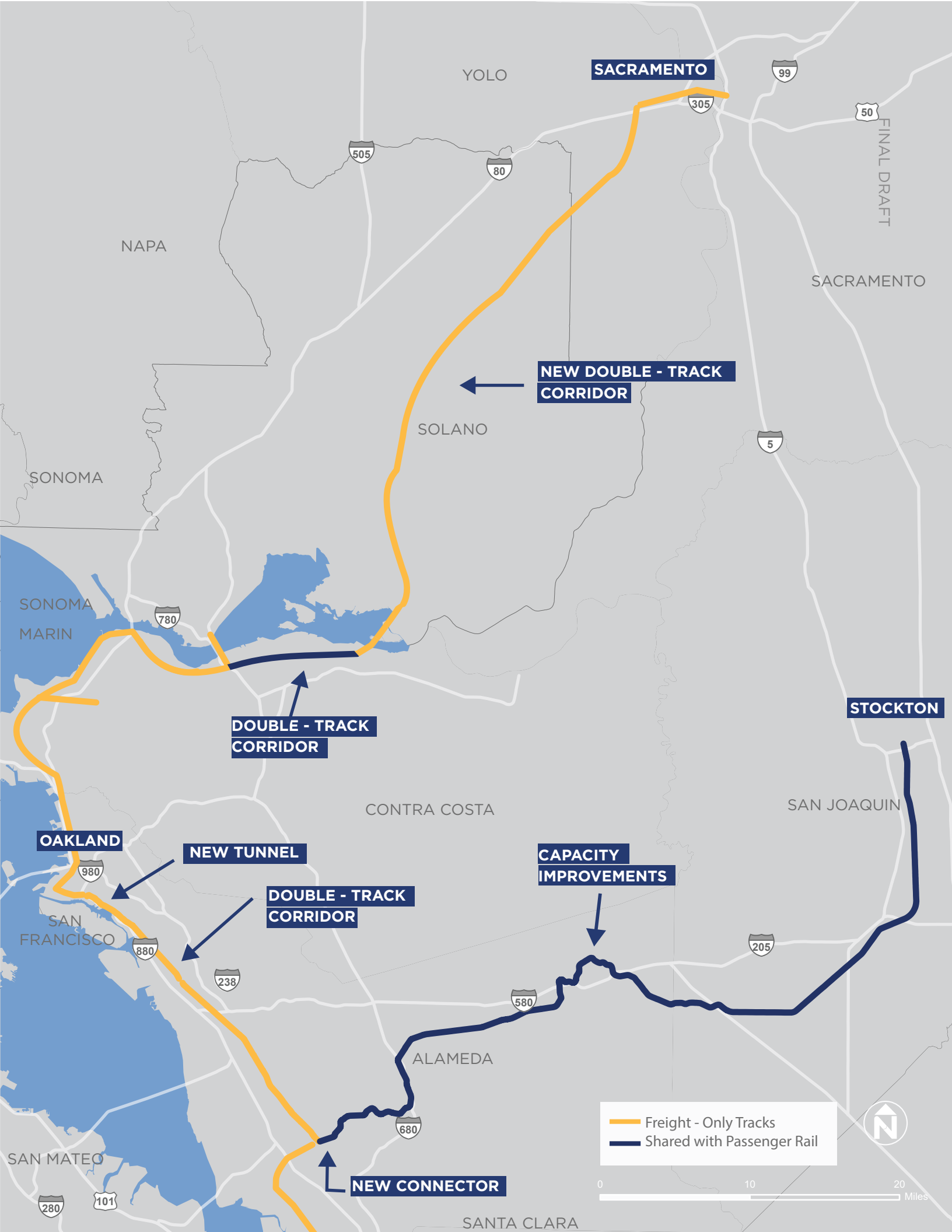
Freight Improvements

To provide passenger-only right-of-way extending from San Jose to Auburn, in the Sierra foothills, most freight trains would have to be relocated from two routes that they currently use: the Coast Subdivision and a short segment of the Oakland Subdivision between Newark and Oakland, and the Martinez Subdivision from Martinez to Sacramento (limited local access could be maintained using overnight operations and, in the case of the refineries in Benicia, via the existing Carquinez Strait drawbridge). In order to support goods movement and the regional economy by "keeping freight whole," the following improvements to alternative routes for freight trains traveling between the Port of Oakland and inland areas are recommended:

- Single-track segments of the Niles Subdivision between the Port of Oakland and Niles Junction would be double-tracked, and at-grade intersections would be grade-separated.
- A new, more direct connection between the Oakland and Niles Subdivisions would be added at Shinn, near Niles Junction.
- Sidings would be added to the east, between Niles Junction and Stockton, to further increase capacity.
- A new tunnel could be provided at Jack London, as described in the previous pages.
- Single-track segments of the Tracy Subdivision east of Martinez would be double-tracked.
- A new high-level crossing of the Delta east of Suisun Bay would be built.
- A new double-track railroad would be constructed in the former Sacramento Northern right-of-way between the Delta and the Martinez Subdivision just west of Sacramento.

Construction of a brand-new 42-mile railroad would be relatively expensive. If this proved infeasible, alternative improvements could be made to either the Tracy or Stockton Subdivisions used by the UPRR and BNSF, respectively. However, this would route freight trains well to the east, making freight trips between the Bay Area and Sacramento significantly longer.

Once these improvements are completed, the Port of Oakland will be served by two freight lines unencumbered by passenger trains.


SACRAMENTO
YOLO
99
305
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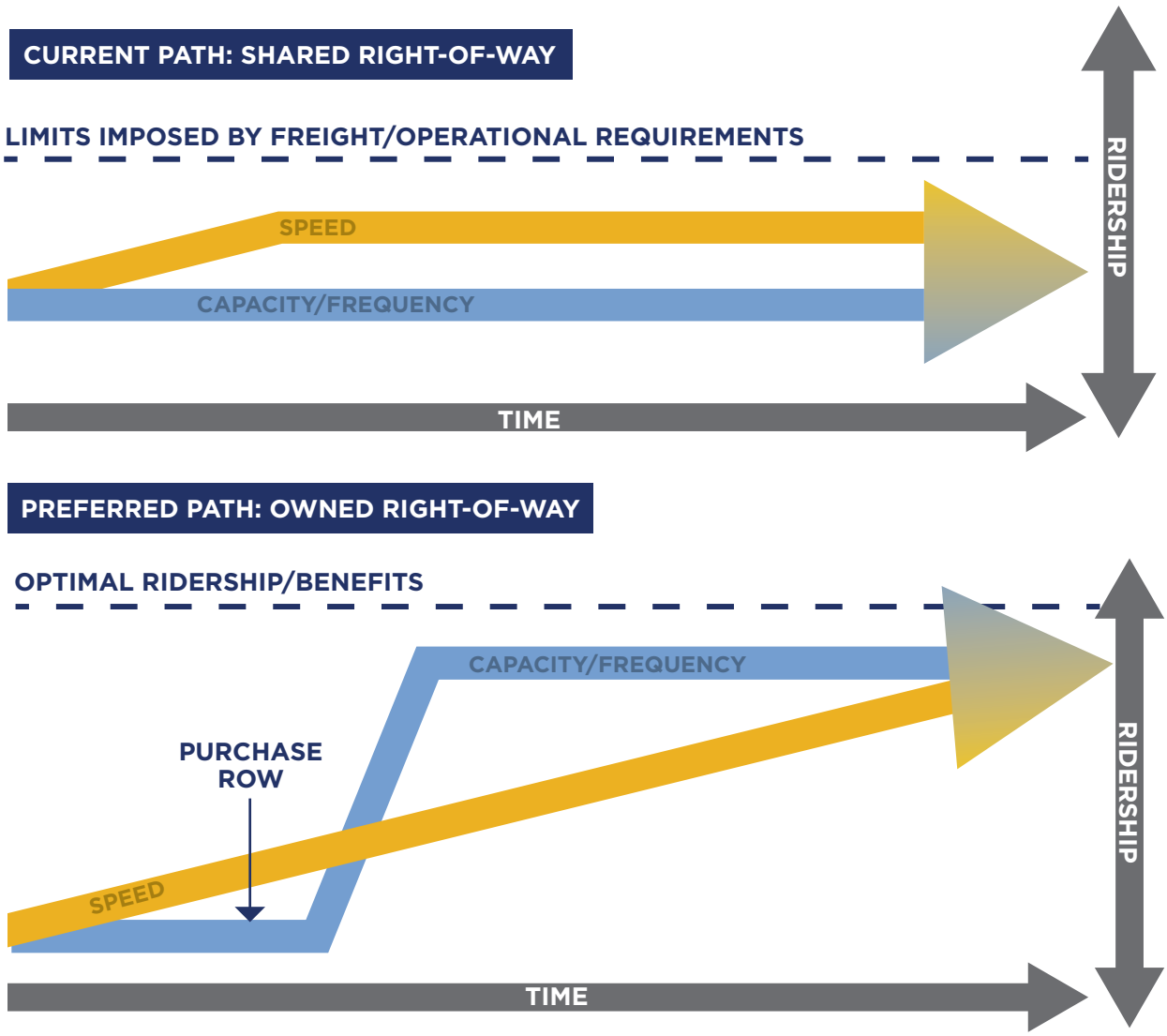
FINAL DRAFT
NAPA
SACRAMENTO
NEW DOUBLE - TRACK CORRIDOR
SOLANO
5
SONOMA
SONOMA
MARIN
780
DOUBLE - TRACK CORRIDOR
STOCKTON
CONTRA COSTA
SAN JOAQUIN
OAKLAND
NEW TUNNEL
980
CAPACITY IMPROVEMENTS
DOUBLE - TRACK CORRIDOR
SAN FRANCISCO
880
205
238
580
ALAMEDA
680
SAN MATEO
NEW CONNECTOR
280
101
SANTA CLARA
Freight - Only Tracks
Shared with Passenger Rail
N
0
10
20
Miles

Operating Plan

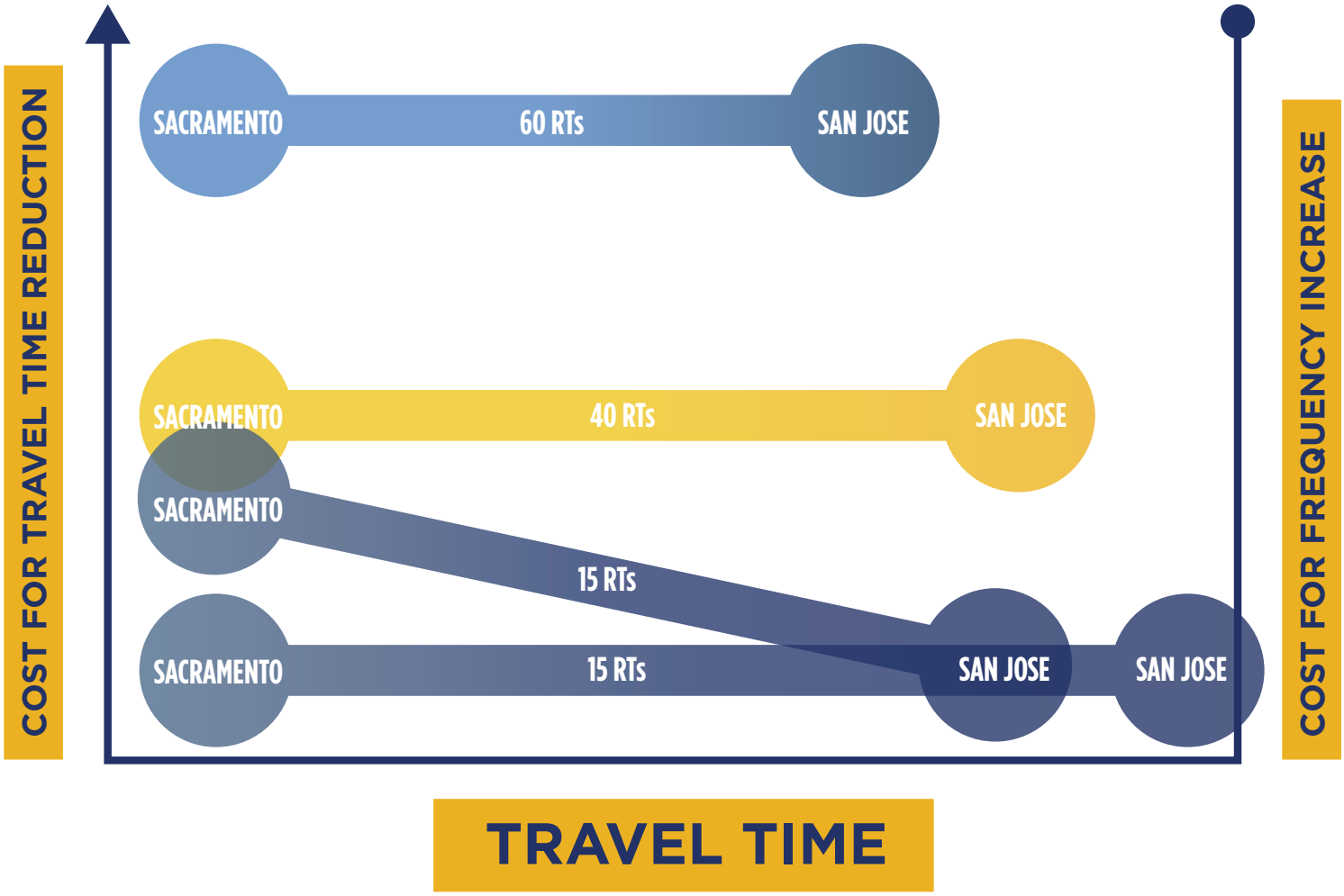
The Vision Plan called for much more frequent service than currently exists, and the improvements called for as part of the initial study corridor – including dedicated right-of-way for passenger rail service, free of conflicts with freight rail – would greatly increase the capacity of the Capitol Corridor to run more trains.

Many service configurations are possible, and the ultimate configuration of service will not be determined for some time. In planning for future service, however, we have assumed up to four trains per hour, or trains departing every 15 minutes during peak periods (rush hours). Two of these trains would be express trains making only the busiest stops (to be finalized through future analyses), while the other two would serve all stops. Outside of peak periods, all trains would make all stops. Service would run no less often than every hour from early in the morning until



late at night. In the interim, service could be increased in segments as additional capacity became available; for example, dedicated right-of-way between San Jose and Oakland would allow service levels to be increased there from seven to 15 round trips per day, matching existing service between Oakland and Sacramento.

In addition to being more frequent, future trains will be much faster. The chart on the following page shows estimated travel times between San Jose and Sacramento today and upon completion of the initial study corridor, for both local and express trains.



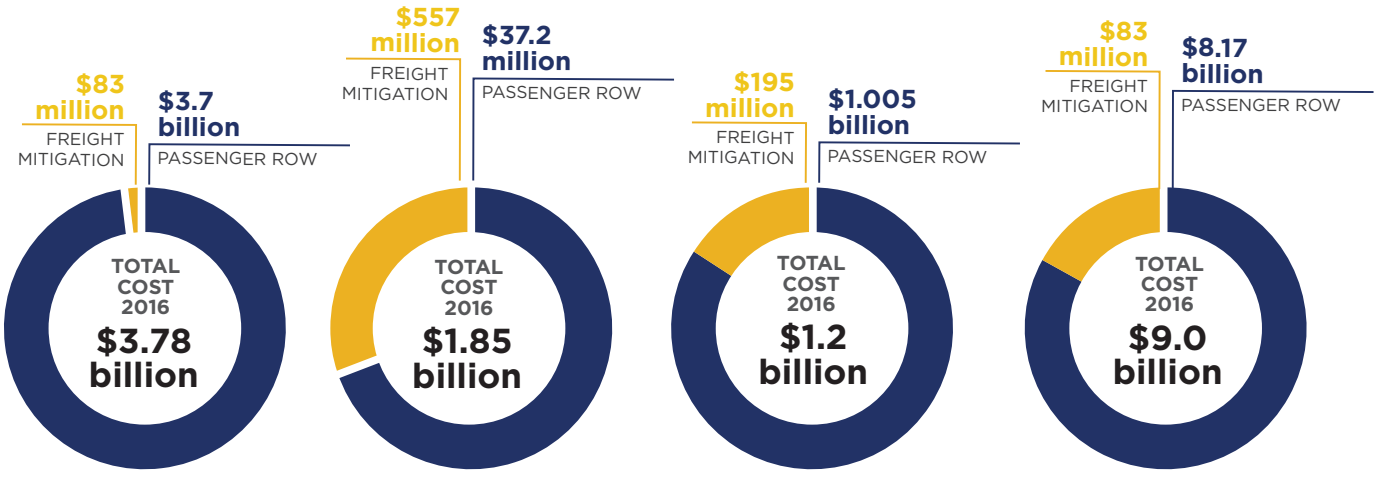
Project Prioritization

Due to its size, complexity and cost, the Vision Implementation Plan will take many decades to complete. For this reason, a strategy of incremental implementation of packages of related projects (primarily projects within each individual segments) has been developed. This strategy prioritizes packages of projects based on their ability to enable "early win" interim benefits and to "set the stage" for other projects. The prioritization strategy is shown on the following page. Note that improvements outside of the rail right-of-way such as grade separations and expanded stations could be completed on an incremental basis over the life of the project, providing accumulating benefits as they are implemented.

Costs and Funding

The Vision Implementation Plan will take many decades to fully implement. When thinking about costs, this is important to understand: It is a relatively expensive plan, but also one that would be funded and implemented over a period of decades. It is also important to understand that economic, ridership and other benefits have not yet been quantified (but will be quantified in the next phase of Vision work, as part of the Vision Communications Plan).

Estimated capital costs (in current dollars) for each phase are shown below. These estimates assume a contingency of 30 percent. They also include both "core" projects such as additional tracks, modified stations and new railcars as well as "related" projects such as grade separations. The proposed second phase of passenger improvements, between San Jose and Oakland, would cost approximately $3.8 billion.



PHASE 2:
San Jose- Oakland

PHASE 3:
Oakland - Richmond

PHASE 4:
Jack London

PHASE 5:
Richmond - Sacramento

By way of comparison, California High-Speed Rail between the Bay Area and the Los Angeles area is currently estimated to cost $68 billion, Los Angeles County voters recently approved a package of transportation improvements costing $120 billion, and a new Amtrak tunnel under the Hudson River between New York and New Jersey is currently estimated to cost $24 billion.

The appendix to this report includes a list of existing and potential funding sources that could be used to implement the Plan. It is important to understand, however, that the VIP is a long-term plan – and the funding framework for major transit capital projects has both evolved greatly over time, and continues to evolve, making future funding sources difficult to predict. State funding has declined, and federal funding from traditional sources (such as the FTA New Starts program) has declined even as other sources (such as TIGER grants) have emerged. One major trend of late has been the emergence of so-called "P3" public-private partnerships under which the private sector takes on some combination of design, construction, operation and maintenance, for a fee. Another nontraditional possibility is so-called "value capture" strategies in which profits from private development enabled by the project are taxed to fund construction, although situations in which value capture may be used are generally limited. The Vision Communications Plan will develop a strategy to support project implementation.

Priority	1	2	3	4	5	6
Projects Status/ Reason for Timing	Already have funding & approvals	Could greatly improve speed and frequency on part of line	Enable further improvements	Major projects that provide immediate benefits	Enable dedicated right-of-way, electrification	Extend dedicated right-of-way, electrification
Timeline	< 10 years	10-15 years	15-20 years	20-25 years	25-30 years	TBD
Passenger Projects	Sacramento-Roseville 3rd track	San Jose-Oakland improvements	Oakland-Richmond improvements	Oakland Jack London tunnel	Richmond-Sacramento improvements	Sacramento-Auburn improvements
Freight Projects		Oakland/Niles Connections	Oakland/Niles Double-track	Oakland Jack London tunnel	New Martinez-Sacramento right-of-way	

STEPS IN THE VISION PROCESS

Should we change the direction of the Capitol Corridor?

YES - We have reached the end of our current path, and conditions are changing

What should the Capitol Corridor of the future look like?

A high-speed feeder railroad built to modern global standards

Confirm that we should proceed

Confirm that this is achievable

Confirm that we should pursue this

Pursue the Vision of a capital and service improvement plan phased in over 30-40 years

WHAT'S NEXT?

The Capitol Corridor Board of Directors adopted the Vision Implementation Plan in November 2016. The next step in this process will be the Vision Communications Plan, or VCP, which will have the following primary purposes:

- To develop a more detailed analysis of potential economic and other benefits, including more detailed ridership estimates; and
- To share the initial study corridor with community and agency partners, get feedback, and start to build consensus.

The VCP will take the final, critical steps necessary to define the value of and justify the investment described in the VIP.

VISION IMPLEMENTATION PLAN APPENDICES

1 INITIAL STUDY CORRIDOR

The Capitol Corridor Vision Plan identified three potential corridors through which a dedicated passenger-only rail system is potentially feasible. The VIP selected and analyzed the corridor that appeared to best achieve the goals of the Vision Plan at this point in time. Further alternative analyses and environmental assessment is required before a locally preferred alternative can be selected.

The initial study corridor (ISC) primarily follows the UPRR Coast, Martinez, and Roseville Subdivisions between San Jose and Auburn. The ISC was divided into three distinct service areas: San Jose to Oakland, Oakland to Sacramento, and Sacramento to Auburn. A future service to Monterey County is currently being considered, but was not included in the scope of this study. The service areas were subsequently divided into geographic segments that allow incremental service and speed increases as projects are completed within each geographic area. The service areas and geographic segments are described below.

SERVICE AREAS

San Jose to Oakland Service Area

The CCJPA currently operates seven round trips daily between San Jose and Oakland on portions of Caltrain and the UPRR's Coast and Niles Subdivisions (see Figure 1-1). The VIP routes Capitol Corridor trains off of the Niles Subdivision onto the Coast Subdivision between Newark and Oakland. The service area of this portion of Capitol Corridor is approximately 43 miles long and is sub-divided into four distinct geographic segments as follows:

- **San Jose to CP Coast (SJ-CPC):** The San Jose to Control Point (CP) Coast segment begins in the vicinity of the existing Caltrain Tamien layover facility (MP 49.5) on the Coast Subdivision and extends north approximately 4.8 miles to CP Coast (MP 44.7). This segment, owned and operated by Caltrain, includes Caltrain's Tamien, Diridon, College Park, and Santa Clara Stations. Capitol Corridor trains currently stop at Diridon and Santa Clara Stations. If CCJPA constructs a new layover facility south of Tamien, Capitol Corridor trains could potentially stop at Taniem in the future.
- **CP Coast to Newark (CPC-NWK):** The Capitol Corridor line continues northward from CP Coast on UPRR's Coast Subdivision 13.7 miles to Newark Junction (MP 31.0). The primarily single-track line crosses through Alviso Salt Flats. Capitol Corridor's Santa Clara Great American Station (MP 40.8) is located in this segment, and a proposed Fremont/Newark Station near the Dumbarton Bridge allowing for intermodal connections.

Figure 1-1 San Jose to Oakland Service Area

- **Newark to Oakland (NWK-OAK):** At Newark the Capitol Corridor line continues north on the Coast Subdivision to Elmhurst Junction (MP 13.5) where it crosses over the UPRR Niles Subdivision and joins the UPRR Oakland Subdivision. The line parallels the Oakland Subdivision for 3.3 miles and the Niles Subdivision for 3.4 miles to just south of Jack London Square in Oakland. The primarily single-track segment to Elmhurst Junction is approximately 24.2 miles in length. Capitol Corridor's Oakland Coliseum Station (MP 12.0), is relocated from the Niles Subdivision adjacent to the BART station.
- **Jack London Square (JLS)**: The Jack London Square segment is located between the UPRR's East (MP 7.7) and West Oakland (MP 6.4) rail yards on the Niles Subdivision and is 1.3 miles in length. The segment also includes approximately 1,600 feet of in-street double main track on Embarcadero Boulevard. Capitol Corridor's Jack London Station (MP 6.8) is located in this segment.

Oakland to Sacramento Service Area

The CCJPA currently operates fifteen round trips daily between Oakland and Sacramento on the UPRR's Martinez Subdivision. In addition to the Capitol Corridor service, Amtrak operates once daily Coast Starlight and California Zephyr long distance passenger trains between Oakland and Sacramento and the five daily round trips of the San Joaquins service between Oakland and Richmond for a total of 44 passenger trains a day.

With the VIP, Capitol Corridor trains continue on the existing route as shown in Figure 1-2, but includes a Franklyn Canyon bypass alignment to avoid coastal areas between Richmond and Martinez. The service area is approximately 88 miles long and is divided into three distinct geographic segments as follows:

Figure 1-2 Oakland to Sacramento Service Area

- **Oakland to North Richmond (OAK-RCH):** From UPRR's West Oakland rail yard, the Capitol Corridor line continues north on the UPRR's Niles and Martinez Subdivisions from Niles MP 6.4 to Martinez MP 15.6 just north of Richmond, approximately 16 miles. Capitol Corridor's Emeryville (MP 4.4), Berkley (MP 6.3), and Richmond (MP 12.2) Stations are located in this segment.
- **North Richmond to Benicia (RCH-BEN):** At this point the line diverges from the UPRR right-of-way onto the proposed Franklyn Canyon Bypass. The Capitol Corridor line parallels the BNSF Stockton Subdivision for approximately 5.8 miles to Franklin Canyon where the line enters a new tunnel alignment to Martinez. The bypass is approximately 6.8 miles in length and includes approximately 5.2 miles of twin bore tunnels. The line rejoins the UPRR Martinez Subdivision (MP 30.0) and continues north across the Carquinez Strait to Benicia (MP 35.0). Capitol Corridor's Martinez Station (MP 31.6) is located in this segment. The segment also includes a potential future station adjacent to Hwy 80/ Hwy 4 in the City of Hercules.
- **Benicia to Sacramento (BEN-SAC):** From Benicia, the Capitol Corridor line continues northeast for 53.8 miles to Sacramento (MP 88.8). Capitol Corridor's Suisun (MP 48.9), Davis (MP 75.5), and Sacramento (MP 88.8) Stations are located in this segment, and a station at Fairfield-Vacaville (MP 53.9) is planned.

Sacramento to Auburn Service Area

The CCJPA currently operates one daily round trip between Sacramento and Auburn on UPRR's Martinez and Roseville Subdivisions. In addition to the Capitol Corridor service, Amtrak operates daily Coast Starlight and California Zephyr long distance passenger trains over portions of this line. The VIP continues to route Capitol Corridor trains on the existing rail alignment between Sacramento and Roseville (see Figure 1-3). East of Roseville, the Capitol Corridor trains use the Mainline No.1 (westbound) alignment to Auburn instead of the Mainline No.2 eastbound alignment as it currently does. The service area is approximately 35 miles long and is divided into two distinct geographic segments as follows:

- **Sacramento to Roseville (SAC-ROS):** From the Sacramento Station (MP 88.8) the Capitol Corridor line continues 17.6 miles east on the Martinez Subdivision to Roseville Station (MP 106.4). Capitol Corridor's Roseville Station (MP 106.4) is located in this segment.
- **Roseville to Auburn (ROS-AUB):** From Roseville (MP 106.4) the line continues on the Roseville Subdivision's Mainline No. 1 to Auburn (MP 124.0), approximately 17.6 miles. Capitol Corridor's Rocklin (MP 109.2) and Auburn (MP 124.0) Stations are located in this segment.

Figure 1-3 Sacramento to Auburn Service Area

EVALUATION CRITERIA

Service Criteria

The VIP envisions a modern passenger service along the I-80/I-880 freeway corridor designed to provide at a minimum:

- Safe and reliable operations;
- Environmentally sustainable operations (carbon neutral to positive);
- Competitive travels times with automobiles;
- High frequency of service to regions employment and residential centers; and
- Modal connectivity to regions transit systems.

The rail service criteria used in this study was modeled after international passenger systems and includes:

- Dedicated passenger-only tracks on either:
  - Separated rights-of-way wherever practical, or
  - Shared corridors with freight on separate tracks in congested urban areas.
- Use of existing rights-of-way to the extent possible to minimize property acquisitions and environmental impacts.
- Speeds competitive with automobile travel
  - Travel times between stations competitive with automobiles
  - Higher top speeds (90 mph - 125 mph) depending on physical constraints within the line segment.
- Service levels based on:
  - AM/PM peak frequency every 15 minutes
  - Off-peak frequency every 30 minutes
  - Express service between major city centers
  - Limited shuttle service between major employment centers
  - Extended service hours from 5:00 AM to 12:00 PM
- Modal connectivity
  - Timed transfers at major intermodal centers
  - Direct transfers (cross platform where possible) to regional transit systems
- Beneficial uses of proposed improvements, including sea level rise protection and tidelands restoration/preservation

Design Criteria

Conceptual corridor alignment plans were prepared based on the following design criteria:

- Operations up to 125 mph: AREMA Manual for Railway Engineering dated 2015.

RECOMMENDED CAPITAL IMPROVEMENTS

In order to achieve the service goals and objectives of the Vision Plan, a long-term program of capital improvements and right-of-way acquisitions was developed for each geographic segment within the three service areas. Corridor alignment drawings were developed (See Appendix VII Corridor Alignment

Drawings) to verify the feasibility of the proposed improvements and identify potential right-of-way impacts. The drawings were based on available aerial images and are at an early conceptual design level (5%-10%). Table I-1 summarizes the proposed improvements needed to achieve the vision of a dedicated passenger system for the region. The following is a brief description of the proposed improvements by geographic segment, starting in San Jose heading northeast to Auburn.

San Jose to CP Coast

- **San Jose to Santa Clara Phase 3 & 4 Track Improvements:** This Caltrain-led project provides a new 4th main track between Diridon Station and CP Coast. The project also modifies the north and south leads into the station to allow for parallel train movements into and out of the station. The addition of high speed rail service to Diridon Station by 2025 may require modifications to the proposed design, additional platforms at Diridon Station, and a fifth main track between San Jose and CP Coast. The California High Speed Rail Authority (CHSRA) is currently analyzing this segment as part of the San Jose to Merced NEPA/CEQA environmental assessment.

CP Coast to Newark

- **Right-of-Way Acquisition:** Within this segment a 35-foot to 45-foot strip of right-of-way is acquired from the UPRR's Coast Subdivision and adjoining public and private properties between CP Coast (MP 44.6) and Newark Junction (MP 31.0). A wider 60-foot to 80-foot strip of right-of-way is proposed across the Alviso Salt Flats to allow the track to be raised to protect against sea level rise, provide for habitat enhancements, and improve sediment transport through restored tidal and alluvial flow.
- **Double Track CP Coast to Newark:** Between CP Coast and Newark 14.5 miles of new passenger double main track is constructed including a new 6,000 foot bridge across the Alviso Salt Flats to improve sediment transport to the existing tidelands. The Santa Clara Great America Station is expanded to include a center platform and improved connectivity to the planned Santa Clara City Place development. The existing UPRR main track remains in place or is shifted as required to allow construction of the passenger double track within a shared corridor.
- **Grade Separations:** The project provides for the construction of seven new grade separations, closure of two crossings, and safety enhancements to the two remaining crossings. These improvements create a sealed rail corridor, improve safety, reduce traffic congestion, and significantly reduce train horn noise.
- **Newark "East Bay" Intermodal Station:** In the vicinity of Newark Junction, a new multi-modal station is proposed. The station would include a park-and-ride facility and connections to potential Dumbarton bus rapid transit or commuter rail services under consideration by Caltrain. The location of the station is not yet determined.

Newark to Oakland

- **Right-of-Way Acquisition**: This project creates a passenger only corridor between Newark and Oakland. Right-of way requirements within this segment include acquisition of:
  - 19.5 miles of Coast Subdivision between Elmhurst Junction (MP 13.5) and Newark (MP 33.0);
  - 3 miles of the Oakland Subdivision between MP10.3 and MP13.3; and
  - 60-foot strip of the Niles Subdivision along the east edge of the East Oakland rail yard (MP 8.5 to MP 7.5) to the Lake Merritt Outlet.

- **Double Track Newark to Oakland:** The project constructs 19.5 miles of a new second main track between Newark and Elmhurst Junctions. The project also rehabilitates the existing main track and installs new concrete ties and rail.
- **Elevated Guideway along Oakland Subdivision**: The project creates 5 miles of elevated double-track guideway adjacent to BART on the Oakland Subdivision, and includes a rail grade separation over the UPRR Niles Subdivision and 1 mile of new double track along the East Oakland Yard from Elmhurst Junction to Lake Merritt Outlet.
- **Oakland Coliseum Intermodal Station**: The project constructs a new elevated passenger station adjacent to the BART station with cross platform connections to BART and the Airport Connector.
- **Grade Separations:** The project provides for the construction of 15 new grade separations and the closure of the five remaining crossings in this segment. This creates a sealed rail corridor, improves safety, reduces traffic congestion, and significantly reduces train horn noise.

Jack London Square (JLS)

- **Jack London Square Tunnel and Underground Station:** The project constructs a cut-and-cover subway tunnel within the 2nd Street right-of-way between Lake Merritt Outlet and Market Street. The project envisions modifications to the upper section of the Posey and Webster tubes that allow the track to pass over the tubes at a lower elevation than without the modifications. A new underground Jack London Square Station between Washington and Franklin Streets is included as part of this project, including a potential connection with a future BART second bay tube crossing. An alternative design shifts the alignment into the block between Embarcadero and 2nd Street. Refer to Technical Appendix III: "Jack London Square Alternatives Evaluation" for more information.

Oakland to North Richmond

- **Right-of-Way Acquisition:** Within this segment a 35-foot to 45-foot strip of right-of-way between MP 6.0 (Niles) and MP 13.0 (Martinez) is acquired from the UPRR as well as limited 10-foot to 30-foot strips of adjoining property to create a shared rail corridor with separate freight and passenger tracks.
- **Oakland Yard Passenger Bypass:** The project constructs new freight main tracks adjacent to existing main tracks between the UPRR Desert and West Oakland Yards. The two existing UPRR main tracks are converted to passenger only use.
- **Double Track Oakland to North Richmond:** The project shifts the existing UP double track to the west side of the right-of-way and constructs a new passenger double track within the existing corridor.
- **Grade Separations:** The project constructs 6 new grade separations and proposes to close ten existing crossings through the cities of Emeryville, Berkley, and Richmond. This creates a sealed rail corridor, improves safety, reduces traffic congestion, and significantly reduces train horn noise.
- **Station Modifications:** The project modifies the Emeryville, Berkley, and Richmond stations to accommodate the new track alignment and center platform configurations.

North Richmond to Benicia

- **Right-of-Way Acquisition:** Within this segment a 35-foot to 45-foot strip of right-of-way along BNSF and I-4 is acquired, including an easement for a 5.2-mile tunnel between Pinole and Martinez for the Franklin Canyon Bypass.
- **Franklin Canyon Bypass:** The project constructs 12.6 miles of new double-track passenger line paralleling BNSF/I-4, as well as a 5.2-mile twin-bore tunnel. The project also includes an Atlas Road grade separation and a potential new Hercules Station adjacent to an I-4 park-and-ride lot.
- **Carquinez Strait High Level Bridge:** The project constructs a new high-level double-track passenger bridge between Martinez and Benicia, including a segment of elevated guideway through Martinez within the existing right-of-way.
- **Martinez Station:** The project constructs a new elevated station at the existing station site as part of the elevated guideway through Martinez and includes a new parking structure.

Benicia to Sacramento

- **Right-of-Way Acquisition:** Within this segment, the Project acquires the UPRR Martinez Subdivision from MP 34.2 to MP 89.0 for passenger-only service.
- **Rail and Tie Replacement:** The project upgrades the existing track to Class-7 track standards (125 mph) and includes the replacement of all timber crossties with concrete ties.
- **Grade Separations:** The project constructs 17 grade separations and proposes closing the seven remaining existing at-grade crossings to create a sealed rail corridor.
- **Station Modifications:** The project modifies the Suisun, Fairfield-Vacaville, and Davis stations to accommodate a new center platform design and level boarding.

Sacramento to Roseville

- **Right-of-Way Acquisition:** Within this segment, a 45-foot to 60-foot strip of right-of-way between MP 91.0 and MP 106.4 on the Martinez Subdivision is acquired from the UPRR. Acquisition of 10-foot to 30-foot strips of property outside of the existing right-of-way are also required in limited areas in order to create a shared corridor.
- **New Third Main Track:** The project constructs a new third main track within UPRR right-of-way between Sacramento and Roseville that includes a crossing of the American River, improvements at Roseville Station, and a new layover facility in Roseville.
- **Second Passenger Main Track:** The project constructs a second passenger-only track between Sacramento and Roseville once the dedicated passenger right-of way is acquired. Once completed the corridor will have four main tracks (2-Passenger + 2-Freight) with space to add a third freight track.

Roseville to Auburn

- **Right-of-Way Acquisition:** Within this segment, a 30-foot to 45-foot strip of right-of-way between MP 106.4 and MP 124.0 is acquired on the UPRR Roseville Subdivision westbound route. Acquisition of 10-foot to 30-foot strips of additional right-of-way will also be required in limited areas in order to create a shared corridor.
- **Passenger Main Track:** The project constructs a new passenger-only main track, including an elevated guideway over the Valley Subdivision in Roseville to create a shared rail corridor.

- **Grade Separations:** The project proposes to construct nine grade separations between Roseville and Auburn.
- **Station Modifications:** The project constructs a new elevated station in Roseville, modifies the existing Rocklin Station, and constructs a new at-grade station in Auburn to accommodate a new track and center platform configuration. Note that the change in grade between the passenger tracks over the Valley Subdivision results in the need for the Roseville station to be elevated or potentially relocated.

Systemwide Improvements

- **Incremental Speed Increases:** The VIP proposes a series of smaller projects to incrementally increase passenger speeds to 90 mph between San Jose and Benicia and to 110 mph between Benicia and Sacramento prior to electrification. Speed improvements correspond to service improvements.
- **San Jose – Sacramento Electrification:** The project electrifies the corridor between San Jose and Sacramento to allow for 125 mph operations.
- **Purchase EMU Trainsets:** The project purchases 24 electric multiple unit (EMU) trainsets each capable of speeds of 125 mph or greater.
- **Station Platform Modifications:** The project modifies all existing platforms to provide for Systemwide level boarding.
- **CMOF:** Project constructs a new Control/Maintenance/Operations Facility (CMOF) to maintain high speed trainsets.

Table 1-1 Recommended Vision Capital Improvement Program

Service Area	Line Segment	Project	Lead Agency	Description	Purpose	Priority Justification
San Jose - Oakland	SJ-CPC	San Jose to Santa Clara Phase 3 & 4 Track Improvements	PCJPB/ CHSRA	Add 2.5 miles of new main track and reconfigure Diridon Station leads.	Provide increased capacity to serve expanded Caltrain, Capitol Corridor, and ACE services. Work partially funded by CCJPA.	Improvements partially funded by CCJPA
	CPC-NWK	Right-of-Way Acquisition	CCJPA/ACE	Acquire dedicated right-of-way including a 45'-60' strip between CP Coast (MP 44.6) and Great America, 60'-80' strip across the Alviso Salt Flats to Newark Junction (MP 31.0).	Provide a dedicated passenger only right-of-way.	Allows at least 15 round trips to San Jose; support ACE expansion plans
		Double Track CP Coast to Newark	CCJPA/ACE	Construct 14.5 miles of new double main track between CP Coast and Newark. Add center platform at Santa Clara Great American Station	Provide track capacity to support 15 minute service headways and to protect against sea level rise between San Jose and Oakland.	Allows at least15 round trips to San Jose
		Grade Separations	CCJPA/ACTC/ACE	Construct 7 new grade separations	Long term program to improve safety and reduce traffic impacts caused by at-grade crossings.	Grouped as priority 2 project.
		Newark Intermodal Station	CCJPA/ACE	Construct new multi modal Station at Newark including connection to Dumbarton Bridge Crossing to Redwood City	Replaces Union City and Fremont Stations and provides for connection to future Caltrain service to Between Union City and Redwood City.	Required when service is shifted to Coast line.
	NWK-OAK	Right-of-Way Acquisition	CCJPA/ACTC	Acquire 19.5 miles of Coast Subdivision between Elmhurst Jct. (MP 13.5) and Newark (MP 33.0). Acquire 3 miles of the Oakland Subdivision between MP10.3 and MP13.3, and a 60-ft Strip of the Niles Subdivision along the east edge of the East Oakland rail yard (MP 8.5 to MP 7.5).	Provide a dedicated passenger only right-of-way.	Allows at least 15 round trips to San Jose; support ACE expansion plans
		Newark to Oakland Second Main	CCJPA	Construct 19.5 miles of new second main track between Newark and Elmhurst Junctions. Replace existing main track timber ties with new concrete ties between Newark and Oakland.	Provide track capacity to support 15 minute service headways between San Jose and Oakland.	Allows at least 15 round trips to San Jose; support ACE expansion plans
		Elevated Guideway along Oakland Subdivision	CCJPA	Construct 5 miles of elevated double track guideway on Oakland Subdivision adjacent to BART and 1 mile of new double track along the East Oakland Yard from Elmhurst Junction to Lake Merritt Outlet.	Eliminate at-grade crossing conflicts and improve intermodal connectivity at BART Coliseum Station.	Dependent on funding availability, can slip to priority 3 or 4.
		Grade Separations	City/CCJPA/ ACTC	Construct 15 grade separations	Long term program to improve safety and reduce traffic impacts caused by at-grade crossings.	Grouped as priority 2 project.
		Oakland Coliseum Intermodal Station	CCJPA	Construct new passenger Station adjacent to the BART Station including cross platform connections.	Improve modal connectivity.	Dependent on funding availability, can slip to priority 3 or 4.
		Oakland Subdivision Acquisition	ACTC	Acquire 10.7 miles of Oakland Subdivision from MP 13.3 to MP 24.0.	Provide right-of-way for Eastbay Greenway Trail and to reconnect neighborhoods	If funding is available can be advanced to priority 1 or 2.
	JLS	Jack London Square Tunnel and Underground Station	City of Oakland/ CCJPA	Construct subway tunnel between Lake Merritt Outlet and Market Street along 2nd Ave and new underground Jack London Station between Washington and Franklin Streets.	Provide track capacity to support 15 minute service headways. Improve safety and reduce traffic impacts caused by at-grade crossings.	If funding is available can be advanced to priority 2 or 3.

Table 1-2 Recommended Vision Capital Improvement Program (continued)

Service Area	Line Segment	Project	Lead Agency	Description	Purpose	Priority Justification
Oakland - Sacramento	OAK-RCH	Right-of-Way Acquisition	CCJPA	Acquire dedicated 45'-60' right-of-way between MP 6.0 (Niles) and MP 13.0 (Martinez). Acquisition of 10' to 30' strips of R/W is required in limited areas.	Provide a dedicated passenger only right-of-way.	Required to increase service between Richmond and Oakland, can be advanced if funding is available.
		Oakland Yard Passenger Bypass	Port/CCJPA	Construct separate freight tracks adjacent to existing main tracks between UPRR Desert and West Oakland Yards.	Eliminate conflicts between freight trains accessing the Port and passenger trains passing through.	
		Double Track Oakland to North Richmond	CCJPA	Shift existing UP double track and construct new passenger double within existing corridor.	Provide track capacity to support 15 minute service headways.	
		Grade Separations	City/CCJPA/ ACTC	Construct 6 grade separations	Long term program to improve safety and reduce traffic impacts caused by at-grade crossings.	Grouped as priority 3 project.
		Station Modifications	City/CCJPA	Modify Emeryville, Berkley, and Richmond stations to accommodate new track alignment and center platforms	Improve safety and modal connectivity, provide modern station amenities, and prepare for level boarding	Required to increase service between Richmond and Oakland, can be advanced if funding is available.
	RCH-BEN	BNSF Right-of-Way Acquisition	CCJPA	Acquire a 40'-50' strip of Right-of-Way along BNSF and I-4 in Franklyn Canyon. Acquire new easement for 5.2 mile tunnel.	Provide a dedicated passenger only right-of-way.	Required for dedicated passenger corridor between Richmond and Sacramento.
		Franklin Canyon Bypass	CCJPA/SJJPA	Construct new double track passenger line paralleling BNSF/I-4 including 5.2 mile twin bore tunnel. Grade separate Atlas Road.	Improve running times and protect against sea level rise.	
		Carquinez Strait High Level Bridge	CCJPA	Construct new high level double track passenger bridge between Martinez and Benicia including elevated guideway segment through the industrial area of Martinez.	Eliminate delays caused by navigation conflicts.	
		Martinez Station	City/CCJPA	Construct new elevated station at existing site.	Improve safety and modal connectivity, provide modern station amenities, and prepare for level boarding	
	BEN-SAC	Right-of-Way Acquisition	CCJPA	Acquire Martinez Subdivision from MP 34.2 to MP 89.0.	Provide a dedicated passenger only right-of-way.	
		Rail and Tie Upgrade	CCJPA	Upgrade existing track to CL-6 including replacing timber crossties with all concrete ties. .	Improve track to make the corridor ready for 90, 110, and 150 mph operations	Long term maintenance program with UPRR.
		Grade Separation	City/CCJPA	Construct 17 grade separations and close the remaining existing at-grade crossings.	Provides grade separated corridor for 125 mph operations.	Grouped as priority 5 project must be completed prior to 125 mph operations
		Station Modifications	City/CCJPA	Modify Suisun and Davis stations to accommodate new center platforms	Improve safety and modal connectivity, provide modern station amenities, and prepare for level boarding	Required for new electric trainsets

Table 1-3 Recommended Vision Capital Improvement Program (continued)

Service Area	Line Segment	Project	Lead Agency	Description	Purpose	Priority Justification
Sacramento - Auburn	SAC-ROS	Right-of-Way Acquisition	CCJPA	Acquire dedicated 40'-60' right-of-way between MP 91.0 and MP 106.4. Acquisition of 10' to 30' strips of R/W is required in limited areas.	Provide a dedicated passenger only right-of-way.	
		Construct new third main track	CCJPA	Construct a new 3rd main track within UPRR Right-of-Way between Sacramento and Roseville including new crossing of American River, Roseville Station Improvements, and layover facility	Provides 10 round trips to Roseville	CCJPA currently seeking funding to complete project
		Construct Second Passenger Main Track	CCJPA	Construct a second passenger only track within dedicated Right-of-Way	Provide track capacity to support increased service levels.	
	ROS-SAC	Right-of-Way Acquisition	CCJPA	Acquire dedicated 30'-45' strip of right-of-way between MP 106.4 and MP 124.0. Acquisition of 10' to 30' strips of R/W is required in limited areas.	Provide a dedicated passenger only right-of-way.	
		Passenger Main Track		Construct a new passenger only main track including an elevated guideway over the Valley Subdivision.	Provide track capacity to support increased service levels.	
		Grade Separations	City/CCJPA	Construct 9 grade separations	Long term program to improve safety and reduce traffic impacts caused by at-grade crossings.	Grouped as priority 6 project.
		Station Modifications	City/CCJPA	Construct new elevated station in Roseville, modify Rocklin Station and construct new at-grade station in Auburn to accommodate new track and platform configuration	Improve safety and modal connectivity, provide modern station amenities, and prepare for level boarding	
System Wide		Incremental Speed Increases	CCJPA/ACE/ SJJPA	Increase passenger speeds to 90 mph between San Jose and Benicia and to 110 mph between Benicia and Sacramento	Reduce travel times	
		San Jose – Sacramento Electrification	CCJPA	Electrify corridor between San Jose and Sacramento	To improve operations, service levels, and air quality	
		Purchase EMU Trainsets	CCJPA	Purchase 24 electric trainsets capable of 150 mph operation.	To improve operations, service levels, and air quality	
		Station Platform Modifications	City/CCJPA	Modify existing platforms to provide for level boarding	Improve safety and reduce dwell times at stations	
		CMOF	CCJPA	Construct new Control/Maintenance/Operations facility	Service new electric trainsets	

Recommended Stations and Facilities Improvements

A crucial element of the VIP is a systematic upgrading of the existing station to modern passenger rail standards including wide center platforms, grade separated pedestrian access, and level boarding platform heights. The station improvements also include expanded bus intermodal facilities and parking structures. New stations are constructed in Newark, Oakland Coliseum, Jack London, Martinez, Roseville, Auburn, and potentially adjacent to Hwy 80/Hwy 4 in the Coty of Hercules. Table I-2 describes types of improvements and staging options under consideration.

Table 1-4 CCJPA VIP Station Improvements Matrix

Station	Type of Improvement	Construction Staging Options
San Jose – Diridon	Additional platforms for HSR Level Boarding Improvements	Caltrain/CHSRA to Determine
Santa Clara – University	Level Boarding Improvements	Caltrain/CHSRA to Determine
Santa Clara – Great America	New Center Platform Station	New Construction north of Existing Station adjacent to City Place Development
Newark (New)	New Center Platform Station	New Station Site to be Determined
Oakland – Coliseum	New Elevated Station adjacent to BART	Expanded Bart Station Site
Oakland – Jack London	New Underground Station	New Station Site, potential TOD
Emeryville	New Center Platform Station	Temporary Closure
Berkeley	New Center Platform Station	Temporary Closure
Richmond – BART	New Center Platform Station	Shift BART Station to East and then Construct New Center Platform on Offset Alignment form existing station
Hercules	New Station	New Station Site Adjacent to I-4 Park-n-Ride Lot
Martinez	New Elevated Station	Overhead Construction on Offset Alignment at Existing Site
Suisun/Fairfield	New Center Platform Station	Temporary Closure
Fairfield/Vacaville	New Center Platform Station	Temporary Closure
Davis	New Center Platform Station	Keep in Service During Construction
Sacramento	Level Boarding Improvements	Keep in Service During Construction
Roseville	New Elevated Station	Overhead Construction on Offset Alignment
Rocklin	New Center Platform Station	New Station Site
Auburn	New Center Platform Station	New Station Site

Station improvements will be implemented in a phased manner with center platform construction and related improvements occurring concurrently with track improvements in the segment. Converting the platform to level boarding occurs later when the corridor is fully separated from freight traffic and electrified.

Once the Capitol Corridor is operating electric trains, it will need a new maintenance facility designed specifically for the type of trainset acquired as well as an operations control center to dispatch the trains. The VIP identifies potential locations for the control center and maintenance facility including:

- Expanded Oakland facility
- Shared High Speed Rail facility in South Bay
- New facility in Yolo County

Train layover yards will also be required near the San Jose Diridon, Oakland Jack London, and Sacramento stations.

2 FREIGHT MITIGATION CONCEPTS

The creation of a passenger-only rail corridor will likely significantly impact the operations of the UPRR and to a lesser extent the BNSF. The VIP identifies potential mitigation projects that restore diminished freight capacity, create additional capacity, and improve operational efficiency to the extent practical. The impacts and proposed mitigation to UPRR and BNSF operations are described by service area below.

SERVICE AREAS

San Jose to Oakland Service Area

Between Newark and Oakland, Capitol Corridor acquires the Coast Subdivision and a 3-mile section of the Oakland Subdivision north of Elmhurst Junction, significantly impacting UPRR's operations. Between San Jose and Newark, the VIP identifies impact mitigation that creates a freight-only main track with a passing siding located midway between San Jose and Newark. The estimated capacity of the line is between 24 and 28 trains per day.

North of Newark, freight service to existing shippers is maintained on the Coast Subdivision through a freight easement, but switching service is limited to nighttime operations. Through-service freight operations on the Coast Subdivision north of Newark are prohibited except in emergency situations.

To compensate for the loss of through freight capacity, the VIP recommends a double-track high-capacity freight corridor on the Niles/Oakland Subdivision between the Port of Oakland and Niles Junction. The capacity of this freight-only double mainline is estimated at 55 to 60 trains per day. Capacity improvements on the Oakland Subdivision between Niles Junction and Stockton, currently envisioned as part of Altamont Corridor Express (ACE) Forward service improvements, will increase the capacity of the line to 25 and 30 trains per day. See Figure 2-1 for locations of the proposed improvements.

Oakland to Sacramento Service Area

Once the CCJPA acquires Martinez Subdivision from Benicia (MP 34.2) to Sacramento (MP 89.0), the UPRR's primary freight route between the East Bay and its major classification yard in Roseville will be eliminated. There are currently 42 passenger trains and as many as 20 freight trains operating on the Martinez Subdivision north of Oakland daily. To compensate for the loss of through freight capacity, the VIP proposes a new double-track high-capacity freight corridor on portions of the former Sacramento Northern Railroad between Pittsburgh and West Sacramento (see Figure 2-2). The capacity of this freight-only corridor is estimated at 55 to 60 trains per day.

Figure 2-1 Freight Mitigation for San Jose to Oakland Service Area

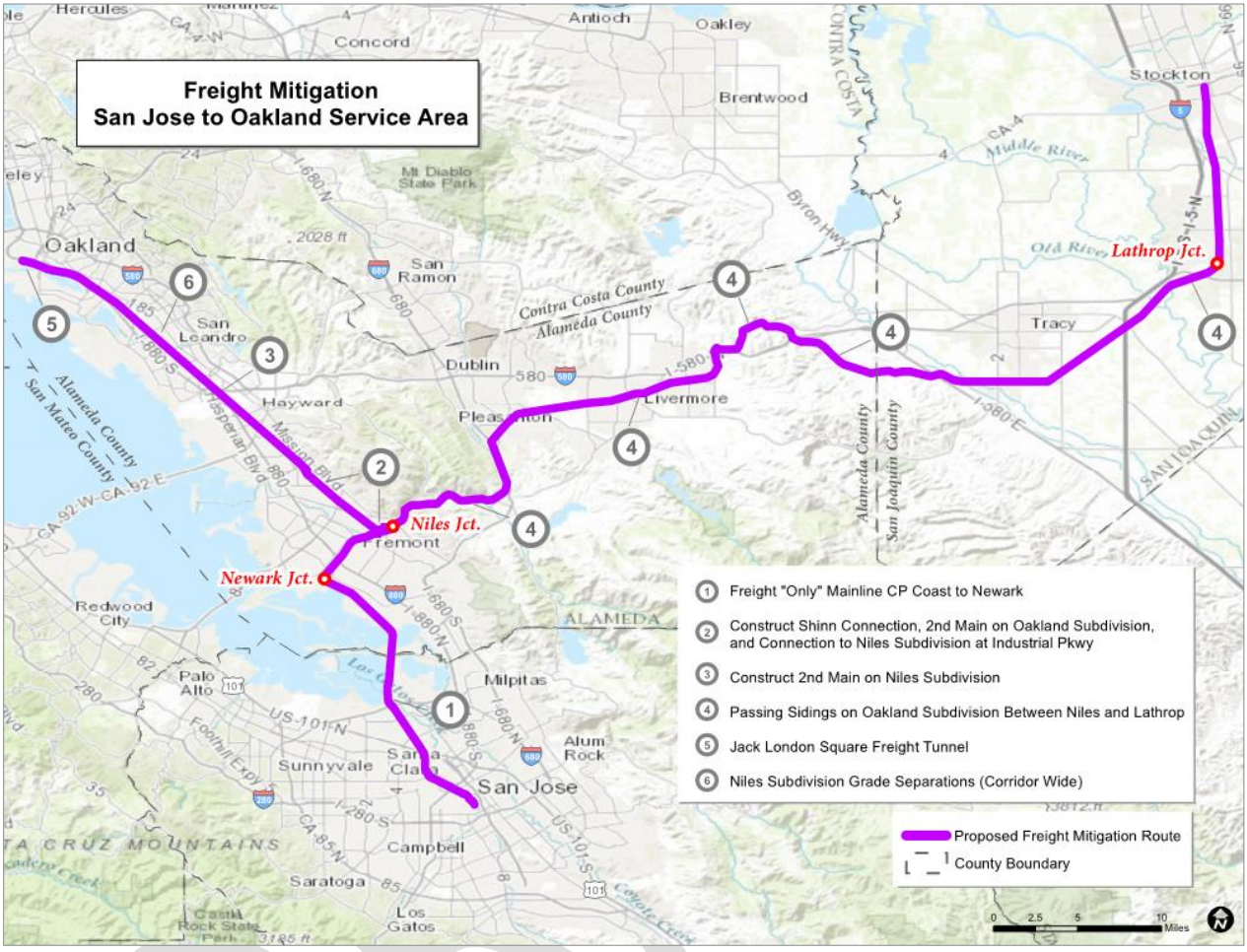
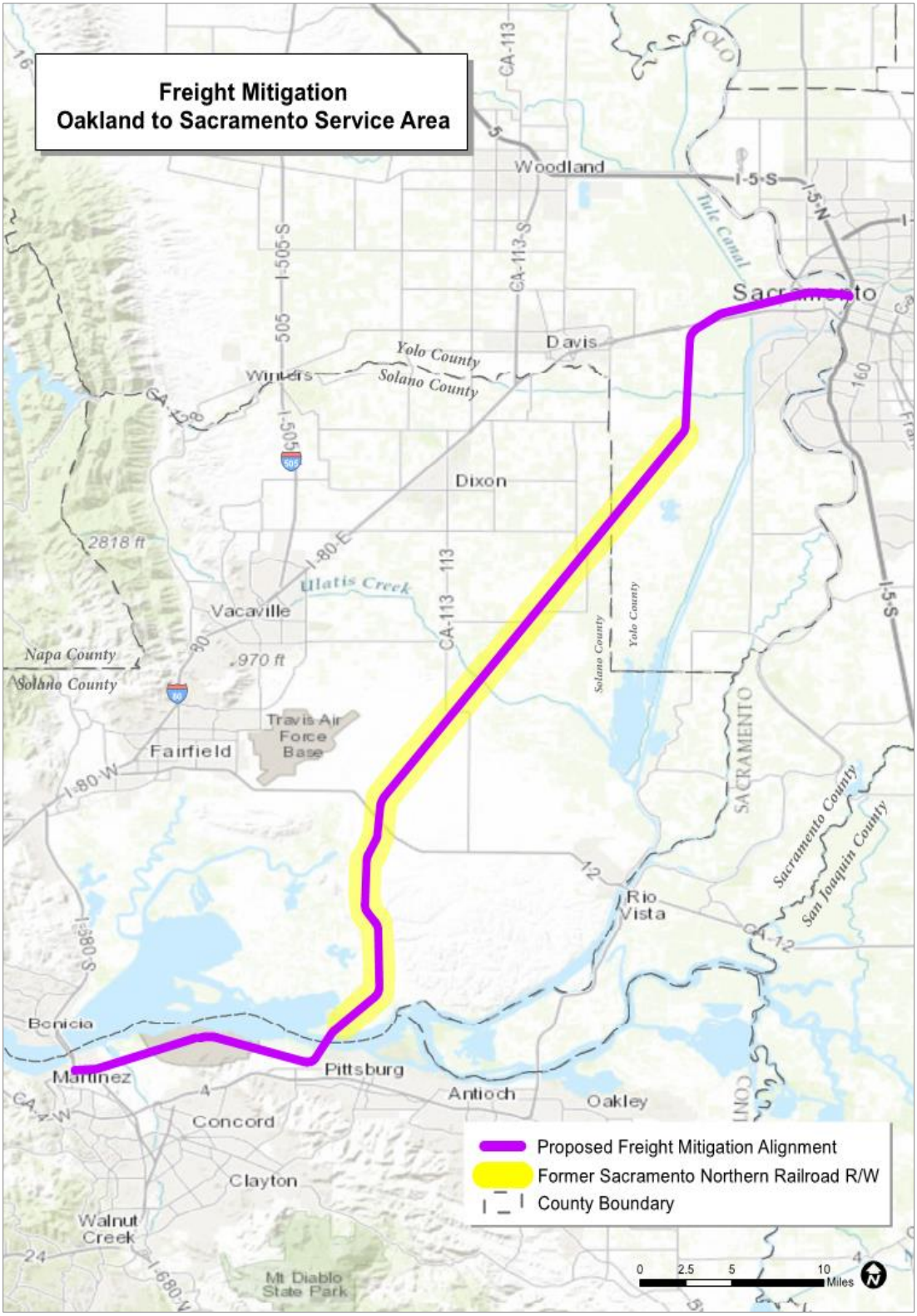


Figure 2-2: Freight Mitigation for Oakland to Sacramento Service Area



Freight service to existing shippers and California Northern Railroad's branch lines at Fairfield and Davis are maintained, but train service is limited to nighttime operations. Service to the petrochemical complexes and auto facility in Benicia continues to be provided by the existing railroad bridge across the Carquinez Strait from Martinez with no operating restrictions.

Sacramento to Auburn Service Area

Between Sacramento and Roseville, the UPRR has an approximate 150-foot wide right-of-way with two main tracks. The Capitol Corridor operates on two new tracks on the northern 45 feet to 60 feet of the right-of-way leaving the existing two main tracks plus room for a future third main for freight trains. Between Roseville and Auburn, the UPRR has two separate lines for eastbound and westbound trains between Roseville and Auburn. The eastbound line has the more favorable ascending grades into the Sierra Foothills. The Capitol Corridor shares the steeper westbound line and operates on its own single track within the corridor leaving the existing main track for freight. The freight mitigation for this service area is limited to compensation for the property used by the Capitol Corridor.

EVALUATION CRITERIA

Service Criteria

The freight mitigation projects are designed to provide at a minimum:

- Safe and reliable operations;
- Expanded freight capacity for efficient goods movement well into the future;
- No interference with passenger operations;
- Improved access to Port of Oakland; and
- Environmentally sustainable operations.

Design Criteria

Conceptual freight alignment plans were prepared based on the following design criteria:

- Freight design speeds up to 79 mph, operating speeds up to 60 mph;
- UPRR main track design criteria and standard plans; and
- AREMA Manual for Railway Engineering dated 2015.

RECOMMENDED CAPITAL IMPROVEMENTS

In order to mitigate freight impacts created by the Vision Plan, a long-term program of freight capital improvements and right-of-way acquisitions was developed for the geographic segments identified previously. Corridor alignment drawings were prepared (see Appendix VII Corridor Alignment Drawings) to verify the feasibility of the proposed improvements and identify potential right-of-way impacts. The drawings were based on available aerial images and are at an early conceptual design level (5%-10%). Table II-1 summarizes the proposed improvements and the following is a brief description of the proposed improvements by geographic segment starting in San Jose heading east to Auburn.

San Jose to Newark

- **Diridon Station to Newark Junction Single Track Freight Main:** Once the additional passenger-only tracks are constructed within this 16-mile segment, the existing main track is dedicated to freight traffic and dispatched by the UPRR.

Newark to Oakland

- **Shinn Connection to Oakland/Niles Subdivision:** The project constructs a new eastbound and westbound connection from the Oakland Subdivision to the Niles Subdivision at Shinn, approximately 1 mile west of the existing Niles Junction. From Shinn north to Industrial Parkway in Carpenter, a new second main track is proposed on the Oakland Subdivision. At International Parkway, a new double-track flyover from the Oakland Subdivision connects back into the Niles Subdivision. North of Industrial Parkway, the Oakland Subdivision can be abandoned, and the Niles Subdivision from Industrial Parkway (MP 24.5) south to Niles Junction (MP 30.0) can be abandoned.
- **Double Track Industrial Parkway to Elmhurst Junction**: The project constructs 11 miles of a new second main track from Industrial Parkway (MP 24.5) north to Elmhurst Junction (MP 13.5) where the Coast Subdivision rejoins the Niles Subdivision.
- **Grade Separations:** Between Niles Junction and Oakland, nine new grade separations and improvements to eight existing at-grade crossings are proposed as mitigation for increased freight traffic.
- **Niles Junction to Stockton Siding Improvements:** This ACE-led project extends seven sidings on the Oakland Subdivision between Niles Junction and Stockton and constructs new wye connections at Lathrop and Stockton Junctions.

Jack London Square (JLS)

- **Jack London Square Tunnel/Trench:** The project constructs a combination trench/tunnel within the Embarcadero right-of-way between Lake Merritt Outlet and Market Street. The project envisions modifications to the upper section of the Posey and Webster tubes to allow the freight tracks to cross over the tubes and still provide a 2,400-foot cut/cover tunnel between Alice and Clay Streets. An alternative design shifts the alignment into the block between Embarcadero and Second Street.

Martinez to Sacramento

- **Right-of-Way Acquisition:** The project transfers approximately 35 miles of the former Sacramento Northern right-of-way between Bay Point and Saxon from Contra Costa, Solano, and Yolo Counties to the UPRR. Approximately 6.5 miles of new 100-foot right-of-way is acquired from private property owners from Saxon north to CP Swingle on the Martinez Subdivision east of Davis.
- **Double Main Track:** The project constructs approximately 10 miles of second main track from Martinez to Bay Point on the UPRR's Tracy Subdivision. From Bay Point, the project constructs 42 miles of new freight double main track northeast to Swingle, where the line connects back into the Martinez Subdivision. Freight and passenger track share the existing right-of-way to Sacramento. The project also includes a new high-level freight rail bridge crossing the Carquinez Strait at Bay Point.

- **Grade Separations:** The project proposes constructing a new I-80 overpass at Swingle and 28 new at-grade crossings, as well as the closure of six crossings.
- **Route Alternatives:** There are two existing rail corridors between Martinez and Sacramento (see Figure 2-3) that are potential alternatives to restoring the Sacramento Northern alignment.
  - **Option 1 UPRR Tracy Subdivision:** The Tracy Subdivision extends from Martinez (MP 34.8) southeast approximately 58.2 miles to Lathrop where it connects to the Fresno Subdivision at MP 81.4. From Lathrop, trains utilize the UPRR's Fresno Subdivision northward approximately 54 miles to Sacramento where the Fresno Subdivision rejoins the Martinez Subdivision at Elvas Junction (MP 38.6) east of the Sacramento Station. The Tracy and Fresno Subdivisions would be double- or triple-tracked with improved connections at Lathrop, Stockton, and Elvas Junctions. The route is approximately 60 miles longer than the Martinez Subdivision and 57 miles longer than the proposed Sacramento Northern alignment.
  - **Option 2 BNSF Stockton Subdivision**: This alternative route utilizes the BNSF's Stockton Subdivision from Bay Point east to Stockton Junction where it connects to the UPRR's Fresno Subdivision at MP 84.5. From Stockton, trains use the UPRR's Fresno Subdivision for approximately 46 miles to Sacramento to rejoin the Martinez Subdivision at Elvas Junction (MP 38.6) east of the Sacramento Station. The BNSF Stockton and UPRR Fresno Subdivisions would be double- or triple-tracked with improved connections at Stockton and Elvas Junctions. A joint track usage agreement between the railroads will need to be negotiated. The route is approximately 35 miles longer than the Martinez Subdivision and 32 miles longer than the proposed Sacramento Northern alignment.

Figure 2-3 Freight Mitigation Route Alternatives

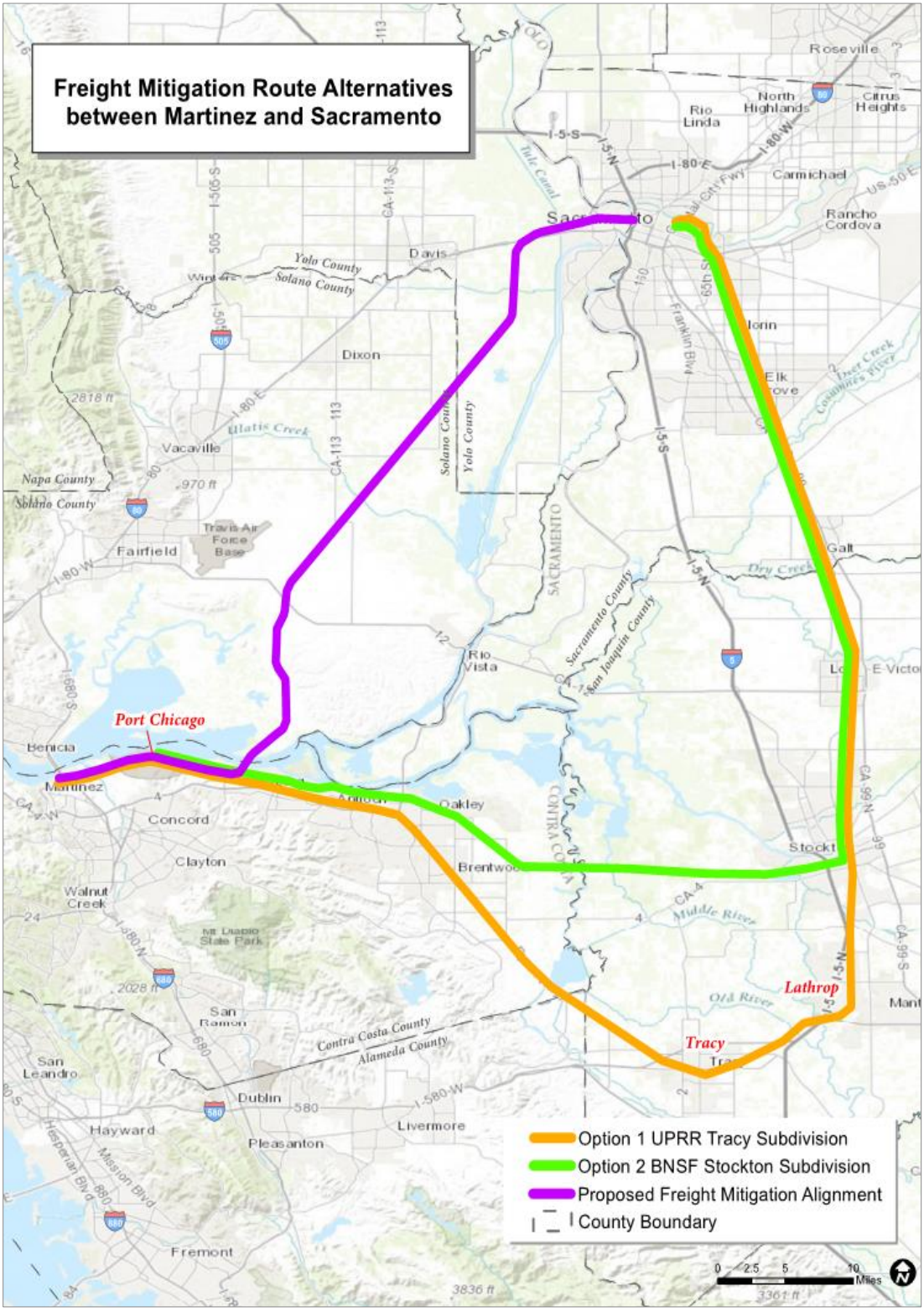


Table 2-1: Recommended Freight Mitigation Projects

	Line Segment	Project	Lead Agency	Description	Purpose	Priority Justification
Freight Mitigation	San Jose to Newark	San Jose to Newark Freight Main Track	CCJPA/Caltrain/ CHSRA	Converts the existing to freight only once passenger tracks are constructed	Replace lost freight capacity on Coast Subdivision south of Newark.	
	Newark to Oakland	Shinn Connection to Oakland/Niles Subdivision	CCJPA/ACE/ Port/ACTC	Construct new eastbound and westbound connections from the Oakland Subdivision to the Niles Subdivision at Shinn, near Niles Junction. Construct new 2nd main track from Niles Junction to Industrial Parkway on Oakland Subdivision and connect to Niles Subdivision at MP 24.5. Grade Separate Industrial Parkway. Abandon Niles Subdivision from MP 30.0 to MP 24.0	Replace lost freight capacity on Coast and Oakland Subdivisions by providing improved access to the Niles Subdivision from the Oakland and Coast Subdivisions.	If funding is available can be advanced to priority 2.
		Niles Double Track	CCJPA/ACE/ Port/ACTC	Construct 2nd main track between Oakland (MP 10.0) and Niles Junction (MP 24.5).	Replace lost freight capacity on Coast and Oakland Subdivisions by providing improved access to the Niles Subdivision from the Oakland and Coast Subdivisions	If funding is available can be advanced to priority 2.
		Grade Separation	CCJPA/ACE/ Port/ACTC	Construct 8 grade separations on Niles Subdivision	Improve safety and reduce traffic impacts caused by at-grade crossings.	Grouped as priority 3 project
		Niles Junction to Stockton Siding Improvements	ACE/Port	Extend 7 sidings and construct new Wye connections at Lathrop and Stockton.	Provide capacity for ACE service and increased freight service through Alameda County.	Required for ACE service increases. Costs not included in VIP estimates.
	JLS	Jack London Square Tunnel/Trench:		Construct a combination trench/tunnel within Embarcadero right-of-way between Lake Merritt Outlet and Market Street including modifications to the upper section of the Posey and Webster tubes and 2,400-ft cut/cover tunnel between Alice and Clay Streets. . An alternative design shifts the alignment into the block between Embarcadero and 2nd Street.	Project eliminates conflicts with pedestrians and vehicles	If funding is available can be advanced to priority 2 or 3.
	Martinez to Sacramento	Sacramento Northern Line Restoration	CCJPA	Construct new double track freight railroad between Bay Point and Sacramento along portions of former SNRR line.	Replaces capacity lost with sale of Martinez Subdivision.	

3 JACK LONDON SQUARE ALTERNATIVES EVALUATION

BACKGROUND

Through the Jack London Square District of Oakland, the UPRR operates on a double main track line within the Embarcadero street right-of-way. The tracks connect UPRR's West and East Oakland rail yards and are the only southbound route (Niles Subdivision) out of the Port of Oakland for freight trains. The UPRR operates up to 18 freight trains a day through Jack London Square. The line also sees a significant amount of switching activity between the two rail yards. In addition to the freight traffic, Capitol Corridor, San Joaquin Corridor, and Amtrak operate 42 passenger trains a day across this 1.3-mile section of track to and from Jack London Square Station for a total of 60 trains per day.

In the previous Vision Plan update, a number of high-level concepts were developed for reconfiguring the tracks through Jack London Square. The concepts were further assessed, and new concepts developed, based on a site visit and informal charrette conducted with staff from the City of Oakland. The goal of this evaluation was to identify a design concept(s) based on the following:

- Engineering feasibility;
- Community impacts and political support;
- Capital costs (to be estimated on an order-of-magnitude basis);
- Operational impacts including travel time (to be estimated on a conceptual basis);
- Urban design impacts including pedestrian and bike access;
- Transit connectivity and access to major destinations; and
- Traffic impacts.

ISSUES IDENTIFIED

The following issues were identified and discussed as part of the Charrette:

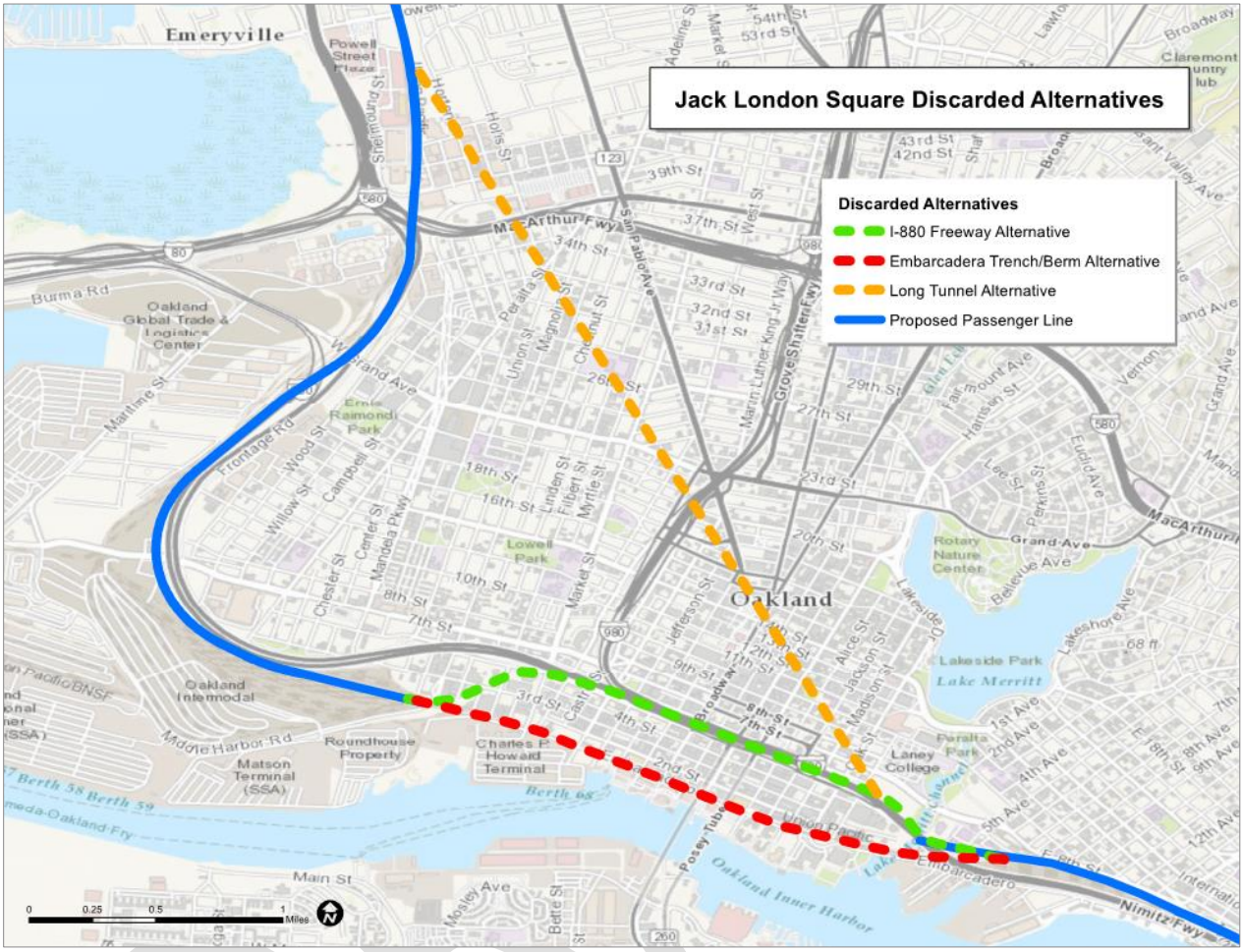
- Limited track capacity for future passenger and freight growth;
- Safety concerns due to increased conflicts between trains and pedestrian/vehicles;
- Infill development of condominiums and apartments creating increased demand for pedestrian access to the waterfront;
- Community's increased awareness of noise and vibration caused by the train traffic; and
- Under-realized value of waterfront development.

ALTERNATIVES IDENTIFIED AND ELIMINATED FROM FURTHER CONSIDERATION

The following alternatives, as shown in Figure 3-1, were identified, evaluated by the study team as to their feasibility, and ultimately determined not feasible:

- **Additional At-grade Tracks:** While there is physical space to construct additional tracks within Embarcadero, the alternative was discarded because it does not address community concerns relating to safety, noise/vibration, traffic impacts, and access to waterfront.
- **Partially Depressed Alternative:** This alternative constructs a four-track trench within Embarcadero approximately 15 feet below street level. Cross streets are partially elevated (10 feet) above existing street level. The depth of the trench is restricted by the depth of the Webster and Posey tubes. The alternative was discarded because it does not address community concerns relating to safety, noise/vibration, and access to waterfront. Moreover, this alternative impacts a 106-inch EBMUD sanitary line located within Embarcadero and creates significant traffic and property impacts by raising the cross streets.
- **Fully Depressed Alternative:** This alternative would construct a four-track cut-and-cover tunnel within Embarcadero. This alternative was discarded because of impacts to the Webster and Posey tubes, utilities conflicts, constructability issues, and high capital costs.
- **I-880 Freeway Alternative:** This alternative relocates the existing freight tracks and add two passenger track adjacent to or in the median of I-880. The alternative was discarded because it did not meet the minimum geometric design criteria.
- **Long Tunnel Alternative:** This alternative constructs a twin bore tunnel diagonally across Oakland with a new station stop in the vicinity of the 19th Street Bart Station. The alternative was discarded because of high capital costs and it left the freight tracks at-grade within Embarcadero.

Figure 3-1: Jack London Square Alternatives Eliminated from Further Consideration



RECOMMENDED FEASIBLE ALTERNATIVES

The following alternatives, as shown in Figures 3-2 and 3-3, were identified and determined to be feasible by the study team:

- **Paired Second St. and Embarcadero Alternative:** This alternative (See Appendix VIII for conceptual Plans) constructs a new passenger line primarily within the Second Street right-of-way from the Lake Merritt outfall north to Adeline Street. The passenger line is in a cut-and-cover tunnel between Oak Street and Market Street, except for a short segment of trench (1,000 feet) over the Webster and Posey Tubes. The upper portions of the tubes are modified (see Figure 3-4) to keep the track profile as low as possible. Franklin Street, Webster Street, Harrison Street, and Alice Street (extension) are raised from five and 13 feet to cross over the trench section. A new underground station with center platform configuration is constructed between Broadway and Jefferson Streets.

  Once the Second Street alignment is complete, it will serve as a temporary freight bypass while a new cut-and-cover freight tunnel is constructed within the Embarcadero right-of-way. As in the Second Street alignment, the Webster and Posey Tubes are modified to keep the track profile as low as possible. Because the tubes are lower at Embarcadero, the freight line is completely

underground between Alice and Martin Luther King Streets. The section of Embarcadero over the tubes is raised three to five feet to provide adequate vertical clearance over the tracks.

- **Second St. and Embarcadero Mid-Block Alternative:** Similar to the paired alternative, this alternative (See Appendix VIII for conceptual Plans) constructs a new freight and passenger cut-and-cover tunnel immediately adjacent to the existing tracks. Both lines are constructed at the same time, minimizing disruptions to the community; however, this alternative requires significant property acquisitions. The acquired property is ultimately redeveloped as a Transit Oriented Development.

Figure 3-2: Paired Second Street and Embarcadero Alternative

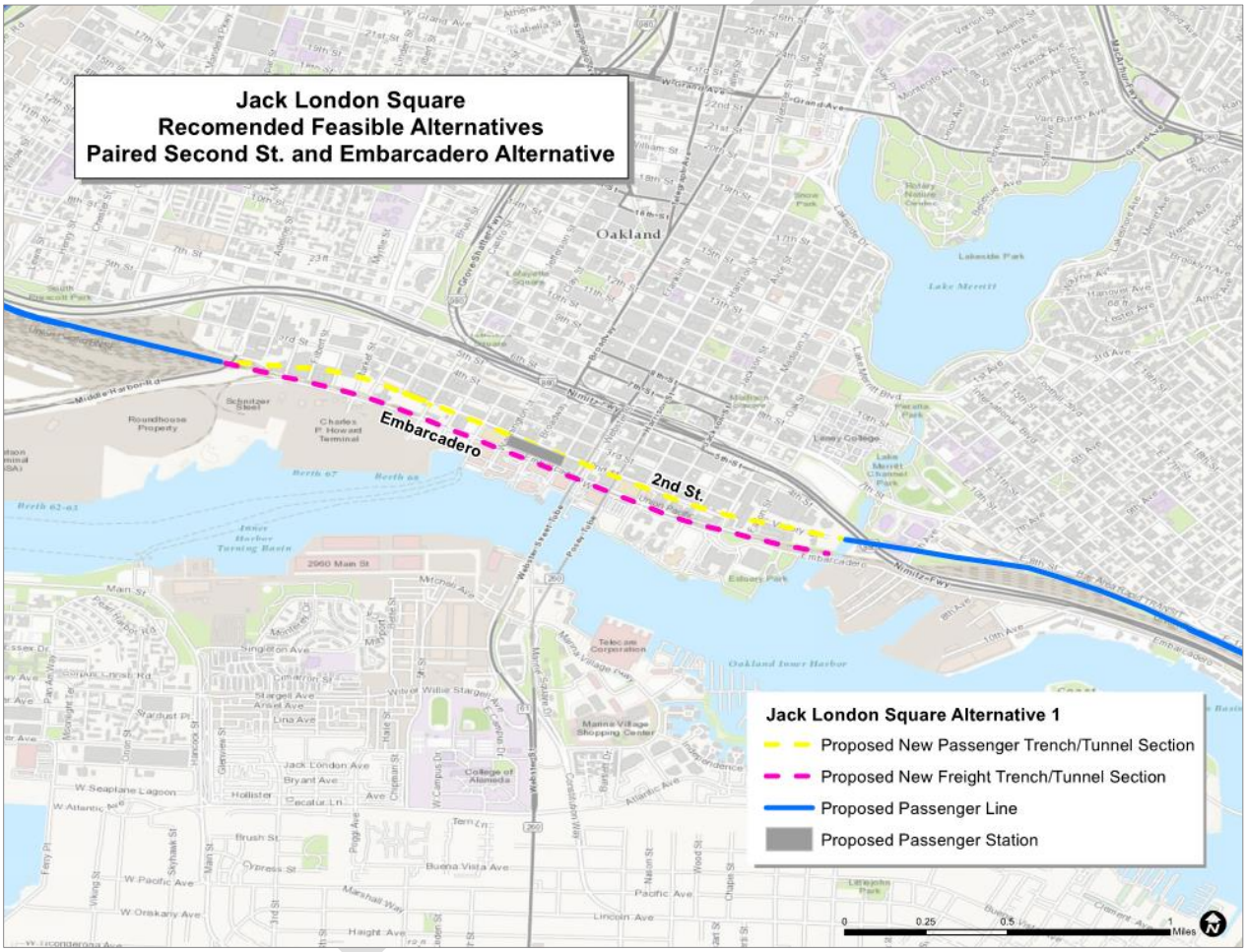


Figure 3-3 Second Street and Embarcadero Mid-Block Alternative

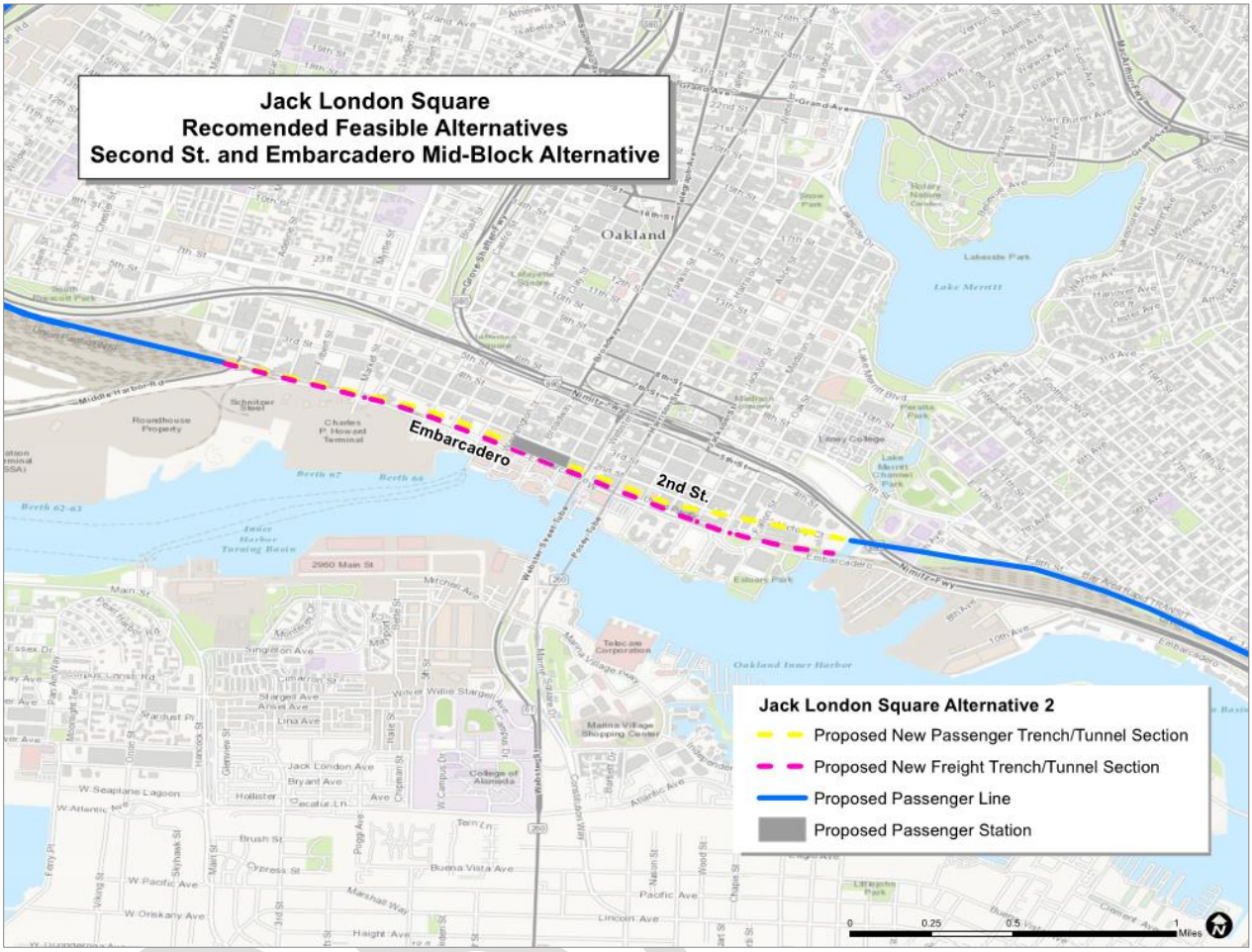
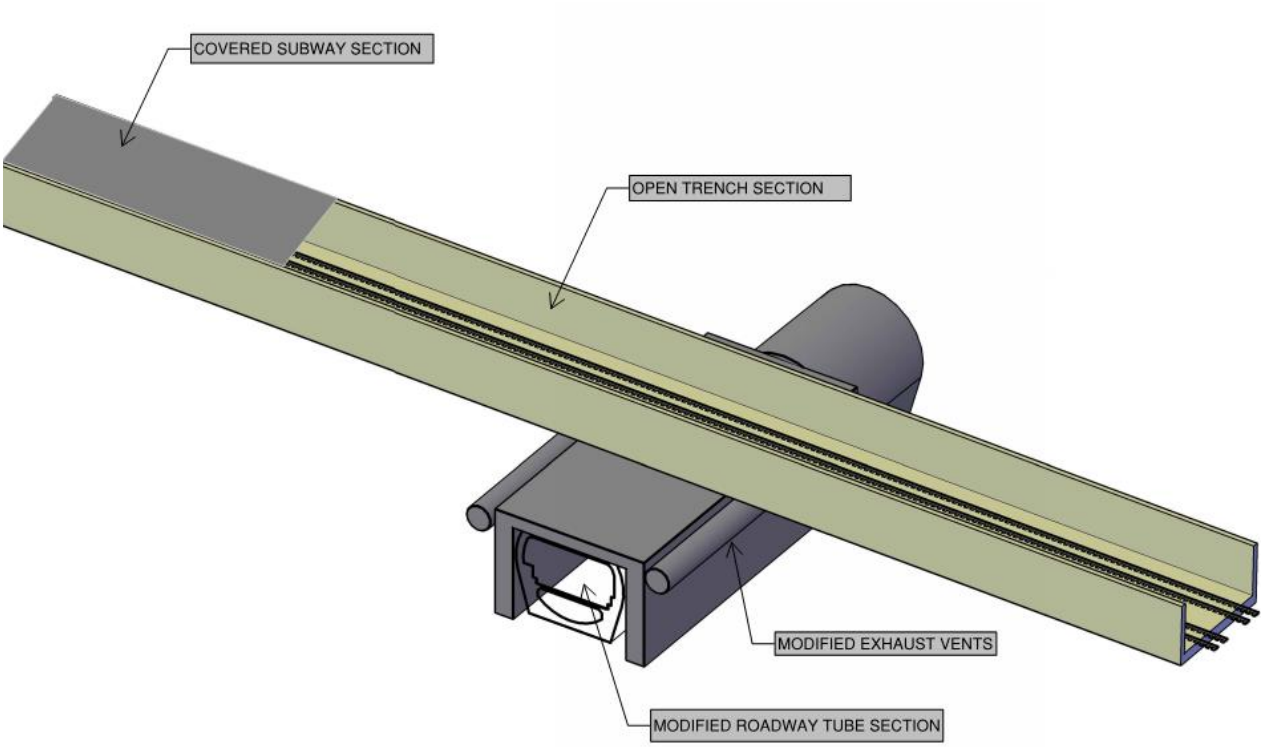


Figure 3-4 Proposed Modifications to the Webster and Posey Tubes



4 OPERATING PLAN, TRAVEL TIMES & OPERATING COSTS

The VIP was primarily a capital planning effort. However, in order to gain a sense of the implications for operating and maintenance costs of the capital plan, a conceptual operating plan was developed. In order to estimate operating costs, it was also necessary to estimate potential travel time improvements, with the understanding that any estimate at this point would likely be conservative, as future technology improvements are almost certain to result in greater time savings.

OPERATING PLAN

Dedicated passenger right-of-way would allow for a dramatic increase in capacity – trains could theoretically operate as frequently as the train control system would allow, just minutes apart. This level of service, however, is unlikely to be needed in the corridor in the 21st Century. Pending findings of the demand and ridership analysis to occur in the VCP, it is likely that service levels in the mid-21st Century will need to be roughly equivalent to those operated today by Caltrain, or on individual BART lines, in order to meet demand. This would amount to a major increase in service over current levels.

For purposes of evaluation, the following conceptual operating plan was developed.

- There would be four trains per hours during the AM and PM peak periods.
- Two of these would be local/all-stop trains and two would be express/limited-stop trains. Headways would be 15 minutes at major station stops would be 15 minutes, and 30 minutes at secondary station stops.
- Mid-day and early evening service would consist of two local trains per hour, for a headway of 30 minutes.
- Late night, trains would operate hourly.
- Overall spans of service would extend from early morning until late night seven days a week (potentially from 5 a.m. to 11:30 p.m. at the departing terminals and 7:30 a.m. to 2 a.m. at the arriving terminals).
- Peak periods with 15-minute service (30-minute local plus 30-minute limited-stop service) would be from 6 a.m. to 9 a.m. and 4 p.m. to 7 p.m. Late-night service would begin around 9:30 p.m.

Limited-Stop Service Pattern

The limited-stop service described above is assumed to include station stops at major locations including Sacramento, Davis, Martinez, Richmond, Oakland Jack London, Santa Clara Great America, and San Jose Diridon. Each of these is a major destination and/or transfer point.

Short-Line Service

It would be possible, and might be desirable, to operate "short line" service within a segment of the corridor. The Capitol Corridor does this today, with more service between Sacramento and Oakland than between Oakland and San Jose, or Sacramento and Auburn. The above operating plan would apply between Sacramento and San Jose; there would likely be somewhat less service between Sacramento and Auburn, and between San Jose and Salinas if that segment were part of the corridor.

Conversely, there might be more service within the urbanized Bay Area, for example between Richmond and Oakland or Richmond and San Jose. This segment includes the major and growing employment and retail center of Emeryville, which is not connected to the BART system despite its inner-Bay Area location. "Infill" stations might also be added within this segment, for example at UC Berkeley's Richmond Field Station. The additional service could be operated by the Capitol Corridor or another operator, such as BART; BART has studied the idea of providing its own service in this segment of the Capitol Corridor using diesel multiple unit or DMU trains like that it will soon operate on the "eBART" line in eastern Contra Costa County. Depending on decisions about the performance characteristics, the interlockings and platforms at Oakland-Jack London should be designed to allow an overlay train to hold while a Capital Corridor train passes.

Trackwork Window

The proposed operating plan provides a three-hour window with no service anywhere in the corridor, and a five-hour window for trackwork on any one track between a designated pair of interlockings. Longer windows, up to seven hours, will be possible with single-track operation.

TRAVEL TIMES

Train Performance Analysis

An operational analysis was performed to help determine how different locomotive and train consist types (locomotives and cars) impact total schedule times with 79, 90, 110, 125, and 150 mph maximum track alignments, depending on constraints. The analysis looked at two operational scenarios:

- Interim service scenario that allows 110 mph operations (track geometry permitting) assuming shared operations with freight in all or part of the corridor.
- Full build service scenario that allows for up to 150 mph operations (track geometry permitting) assuming the line is separated from freight traffic and electrified.

Train Performance Calculator

Train Performance Calculator (TPC) runs were performed using Rail Traffic Controller© (RTC) software developed by Berkeley Simulation Software, LLC. TPC runs calculate the estimated running time for a particular train consist over a specific segment of infrastructure, including the amount of time trains take accelerating and decelerating for station stops. TPCs are used to determine a train's pure running time, one of three components used to develop schedules, as described below:

- Pure Running Time: The amount of time it takes a train to depart from one station and arrive at another.
- Station Dwell Time: The amount of time scheduled for a train at a station to allow for passenger entraining/detraining, crew changes, etc. Scheduled dwell times on the Capitol Corridor range from one to two minutes, depending on the typical passenger volume at a station.
- Recovery Time: Time that is added to a schedule to account for typical train delays, such as freight and passenger train interference, heavy passenger entraining or detraining, etc. Amtrak sets recovery time at 8 percent of the total pure running time.

Train Consist Selection

For alignment options involving shared operations with freight service, only high speed diesel locomotive consists were tested, due to operational and infrastructure issues related to operating 150 mph electric high speed rail consists in shared corridors. The locomotive used in the calculations is the Motive Power Industries HSP-46 diesel locomotive, which is the only 125 mph-capable locomotive currently in revenue service in the United States. The new Siemens SC-44 Charger© diesel locomotive is currently undergoing revenue testing and will provide a better performing alternative to the HSP-46.

There are two existing 110 mph passenger train operations outside of the Northeast Corridor; sections of the Chicago-Detroit-Pontiac Wolverine Service route, and sections of the Chicago-St. Louis Lincoln Service route. In order to attain consistent 110 mph operation on the segments upgraded to support that speed, Amtrak utilizes two General Electric P-42 locomotives per train. On both routes, 110 mph segments are intermixed with lower speed segments, i.e., trains need to accelerate and decelerate constantly to attain maximum operating speed. With only one P-42 locomotive in the consist, the tractive effort of just one locomotive is insufficient to allow the trains to attain and maintain 110 mph operation for any significant amount of time before the trains need to slow for reduced speed segments.

Interim Service Scenario

In order to evaluate performance with operating conditions similar to existing Amtrak 110 mph operations, the train performance analysis tested typical Capitol Corridor bi-level train consists with both one and two locomotives and improved track infrastructure and alignment alternatives capable of supporting 79, 90, and 110 mph maximum speeds.

The complete schedule times for all-stop train service between Sacramento and San Jose Diridon, for each locomotive and infrastructure alternative, are shown in Table 4-1 below:

Table 4-1 All-Stop Travel Times

Northbound	Current Schedule		79 mph	90 mph	110 mph
1 HSP-46 diesel locomotive	3:08		2:52	2:50	2:46
2 HSP-46 diesel locomotives	…		2:45	2:38	2:34

Southbound	Current Schedule	79 mph	90 mph	110 mph
1 HSP-46 diesel locomotive	3:08	2:50	2:47	2:44
2 HSP-46 diesel locomotives	…	2:41	2:34	2:31

The TPC results offer some interesting comparisons. For example, an eastbound train with one locomotive operating on the improved 110 mph alignment makes the run from Sacramento to San Jose Diridon in 2 hours and 46 minutes, compared to today's schedule of 3 hours and 8 minutes. For all alternative alignments, a two-locomotive consist performs significantly better than a one-locomotive consist, ranging from 7 minutes at 79 mph to 12 minutes at 110 mph. An eastbound train with two locomotives, operating over an improved 79 mph alignment, can make the same trip in 2 hours and 45 minutes, one minute faster than a one-locomotive consist operating on the 110 mph alignment. Figures 5-1 and 5-2 illustrate the maximum attainable speeds for the limited-stop and all-stop services using the two-locomotive consist. As the figures show, significant portions of the corridor between San Jose and Sacramento allows for trains to operate at speeds over 90 mph for both the all-stop and limited-stop schedules, primarily within the existing rail corridors.

Figure 4-1 Speed Chart - Two HSP46 Trainset, Northbound All-Stop Schedule

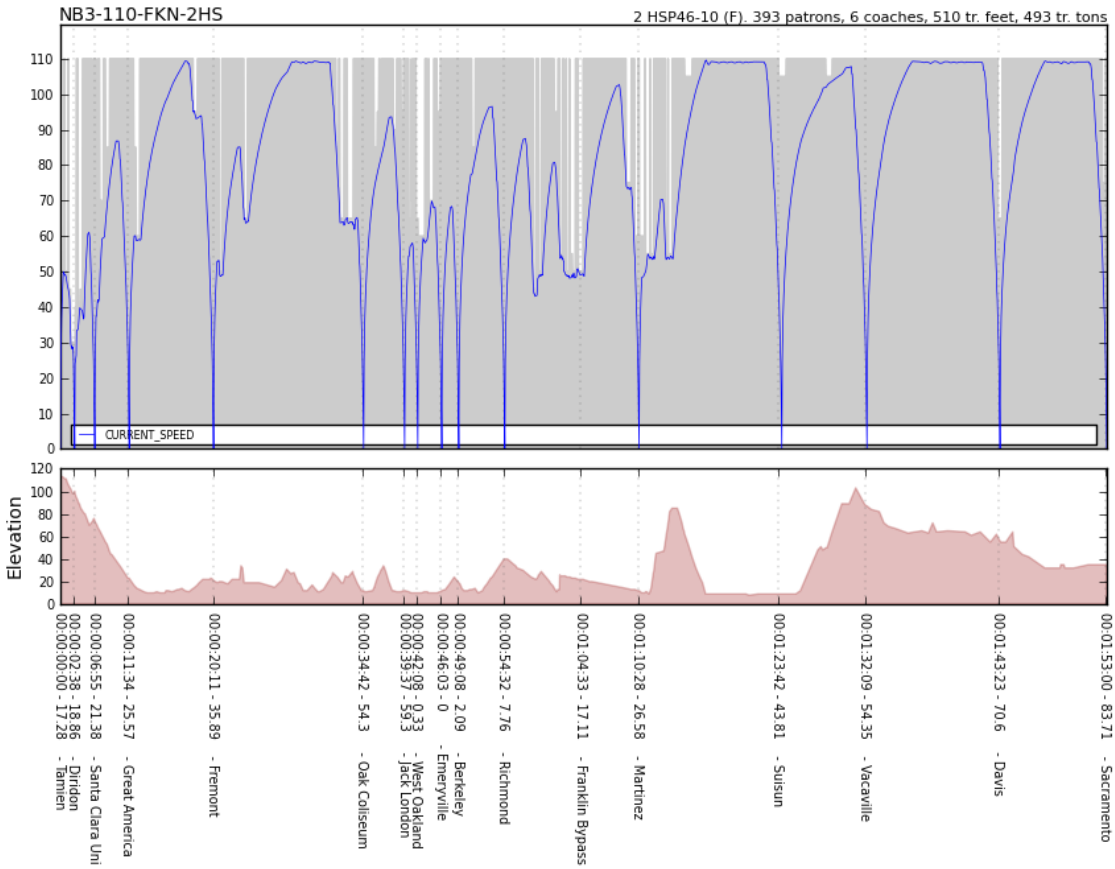
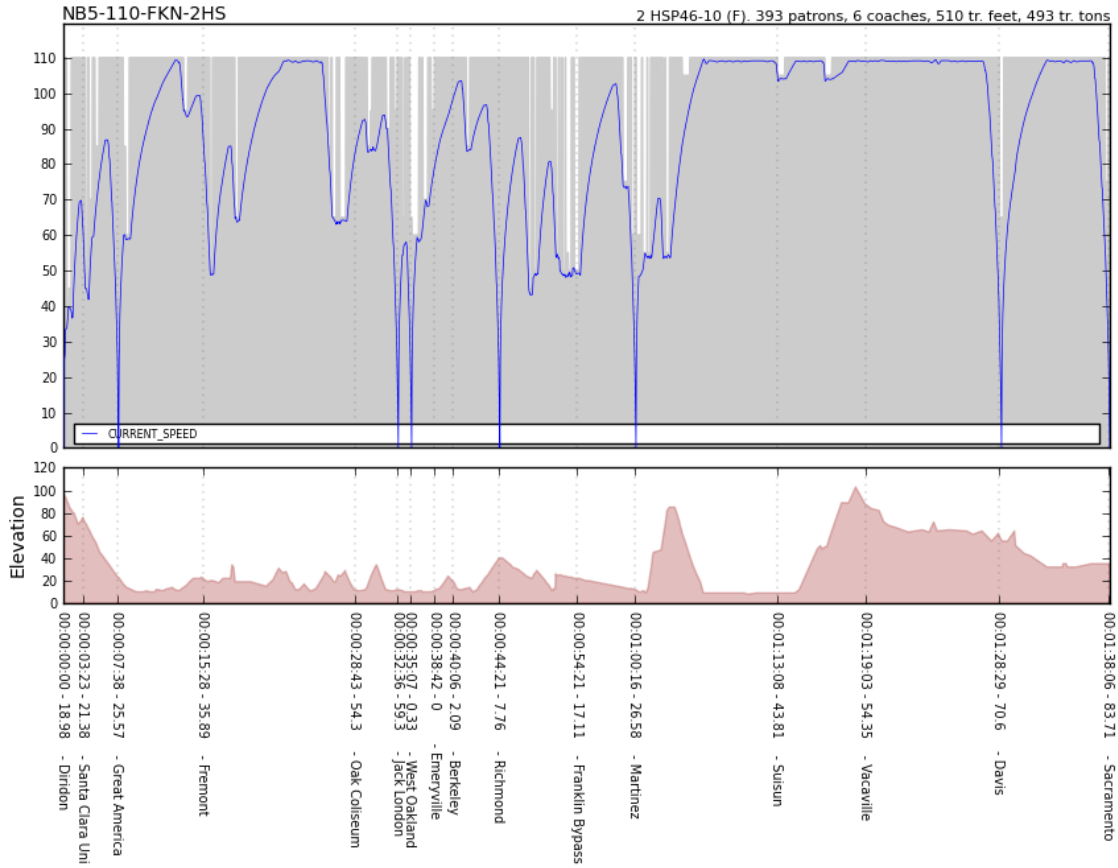


Figure 4-2 Speed Chart - Two HSP46 Trainset, Northbound Limited-Stop Schedule



The TPC results indicate that the same operating constraints in the 110 mph Midwestern routes also impact future Capitol Corridor operations. Due to speed restrictions imposed on all future alignment scenarios based upon geographical constraints, the segments capable of supporting higher maximum speeds are intermixed with segments mandating slower maximum speeds. A train consist capable of accelerating and decelerating rapidly is more able to maximize the amount of time that the train can attain maximum operating speeds.

Another major impact in corridors with shared freight and passenger operations involves the maximum operating speed differential between passenger and freight operations. In most shared passenger/freight corridors, maximum authorized speeds for freight trains vary between 40 and 60 mph, depending on the class of train, and up to 79 mph for passenger trains. Passenger trains operating at significantly faster speeds than freight trains consume a great amount of mainline capacity. Trains need to be spaced farther apart to avoid faster passenger trains "catching up" to slower freights operating in the same direction. Overtakes, where passenger trains pass freight trains at speed on the other main track, can take anywhere from 20 to 35 miles to accomplish, with a correspondingly high potential to delay opposing passenger and freight trains.

Based upon the TPC analysis the key findings for the interim service scenario are summarized as follows:

- Improved schedule times can be more effectively achieved by increasing the tractive effort for individual trains and minor geometric improvements within the existing rail corridors for speeds up to 110 mph.
- To obtain operating speeds greater than 110 mph on meaningful segments of the Capitol Corridor, extensive right-of-way acquisition and infrastructure improvements and the elimination of more station stops for express service would be required.
- Increasing maximum operating speeds beyond 79 mph on shared tracks requires significant capital funds for track and signal improvements, as well as potential right-of-way acquisition for flattening of select curves.
- Maintenance costs increase significantly for the higher classes of track required for 90 and 110 mph operation, as does the amount of time maintenance crews place tracks out of service to perform maintenance.
- Overall train capacity on a shared double main track decreases as the variance between passenger and freight train maximum operating speeds increases.
- Most capacity related improvements to the existing shared freight tracks to allow passenger trains to overtake slower freight trains corridor will not benefit passenger operations after transition to a dedicated passenger-only right of way is achieved.
- It is more cost effect to operate two-locomotive consists at 79mph then to build the additional track capacity required for 110 mph shared track operations. Speeds over 79mph should only be considered on dedicated passenger track segments.

Full Build Service Scenario

The ultimate goal of the Capitol Corridor Vision Plan is to create a passenger-only rail corridor that:

- Operates without passenger/freight capacity and operational conflicts;
- Interlines with other regional electrified rail systems including Caltrain and High Speed Rail; and
- Utilizes electric propulsion technology to drastically reduce or eliminate greenhouse gas emissions.

TPC runs were conducted for the optimized 150 mph alignment using an Amtrak Acela train consist (2 power cars and 6 coaches), which currently operates at speeds of up to 165 mph on Amtrak's Northeast Corridor. Table 5-2 below indicates the maximum speed attained by the Acela train consist by station-to station segment:

Table 4-2 Maximum Acela Consist Operating Speed by Segment

Train Schedule	Sacramento-Davis	Davis-Benicia	Davis-Vacaville	Vacaville-Suisun	Suisun-Benicia
Southbound Limited Stop					
Southbound All Stop	114 mph	120 mph	…	…	…
Northbound Limited Stop	114 mph	…	118 mph	117 mph	110 mph
Northbound All Stop	116 mph	121 mph	…	…	…

With an alignment primarily restricted to the existing rail corridors, TPC results show that there are no segments that permit 150 mph operation due to station spacing and geographical constraints. The only segment capable of permitting sustained speeds higher than 110 mph is the segment between Benicia and Sacramento.

As the table indicates, all sections of the Benicia-Sacramento segment allow for Acela train consist speeds to exceed Class 6 110 mph maximum speeds, but none allow for Acela to remotely approach the design speed goal of 150 mph. Only one section (southbound Davis- Benicia) allows the train to exceed 120 mph (121 mph).

Figures 4-3 and 4-4 illustrate the maximum attainable Acela train consist speeds and two HSP-46 train consist speeds for the limited stop services. As the figures indicate, the two HSP-46 train consist can operation at 125 mph over significant portions of the corridor between San Jose and Sacramento while the Acela can only achieve 120 mph for short period.

Figure 4-3 Speed Chart - Acela Trainset, Limited-Stop Schedule

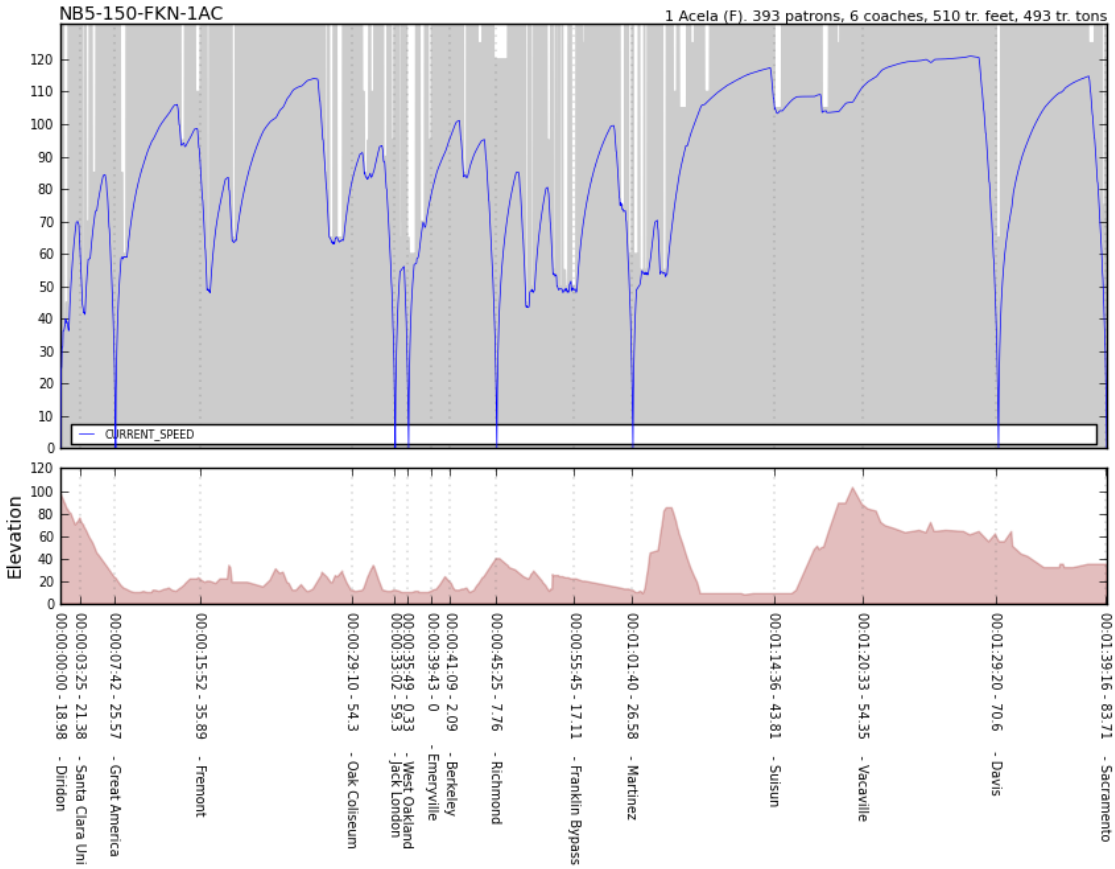


Figure 4-4 Speed Chart - Two HSP 46 Trainset, Limited-Stop Schedule

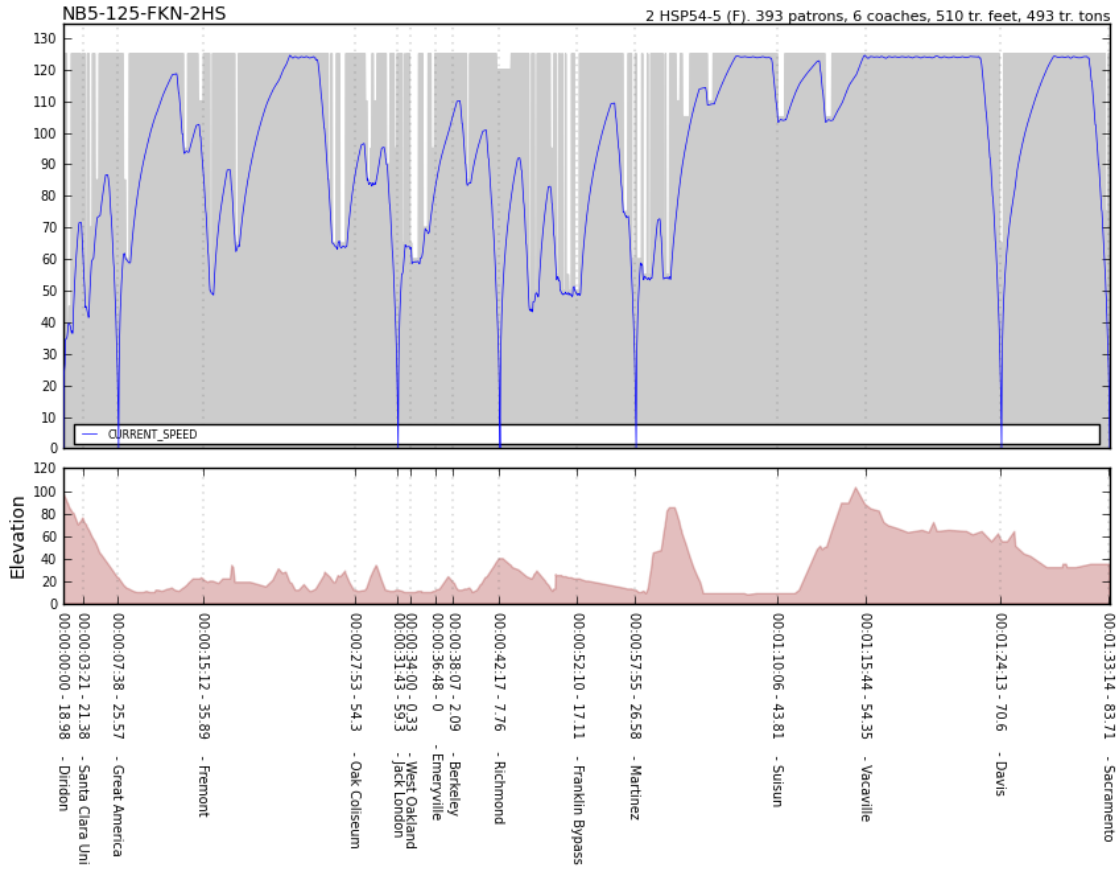


Table 4-3 below compares schedules developed for 150 mph capable electric service compared with schedules for 125 mph diesel trains powered by two locomotives:

Table 4-3 Schedule Comparison - Acela Trainset and Two-Locomotive Diesel Consists

All Stop	hh:mm	hh:mm
Eastbound	**125**	**150**
2 HSP-46 diesel locos	1:57	…
Acela trainset	…	2:06

Limited Stop	hh:mm	hh:mm
Eastbound	**125**	**150**
2 HSP-46 diesel locos	1:38	…
Acela trainset	…	1:53

According to the analysis, the two-locomotive diesel train consist, restricted to 125 mph maximum speed, outperforms the Acela train consist.

There is a marked difference in horsepower per ton of train consist (HPT) between the two-diesel locomotive and Acela train consists, according to the train consist profile generated by RTC:

- 2 HSP-46 locomotives, 6 bi-level cars: 14.13 HPT
- *Acela* (2 power cars, 6 coaches): 8.11 HPT
- Variance: 6.02 HPT

With significantly more power and tractive effort, the two-locomotive diesel train consist outperforms the Acela in its ability to accelerate from station stops and speed restrictions and therefore is able to support a shorter schedule than what the Acela can do.

It should be noted that Acela trains use electric propulsion technology that is over 20 years old. It is highly likely that trainsets eventually procured for the Capitol Corridor will have better performance characteristics, including acceleration and deceleration, than the Acela train consists used in the model (which is the only high speed electric train consists currently available for RTC). The procurement and eventual introduction of future state of the art electric trainsets will likely reduce pure running time for trains in the corridor by several minutes over the model's results for the two-locomotive diesel consist.

Based upon the TPC analysis, the key findings are summarized as follows:

- Projected schedule times for consists capable of 150 mph electric operations are slightly worse than 125 mph two locomotive diesel schedules, due to the diesel consists' higher horsepower per ton ratio. It must be reemphasized that newer electric rail technology will provide better acceleration/deceleration characteristics than is currently provided by Acela trainsets.
- Station spacing and geometric constraints limit the achievable operating speeds along the corridor as follows:
  - San Jose Diridon – Santa Clara Great America = 79 mph
  - Santa Clara Great America – Oakland Coliseum = 125 mph
  - Oakland Coliseum – Martinez = 110 mph
  - Martinez – Sacramento = 125mph
- Newer technology trainsets, however, may not provide enough of an improvement to justify planning for track segments at design speeds higher than 125 mph.

TRAVEL TIMES

On the following pages are projected scheduled travel times between stations, including dwell time at stations (assumed to be one minute, except at Oakland Jack London Station, where 3 minutes, 30 seconds of dwell time is assumed in order to allow for schedule recovery).

Figure 4-5 Travel Times for All-Stop Service

	Sacramento	Davis	Vacaville	Suisun	Martinez	Richmond	Berkeley	Emeryville	Jack London	Oak Coliseum	Fremont	Great America	Santa Clara University	Diridon
Sacramento	0:00:00	0:08:58	0:20:28	0:29:22	0:43:35	1:00:23	1:06:45	1:10:40	1:19:36	1:25:39	1:40:36	1:49:41	1:55:16	2:00:05
Davis	0:08:58	0:00:00	0:11:30	0:20:24	0:34:37	0:51:25	0:57:47	1:01:42	1:10:38	1:16:41	1:31:38	1:40:43	1:46:18	1:51:07
Vacaville	0:20:28	0:11:30	0:00:00	0:08:54	0:23:07	0:39:55	0:46:17	0:50:12	0:59:08	1:05:11	1:20:08	1:29:13	1:34:48	1:39:37
Suisun	0:29:22	0:20:24	0:08:54	0:00:00	0:14:13	0:31:01	0:37:23	0:41:18	0:50:14	0:56:17	1:11:14	1:20:19	1:25:54	1:30:43
Martinez	0:43:35	0:34:37	0:23:07	0:14:13	0:00:00	0:16:48	0:23:10	0:27:05	0:36:01	0:42:04	0:57:01	1:06:06	1:11:41	1:16:30
Richmond	1:00:23	0:51:25	0:39:55	0:31:01	0:16:48	0:00:00	0:06:22	0:10:17	0:19:13	0:25:16	0:40:13	0:49:18	0:54:53	0:59:42
Berkeley	1:06:45	0:57:47	0:46:17	0:37:23	0:23:10	0:06:22	0:00:00	0:03:55	0:12:51	0:18:54	0:33:51	0:42:56	0:48:31	0:53:20
Emeryville	1:10:40	1:01:42	0:50:12	0:41:18	0:27:05	0:10:17	0:03:55	0:00:00	0:08:56	0:14:59	0:29:56	0:39:01	0:44:36	0:49:25
Jack London	1:19:36	1:10:38	0:59:08	0:50:14	0:36:01	0:19:13	0:12:51	0:08:56	0:00:00	0:06:03	0:21:00	0:30:05	0:35:40	0:40:29
Oak Coliseum	1:25:39	1:16:41	1:05:11	0:56:17	0:42:04	0:25:16	0:18:54	0:14:59	0:06:03	0:00:00	0:14:57	0:24:02	0:29:37	0:34:26
Fremont	1:40:36	1:31:38	1:20:08	1:11:14	0:57:01	0:40:13	0:33:51	0:29:56	0:21:00	0:14:57	0:00:00	0:09:05	0:14:40	0:19:29
Great America	1:49:41	1:40:43	1:29:13	1:20:19	1:06:06	0:49:18	0:42:56	0:39:01	0:30:05	0:24:02	0:09:05	0:00:00	0:05:35	0:10:24
Santa Clara Uninversity	1:55:16	1:46:18	1:34:48	1:25:54	1:11:41	0:54:53	0:48:31	0:44:36	0:35:40	0:29:37	0:14:40	0:05:35	0:00:00	0:04:49
Diridon	2:00:05	1:51:07	1:39:37	1:30:43	1:16:30	0:59:42	0:53:20	0:49:25	0:40:29	0:34:26	0:19:29	0:10:24	0:04:49	0:00:00

Figure 5-6 Travel Times for Limited-Stop Service

	Sacramento	Davis	Martinez	Richmond	Jack London	Great America	Diridon
Sacramento	0:00:00	0:08:58	0:36:39	0:53:27	1:07:22	1:32:31	1:41:10
Davis	0:08:58	0:00:00	0:36:39	0:44:29	0:58:24	1:23:33	1:32:12
Martinez	0:36:39	0:27:41	0:00:00	0:16:48	0:30:43	0:55:52	1:04:31
Richmond	0:53:27	0:44:29	0:16:48	0:00:00	0:13:55	0:39:04	0:47:43
Jack London	1:07:22	0:58:24	0:30:43	0:13:55	0:00:00	0:25:09	0:33:48
Great America	1:32:31	1:23:33	0:55:52	0:39:04	0:25:09	0:00:00	0:08:39
Diridon	1:41:10	1:32:12	1:04:31	0:47:43	0:33:48	0:08:39	0:00:00

OPERATING COSTS

Crew requirements were used as a proxy for operating costs. Crew labor is usually the largest single cost driven by operations, and is generally proportional to car mileage, car maintenance, car inspection and track maintenance.

Schedule Specifications

Sketch schedules were built with one minute dwell at intermediate stations, and three minute, 30 second dwell/recovery at Jack London Square. These dwells reflect high level platforms resembling a commuter operation. Terminal layovers for crews and consists are generally 25-30 minutes. Assuming CBTC, trains are kept temporally separated by 3 minutes running time.

Crew and Train Requirements

Crew and train requirements were developed based on some experimentation with crew workday duration. The fleet size is 10 consists plus spares under the current headways, but with all trips extended to San Jose-Diridon, and the ultimate fleet size is 24 consists required for service, plus spares.

Crew requirements are currently 17 crews per weekday. The ultimate, recommended crew requirement is estimated to be 48 crews per weekday. In this crew schedule, most crews make one round trip, accruing about 5 hours 15 minutes cab time, meaning that with other allowances for reporting, inspecting and briefings, most crews will have at least an hour of time within the workday where they could be used for yard moves.

This reflects a decision, after study, to avoid both en route crew changes and exceptionally long workdays. In the context of Positive Train Control, daily briefings consume more time, a longer workday becomes untenable and en route crew changes cause longer dwell times.

We did, however, experiment with crew counts for longer workdays and en route crew changes.

- The crew requirement was 30 crews per weekday enforcing a maximum workday of 16 hours, with many split shifts.
- The crew requirement was 36 crews limiting the workday to 15 hours (with all longer jobs as split shifts) and a maximum workday of 12 hours for non-split shifts.
- We also tested workdays under 8 hours, but allowing an en route crew change at Oakland-Jack London, and produced a crew count of 40 crews.

These three crewing strategies create either very extreme workdays, where any lateness risks hours-of-service violations, or do not allow for enhanced crew briefings associated with Positive Train Control. The en route crew change required an extended dwell and recovery at Jack London Square and some risk of a stranded train if the relieving crew was late. These three strategies are not recommended.

As a result of not making en route crew changes, crew bases and yards, as well as running maintenance and inspection facilities, are needed at both Sacramento and San Jose-Diridon.

5 VISION IMPLEMENTATION STRATEGY

PROJECT PRIORITIZATION

The VIP identified 37 individual projects or programs of improvements from right-of-way acquisition, to grade separations, to the purchase of new trainsets necessary to achieve the CCJPA vision of a modern electrified passenger line for Northern California. The VIP also identifies seven freight mitigation programs that are required to achieve the objectives of the Vision Plan. Once the 44 projects for the VIP and freight mitigations were identified they were prioritized based on the following general criteria:

- **Priority No.1:** Defined projects with environmental clearance and identified funding sources that can be implemented within the next 10 years.
- **Priority No. 2:** Projects that once implemented would significantly increase service and reduce travel times on portions of the Capitol Corridor. The projects require 10 to 15 years to implement since preliminary engineering and environmental analysis have not been initiated and funding sources have not been identified.
- **Priority No. 3:** Projects that are critical to achieving Capitol Corridor's vision of dedicated passenger rail system, but do not result in any significant interim service improvements. These projects require 15 to 20 years to implement.
- **Priority No. 4:** Large capital improvement projects that are critical to achieving Capitol Corridor's vision of dedicated passenger rail system, but also provide significant public benefits if implemented independently. These projects require 20 to 25 years to implement. If funding were secured, they could be implemented early.
- **Priority No. 5:** Large capital improvements projects that are required to achieving Capitol Corridor's vision of dedicated passenger rail system, but if implemented individually do not provide significant public benefits. These projects require 25 to 30 years to implement.
- **Priority No. 6:** Projects that extend electrified passenger service beyond the initial operating system envisioned between San Jose and Sacramento.
- **Priority No. 1-X:** Smaller projects that are part of a program of improvements, such as grade separations, that if implemented over a period of time provide cumulative public benefits up to the time the vision plan is fully implemented.

Table 5-1 Vision Project Priorities

Line Segment	Project	Purpose	Priority	Time Frame	Comments
San Jose to CP Coast	San Jose to Santa Clara Phase 3 & 4 Track Improvements	Provide increased capacity to serve expanded Caltrain, Capitol Corridor, and ACE services.	1	2020-2025	Improvements partially funded by CCJPA
CP Coast to Newark	Right-of-Way Acquisition	Provide a dedicated passenger only right-of-way.	2	2025 -2030	Allows 15 round trips to San Jose
	Double Track CP Coast to Newark	Provide track capacity to support 15 minute service headways and to protect against sea level rise between San Jose and Oakland.	2	2025 -2030	Allows 15 round trips to San Jose
	Grade Separations	Long term program to improve safety and reduce traffic impacts caused by at-grade crossings.	1-5	2020-2045	Grouped as priority 2 project.
	Newark Intermodal Station	Replaces Union City and Fremont Stations and provides for connection to future Caltrain service to Between Union City and Redwood City.	2	2025 -2030	Required when service is shifted to Coast line.
Newark to Oakland	Right-of-Way Acquisition	Provide a dedicated passenger only right-of-way.	2	2025-2030	Allows 15 round trips to San Jose
	Newark to Oakland Second Main	Provide track capacity to support 15 minute service headways between San Jose and Oakland.	2	2025-2030	Allows 15 round trips to San Jose
	Elevated Guideway along Oakland Subdivision	Eliminate at-grade crossing conflicts and improve intermodal connectivity at BART Coliseum Station.	2	2025-2030	Dependent on funding availability, can slip to priority 3 or 4.
	Grade Separations	Long term program to improve safety and reduce traffic impacts caused by at-grade crossings.	1-5	2020-2045	Grouped as priority 2 project.
	Oakland Coliseum Intermodal Station	Improve modal connectivity.	2	2025-2030	Dependent on funding availability, can slip to priority 3 or 4.
	Oakland Subdivision Acquisition	Provide right-of-way for Eastbay Greenway Trail and to reconnect neighborhoods	3	2030-2035	If funding is available can be advanced to priority 1 or 2.

Table 5-1 Vision Project Priorities (Continued)

Line Segment	Project	Purpose	Priority	Time Frame	Comments
JLS	Jack London Square Tunnel and Underground Station	Provide track capacity to support 15 minute service headways.	4	2035-2040	If funding is available can be advanced
Oakland to Richmond	Right-of-Way Acquisition	Provide a dedicated passenger only right-of-way.	3	2030-2035	Required to increase service between Richmond and Oakland. If funding is available can be advanced to priority 2
	Oakland Yard Passenger Bypass	Eliminate conflicts between freight trains accessing the Port and passenger trains passing through.	3	2030-2035	
	Double Track Oakland to North Richmond	Provide track capacity to support 15 minute service headways.	3	2030-2035	
	Grade Separations	Long term program to improve safety and reduce traffic impacts caused by at-grade crossings.	1-5	2020-2045	Grouped as priority 3 project.
	Station Modifications	Improve safety and modal connectivity, provide modern station amenities, and prepare for level boarding	3	2030-2035	Can be advanced if funding is available.
Richmond to Benicia	BNSF Right-of-Way Acquisition	Provide a dedicated passenger only right-of-way.	5	2040-2045	Required for dedicated passenger corridor between Richmond and Sacramento.
	Franklin Canyon Bypass	Improve running times and protect against sea level rise.	5	2040-2045	
	Carquinez Strait High Level Bridge	Eliminate delays caused by navigation conflicts.	5	2040-2045	
	Martinez Station	Improve safety and modal connectivity, provide modern station amenities, and prepare for level boarding	5	2040-2045	
Benicia to Sacramento	Right-of-Way Acquisition	Provide a dedicated passenger only right-of-way.	5	2040-2045	
	Rail and Tie Upgrade	Improve track to make the corridor ready for 90, 110, and 150 mph operations	2-3	2025-2035	Long term maintenance program with UPRR.
	Grade Separation	Provides grade separated corridor that is required for 150 mph operations.	1-5	2020-2045	Must be completed prior to 125mph operations
	Station Modifications	Improve safety and modal connectivity, provide modern station amenities, and prepare for level boarding	5	2040-2045	Required for new electric trainsets

Table 5-1 Vision Project Priorities (Continued)

Line Segment	Project	Purpose	Priority	Time Frame	Comments
Sacramento to Roseville	Right-of-Way Acquisition	Provide a dedicated passenger only right-of-way.	6	2045+	
	Construct new third main track	Provides 10 round trips to Roseville	1	2020-2025	CCJPA currently seeking funding to complete project
	Construct Second Passenger Main Track	Provide track capacity to support increased service levels.	6	2045+	Limited service expansion s possible without new main track.
Roseville to Auburn	Right-of-Way Acquisition	Provide a dedicated passenger only right-of-way.	6	2045+	
	Passenger Main Track	Provide track capacity to support increased service levels.	6	2045+	
	Grade Separations	Long term program to improve safety and reduce traffic impacts caused by at-grade crossings.	1-5	2020-2045	Grouped as priority 6 project in cost estimate.
	Station Modifications	Improve safety and modal connectivity, provide modern station amenities, and prepare for level boarding	6	2045+	
System Wide	Incremental Speed Increases	Reduce travel times	3-5	2030-2040	
	San Jose – Sacramento Electrification	To improve operations, service levels, and air quality	5	2040-2045	Could be deferred to priority 6 if 2 locomotive consist are used.
	Purchase EMU Trainsets	To improve operations, service levels, and air quality	5	2040-2045	
	Station Platform Modifications	Improve safety and reduce dwell times at stations	5	2040-2045	
	CMOF	Service new electric trainsets	5	2040-2045	

Table 5-2 Freight Mitigation Project Priorities

Line Segment	Project	Purpose	Priority	Time Frame	Comments
San Jose to Newark	San Jose to Newark Freight Main Track	Replace lost freight capacity on Coast Subdivision south of Newark.	2	2025-2030	Required to increase service to San Jose
Newark to Oakland	Shinn Connection to Oakland/Niles Subdivision	Replace lost freight capacity on Coast and Oakland Subdivisions by providing improved access to the Niles Subdivision from the Oakland and Coast Subdivisions.	2	2025-2030	Required to increase service to San Jose and shift freight off of Coast Subdivision.
	Niles Double Track	Replace lost freight capacity on Coast and Oakland Subdivisions by providing improved access to the Niles Subdivision from the Oakland and Coast Subdivisions	3	2030-2035	If funding is available can be advanced to priority 2.
	Grade Separation	Improve safety and reduce traffic impacts caused by at-grade crossings.	1-4	2020-2040	Grouped as priority 3 project in cost estimate
	Niles Junction to Stockton Siding Improvements	Provide capacity for ACE service and increased freight service through Alameda County.	1-2	2015-2030	Required for ACE service increases. Costs not included in VIP estimates.
JLS	Jack London Square Tunnel/Trench:	Project eliminates conflicts with pedestrians and vehicles	4	2035-2040	If funding is available can be advanced to priority 2 or 3.
Martinez to Sacramento	Sacramento Northern Line Restoration	Replaces capacity lost with sale of Martinez Subdivision.	5	2040-2045	Required for passenger only corridor between Martinez and Sacramento.

IMPLEMENTATION PHASING STRATEGY

Once the projects were prioritized, they were grouped into four phases based on the potential to increase service levels and reduce travel time as follows:

- **Phase 1:** On-going projects that are programmed and have identified funding sources. Projects are implementable over the next 10 years and will provide modest service increases or travel time reductions.
- **Phase 2:** Mid-range projects providing significant increases in service and are achievable within the next 10 to 20 years, pending available funding.
- **Phase 3:** Long-range capital-intense projects that are required to achieve the vision, but require significant time to plan and implement. This phase will likely require 20 to 30 years to plan, fund, and implement.
- **Phase 4:** Expansion of electrified service beyond the San Jose to Sacramento Initial Operating Segment (IOS). This phase occurs after passenger-only operations are established on the IOS.

The implementation phasing strategy presents a first cut of the timeline of projects (see Table 5-3) that will allow significant increases in service levels.

Table 5-3 Implementation Timeline

	Time Frame	Projects
Phase 1	2016-2025	Priority 1
Phase 2	2025-2035	Priority 2 & 3
Phase 3	2035-2045	Priority 4 & 5
Phase 4	Beyond 2045	Priority 6

The timing of construction of each improvement is highly dependent on funding sources already committed, reasonably anticipated, or as yet unidentified. The phasing plan should be viewed as an ever-evolving process subject to further analysis and modification. It should be reviewed and updated every five years or as events warrant.

PROJECT COSTS

Order-of-magnitude cost estimates were prepared for the identified program of improvements and right-of-way acquisitions and were grouped together based on their assigned priority (see Tables V-1 and V-2 for project priority). Unit costs were developed for the major construction items and order-of-magnitude quantities were developed for each group of projects based on priority.

Costs include basic construction costs in 2016 plus 21% for program management, engineering, environmental, and construction inspection. A 30% contingency was added to the base construction costs and program costs. The costs were escalated to the mid-point of construction based on a 3.0% annual inflation factor. Refer to Appendix VI for detailed order-of-magnitude costs and quantity estimates. It is important to note that most of the projects are in the very early stages of development and the project costs are subject to change as the projects are refined and economic conditions change.

Table 5-4 summarizes the costs based on the phasing criteria present in Table 5-3. Phase 1 costs are for the proposed third main track between Sacramento and Roseville that increases service from one round trip to ten round trips a day between Sacramento and Roseville.

Table 5-4 Project Costs (in 2016 Dollars)

Phase	Priority	Description	Time Frame	Project Cost
1	1	Sacramento-Roseville 3rd Track	2016-2025	$235M
2a	2	San Jose-Oakland Dedicated Passenger Corridor	2025-2030	$3.78B
2b	3	Oakland-Richmond Dedicated Passenger Corridor	2030-2035	$1.85B
3a	4	Jack London Square Tunnel	2035-2040	$1.20B
3b	5	Richmond-Sacramento Dedicated Passenger Corridor	2040-2045	$9.00B
4	6	Sacramento-Auburn Dedicated Passenger Corridor	Beyond 2045	$2.13B

Figures 5-1 and 5-2 summarize the major cost components of Phase 2 (2a and 2b) of the implementation plan in 2016 dollars.

The estimated cost to create a dedicated passenger corridor between San Jose and Oakland is approximately $3.78 billion. Completion of Phase 2a allows CCJPA to increase service from seven to 15 round trips daily between San Jose and Diridon, provides increased capacity for ACE trains, creates a high-capacity freight corridor from the Port of Oakland southward, grade separates the passenger corridor, and provides connectivity to the future Dumbarton rail crossing.

Extending the dedicated passenger corridor northward to Richmond is estimated to cost an additional $1.85 Billion. Completion of Phase 2b allows CCPJA to run a shuttle service between Richmond and San Jose potentially using Diesel Multiple Units (DMU).

Figure 5-1 San Jose-Oakland Dedicated Passenger Corridor

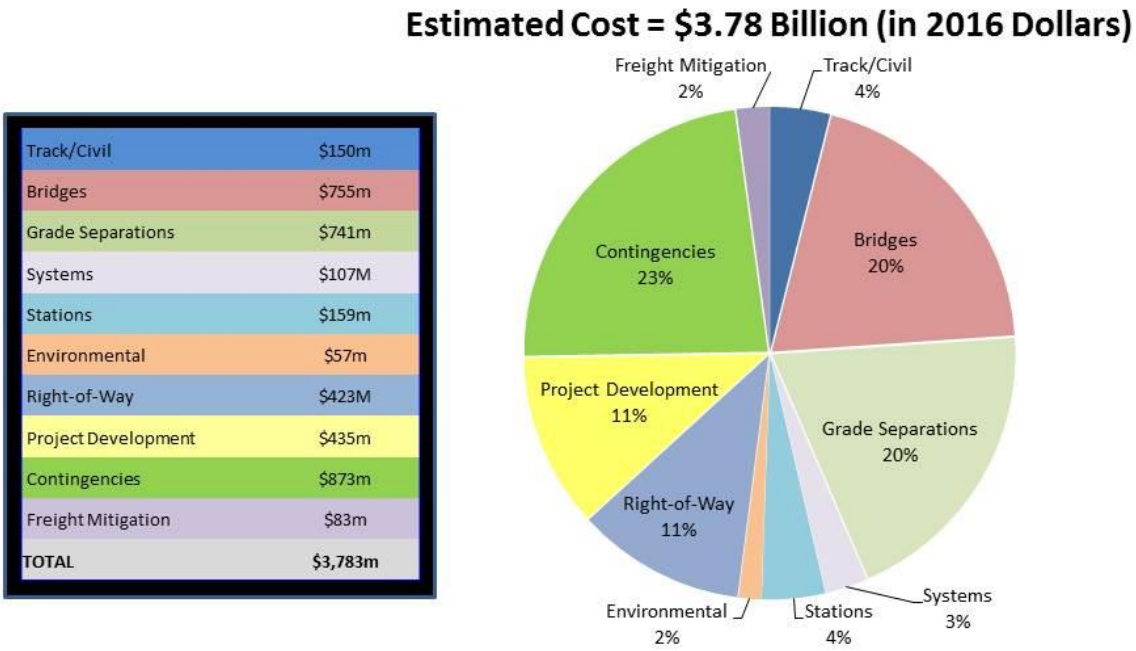
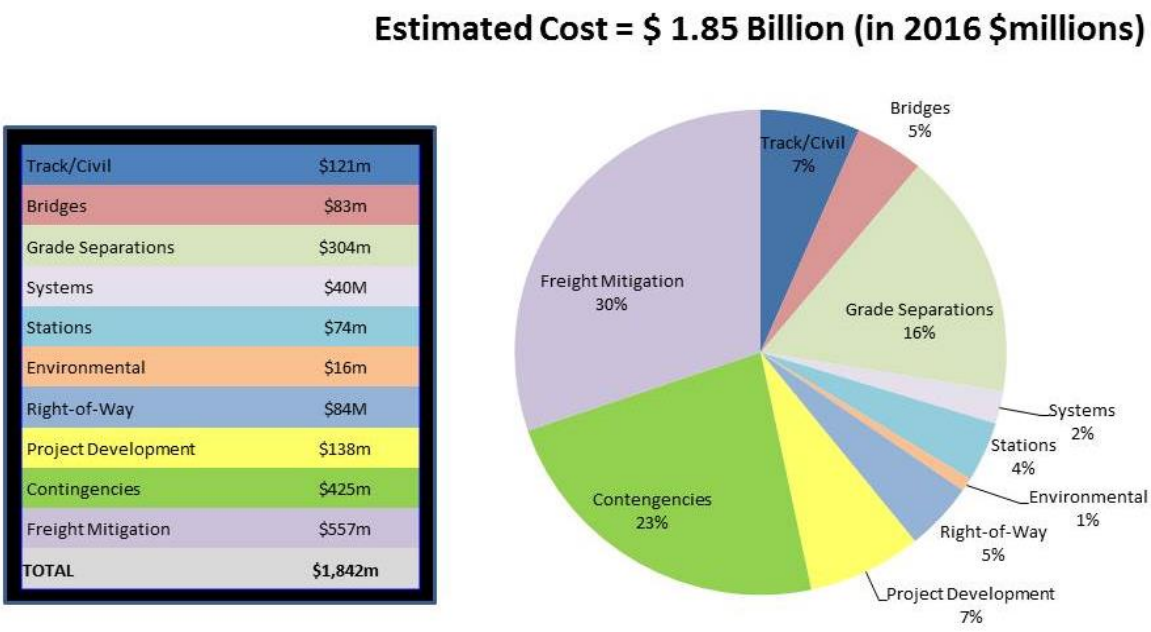


Figure 5-2: Oakland-Richmond Dedicated Passenger Corridor



A significant portion of Phase 2 project costs are committed to grade separations and improving goods movements in the East Bay, approximately $1.05 Billion and $640 Million, respectively.

Figures 5-3 and 5-4 summarize the major cost components of Phase 3 (3a and 3b) of the implementation plan in 2016 dollars.

Figure 5-3: Jack London Square Tunnel

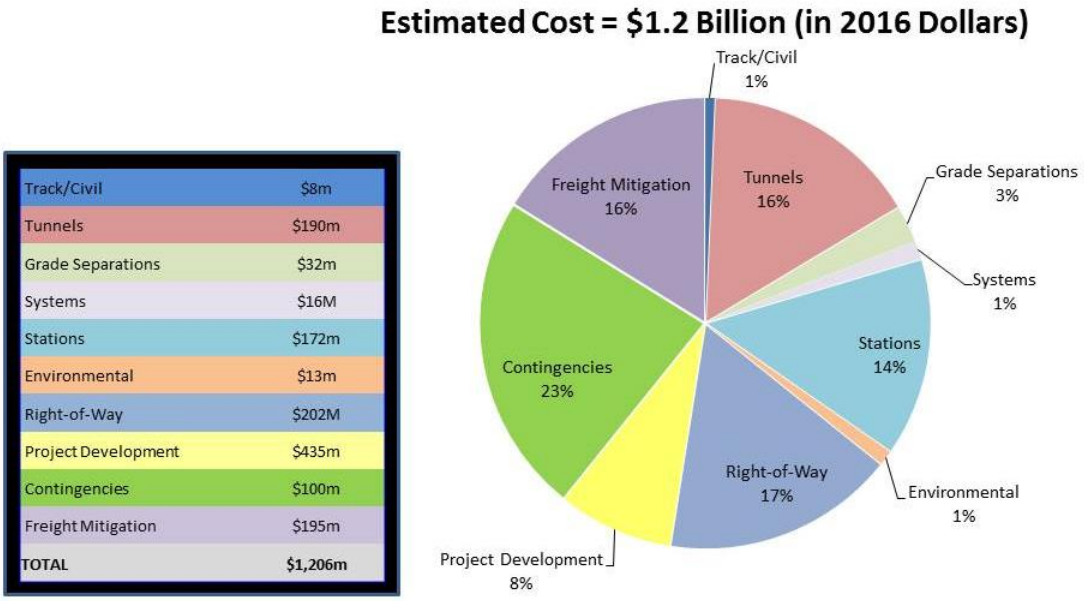
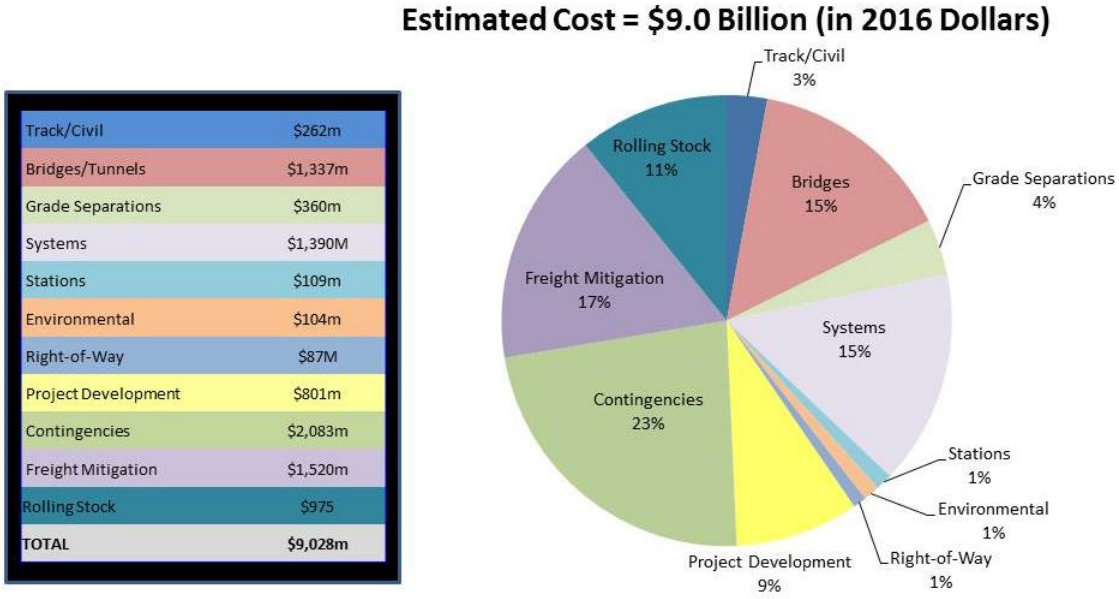


Figure 5-4: Richmond-Sacramento Dedicated Passenger Corridor



Completion of Phase 3a creates separate grade-separated passenger and freight lines through Jack London Square including a new underground station centered on Broadway Street at an estimated cost of $1.2 Billion. If funding becomes available sooner, the project can be advanced ahead of Phase 2b. Significant service benefits from the project are only possible if Phase 2a is completed.

Phase 3b achieves the CCJPA's vision of a modern electrified passenger rail system between San Jose and Sacramento at speeds of 125 mph, but at a significant cost, approximately $9.0 Billion. The major cost elements of this phase of the VIP are $2.37 Billion for electrification and new trainsets, $1.52 Billion to

replace the UPRR rail corridor between Martinez and Sacramento, and $1.34 Billion for the Franklin Canyon Tunnel and new high-level crossing of the Carquinez Strait.

Table 5-3 VIP Passenger Order-of-Magnitude Project Costs

Items	Priority 1: Sacramento to Roseville 3rd Track	Priority 2: Santa Clara (CP Coast) to Oakland	Priority 3: Oakland to Richmond Passenger Dbl. Track	Priority 4: Jack London Station and Subway Tunnel	Priority 5: Richmond to Sacramento +Corridor Wide Electrification	Passenger Subtotals	Subtotal Passenger and Freight	Priority 6: Auburn Extension
Trackwork		$115,300,000	$78,000,000	$6,700,000	$215,400,000	$415,400,000	$654,300,000	$66,300,000
Site Civil		$34,400,000	$43,100,000	$1,000,000	$46,900,000	$125,400,000	$248,900,000	$29,200,000
Structures		$755,100,000	$83,400,000	$190,200,000	$1,336,700,000	$2,365,000,000	$3,043,400,000	$147,900,000
Grade Separations		$740,000,000	$304,000,000	$32,000,000	$360,000,000	$1,436,000,000	$1,924,000,000	$272,000,000
Systems		$106,600,000	$39,500,000	$16,400,000	$1,390,200,000	$1,552,700,000	$1,754,100,000	$634,200,000
Roadway		$1,000,000				$1,000,000	$21,000,000	$2,000,000
Stations and Facilities		$159,300,000	$74,000,000	$171,500,000	$108,800,000	$513,600,000	$513,600,000	$107,000,000
Environmental Mitigation		$57,400,000	$16,200,000	$12,500,000	$103,700,000	$189,800,000	$242,600,000	$37,800,000
Subtotal Construction Costs		$1,969,100,000	$638,200,000	$430,300,000	$3,561,700,000	$6,599,300,000	$8,401,600,000	$1,296,400,000
Right-of-way		$422,800,000	$84,100,000	$201,600,000	$86,600,000	$795,100,000	$960,100,000	$191,000,000
Rolling Stock					$975,000,000	$975,000,000	$975,000,000	
Subtotal Base Project Costs		**$2,391,900,000**	**$722,300,000**	**$631,900,000**	**$4,623,300,000**	**$8,369,400,000**	**$10,336,700,000**	**$1,487,400,000**
Program Management (5% Base Project)		$119,600,000	$36,100,000	$31,600,000	$231,200,000	$418,500,000	$516,900,000	$74,400,000
Environmental Clearance (3% Constr. Cost)		$59,100,000	$19,100,000	$12,900,000	$106,900,000	$198,000,000	$252,100,000	$38,900,000
Engineering (6% Constr. Cost)		$118,100,000	$38,300,000	$25,800,000	$213,700,000	$395,900,000	$504,000,000	$77,800,000
CI&E (7% Constr. Cost)		$137,800,000	$44,700,000	$30,100,000	$249,300,000	$461,900,000	$588,100,000	$90,700,000
Contingencies (30% of above)		$848,000,000	$258,200,000	$219,700,000	$1,627,300,000	$2,953,200,000	$369,500,000	$530,800,000
Subtotal in 2016 Dollars	**$235,000,000**	**$3,674,500,000**	**$1,118,700,000**	**$952,000,000**	**$7,051,700,000**	**$12,796,900,000**	**$15,857,300,000**	**$2,300,000**
Construction Year (Mid Point)	*2018*	*2025*	*2030*	*2035*	*2040*			*2050*
Construction Escalation (@ 3%/yr.)	$14,300,000	$1,119,900,000	$573,400,000	$717,300,000	$7,238,000,000	$9,693,300,000	$12,328,800,000	$3,983,400,000
Total Passenger Service Cost	**$249,300,000**	**$4,794,400,000**	**$1,692,100,000**	**$1,669,300,000**	**$14,334,700,000**	**$22,490,500,000**	**$ 28,186,100,000**	**$6,283,400,000**

Note: Costs rounded to nearest $100,000

Table 5-4 Freight Mitigation Order-of-Magnitude Project Costs

Items		Priority 2: Oakland/Niles Subdivision Freight Railroad Connections	Priority 3: Oakland/Niles Double Track Project	Priority 4: Jack London Trench/Tunnel Project	Priority 5: Martinez to Sacramento Freight Railroad	Freight Subtotals
Trackwork		$20,000,000	$19,500,000	$4,600,000	$194,800,000	$238,900,000
Site Civil		$3,900,000	$7,900,000	$42,200,000	$69,500,000	$123,500,000
Structures		$25,200,000	$7,800,000	$107,000,000	$538,000,000	$678,000,000
Grade Separations			$392,000,000	$	$96,000,000	$488,000,000
Systems		$10,000,000	$15,500,000	$2,300,000	$173,600,000	$201,400,000
Roadway		$2,000,000	$4,000,000		$14,000,000	$20,000,000
Stations and Facilities						
Environmental Mitigation		$1,800,000	$13,400,000	$4,700,000	$32,600,000	$52,500,000
Subtotal Construction Costs		**$62,900,000**	**$460,100,000**	**$160,800,000**	**$1,118,500,000**	**$1,802,300,000**
Right-of-way		$6,500,000			$158,500,000	$165,000,000
Rolling Stock						
Subtotal Base Project Costs		**$69,400,000**	**$460,100,000**	**$160,800,000**	**$1,277,000,000**	**$1,967,300,000**
Program Management (5% Base Project)		$3,500,000	$23,000,000	$8,000,000	$63,900,000	$98,400,000
Environmental Clearance (3% Constr. Cost)		$1,900,000	$13,800,000	$4,800,000	$33,600,000	$54,100,000
Engineering (6% Constr. Cost)		$3,800,000	$27,600,000	$9,600,000	$67,100,000	$108,100,000
CI&E (7% Constr. Cost)		$4,400,000	$32,200,000	$11,300,000	$78,300,000	$126,200,000
Contingencies (30% of above)		$24,900,000	$167,000,000	$58,400,000	$456,000,000	$706,300,000
Subtotal in 2016 Dollars		**$107,900,000**	**$723,700,000**	**$252,900,000**	**$1,975,900,000**	**$3,060,400,000**
Construction Year (Mid Point)		*2025*	*2030*	*2035*	*2040*	
Construction Escalation (@ 3%/yr.)		$32,900,000	$371,000,000	$190,600,000	$2,040,700,000	$2,635,200,000
Total Freight Mitigation Cost		**$130,000,000**	**$1,094,700,000**	**$443,500,000**	**$4,016,600,000**	**$5,695,600,000**
Total Project Development Cost		**$4,555,500,000**	**$2,786,800,000**	**$2,112,800,000**	**$18,351,300,000**	**$28,186,100,000**

Note: Costs rounded to nearest $100,000

6 FUNDING OPTIONS

This appendix provides a preliminary assessment of potential funding options for the improvements described in the Capitol Corridor Vision Implementation Plan (CCVIP), with a focus on property-based funding sources such as special taxes, special assessments, development impact fees and tax increment financing tools. The memo focuses on the Capitol Corridor transit improvements, and does not consider potential funding sources for related improvements to freight rail.

The appendix is organized in the following sections:

- A summary of funding needs included in the Capitol Corridor Vision Implementation Plan;
- An overview of federal, state and local capital funding sources for transit;
- Details about a range of property-based funding sources and their applicability to planned Capitol Corridor improvements; and
- Conclusions about the categories of improvements that are most likely to be funded using property-based sources.

A matrix with information about all of the property-based funding sources discussed in this memo is provided at the conclusion of this appendix.

SUMMARY OF FUNDING NEEDS

The CCVIP incorporates a variety of capital improvements, some of which are corridor-wide, while others are location specific. These improvements are summarized in Table 1, on the following page.

Table 6-1 Major Improvements in the Capitol Corridor Vision Implementation Plan

Location	Planned Improvements
Corridor-wide	Electric train infrastructure
	Upgraded signaling systems
	Curve straightening/grade leveling
	Enhancements to existing stations
	Grade-separation of at-grade intersections
San Jose-Oakland	New storage and maintenance facility near Tamien Station
	Improvements to Diridon Station
	Additional tracks
	Reconstruction of the Santa Clara Station
	Double-tracking of some segments
	Possible new station at Dumbarton Bridge
	A new viaduct in the Oakland Subdivision
	New intermodal Oakland Coliseum station
Jack London District	Tunnel below 2nd Street (and possible freight rail tunnel beneath Embarcadero)
	New subway station (in conjunction with second Transbay Tube)
Oakland-Richmond	Expansion of existing right-of-way
	Rebuild existing stations
	Possible new stations
Richmond-Suisun/Fairfield	Franklin Canyon Tunnel
	New Carquinez Straight crossing
Suisun/Fairfield-Sacramento	Tunnel under Downtown Sacramento (in conjunction with high-speed rail)

OVERVIEW OF CAPITAL FUNDING SOURCES

Funds from a wide variety of federal, state and local sources might be used to help pay for the improvements envisioned in the CCVIP. Historically the CCJPA has primarily relied upon state sources with very minor use of any federal sources for capital improvements, however the availability of funding from state sources has diminished over time, and shifted to become more competitive.[1]

[1] Capitol Corridor Joint Powers Authority, Capitol Corridor Intercity Passenger Rail Service Business Plan Update FY 2016-17 – FY017-18, February 2016.

Federal

Federal funding is typically an important source for major transit capital projects such as the ones outlined in the CCVIP. The Fixing America's Surface Transportation (FAST) Act will provide up to $305 billion for transportation over five years. While the FAST Act provides for funding specifically for state supported intercity passenger rail services such as the Capitol Corridor, funds have yet to be appropriated, and thus the outlook for federal funding for Capitol Corridor improvements is uncertain.

State

The primary source of state funding for the Capitol Corridor has historically been the State Transportation Improvement Program (STIP), specifically the Interregional Transportation Improvement Program (ITIP), which represents 25 percent of the STIP and is used to fund projects that connect metropolitan areas. Over time, changes to the funding allocation formulas, combined with reductions in the amount of state funding for transit, have resulted in very limited funding for needed Capitol Corridor improvements. Bond measures which included provisions for the state intercity passenger rail program have also played a significant role but those sources have been one-time in nature and not a dedicated funding stream on which to build a capital program.

With limited STIP funds, state bonds and grants have become more critical components of Capitol Corridor funding. Proposition 1B provided nearly $20 billion in funds for transit, however these funds have now nearly all been expended. CCJPA's allocation of Proposition 1A funds are now fully committed toward Capitol Corridor improvements for phase one of a service expansion between Sacramento and Roseville and to a lesser extent for a travel time savings project. The state Cap and Trade program is another important source; CCJPA has been successful at receiving small scale grants of the Transit Intercity Rail Capital Program (TIRCP) for the aforementioned travel time savings project (TIRCP year one) and service expansion between Sacramento and Roseville (year two TIRCP). However, in total those TIRCP funds have only amounted to under $14 million for the CCJPA. In the future, it is possible that the program will allow multi-year allocations for some projects, however the viability of the TIRCP and Cap and Trade program as a significant capital funding source is in jeopardy due to the Cap & Trade carbon auction market under achieving on anticipated projections.

Local

Given the limitations on federal and state funding, local funding for transit has grown in importance over time, most notably county sales tax measures. Identifying local funding sources is also critical because federal and state discretionary grant programs favor projects that can illustrate a high level of local commitment.

Local funding can come from a variety of sources. The biggest source of local funding in California by far is local sales tax measures. Counties and special districts (such as BART) can adopt sales tax increases for transportation purposes, subject to a 2/3 local voter approval. Sales tax measures offer the benefit of drawing from a relatively broad area, and can include a variety of improvements that, when combined, will appeal to a wide range of voters.

In addition to sales tax measures, recent years have seen increased interest in the use of property-based funding sources such as special taxing districts, tax increment financing and developer fees.

Additional detail about these sources and their potential to help fund Capitol Corridor improvements is discussed in the section below. While they are sometimes discussed together, it is important to distinguish between property-based funding sources and public-private partnerships (PPPs). A PPP is a method of project delivery wherein private and public sector entities enter into a partnership to provide public improvements. Typically, the private party will provide the improvements and bear some of the financial and/or operational risk in the project, in some cases including financing (e.g., debt).

Property-Based Funding Sources

Property-based funding mechanisms – also sometimes referred to as "value capture" mechanisms -- include a variety of tools that are employed by the public sector at the local level. These tools are attracting increased interest in transit finance circles, in part due to the limitations on of state and federal funding. A strong rationale exists for the use of property-based tools to help fund transit projects, since many studies show that transit investments have the potential to positively impact nearby property values and development potential. Unless this value is captured through a tax or other mechanism, this increase in value represents a "windfall gain" for property owners.

The planned Capitol Corridor improvements will generate a wide range of economic benefits. Many of the benefits will accrue to the broader megaregion: enhancements to the system will help to promote economic development by linking high tech clusters, research institutions and supporting industries; improving access to labor; facilitating goods movement; making the mega-region more competitive and diversifying local economies. Households and workers will benefit from reduced transportation costs and access to a greater number of jobs. And finally, some benefits will accrue to nearby property owners in the form of enhanced property values and improved development potential. Where this occurs there may be potential for property-based funding sources.

In general, property-based tools fall into four categories: special assessments and taxes, tax increment financing (TIF), direct developer contributions (including development impact fees, negotiated developer contributions, and community benefits/density bonus programs), and public sector real estate transactions. The tools available in California are described below, along with an initial assessment of their applicability to the Capitol Corridor. A detailed table comparing the tools is provided as an appendix.

Community Facilities Districts

A **Mello-Roos Community Facilities District (CFD)** is a type of special taxing district formed when property owners or registered voters within a geographic area agree to impose a new tax on property in order to fund infrastructure improvements, public facilities or certain public services. It is important to note that a CFD may not be used to fund ongoing transit service or maintenance of transit facilities.

A CFD can be formed by a city, county, joint powers authority or other special district. Tax revenues can be collected and used on a pay-as-you-go basis (over time), or serve as the basis to issue a bond. CFDs are relatively flexible in their application, and the special tax rates may be set on any reasonable basis determined by the local legislative body (e.g., on the basis of building area, parcel size, or linear feet of parcel frontage), except that the tax cannot be *ad valorem* (based on property value). CFD boundaries can be drawn to include non-contiguous parcels, and

different special tax rates can be set for different parcels within the CFD, based on land use/property type, distance from a transit station, densities, or other material factors.

A CFD requires approval by two-thirds of property owners (weighted by property area) so long as there are no more than 12 registered voters living within the proposed boundary. If there are more than 12 registered voters living within the district, the formation of a CFD requires two-thirds voter approval.

Potential Use for Capitol Corridor: ***Possible***

CFDs are typically used within a relatively small district, where property owners will see a direct benefit from improvements. It is possible that a CFD could be used to assist with improvements at individual stations, particularly to help fund a new station or enhancement to an existing station.

Special Assessment Districts

Special Assessment Districts are designated districts where property owners agree to pay an additional assessment in order to fund specific improvements or services. California law defines a number of different types, including Lighting and Landscaping Districts, Parking Districts, Transit Benefit Assessment Districts and Property-Based Business Improvement Districts. The general characteristics of Special Assessment Districts are described below, followed by additional detail about the most relevant types of assessment districts that might be used for Capitol Corridor improvements.

An assessment district may be created by a city, county, joint powers authority or other special district. Districts are established by a vote of the property owners and require support from owners of a simple majority (50 percent plus one) of assessed property value in the district. However, under Proposition 218, a constitutional amendment passed by California voters in 1996, the amount that each property owner pays must be directly proportional to the "special benefit" the property will receive from the proposed improvement. The assessment district may not be used to pay for the portion of an improvement that accrues to the community at large (known as the "general benefit").

Due to the special benefit requirement, assessment districts are typically used to fund small, primarily local-serving infrastructure such as landscaping, lighting, street, or sidewalk improvements. The Municipal Improvement Act of 1913 specifies that local governments may use special assessment districts to pay for public transit facilities (including stations, rolling stock and other equipment, and land acquisition) "designed to serve an area of not to exceed three square miles."[2] Most types of assessment districts have the ability to issue tax-exempt bonds.

Transit Benefit Assessment Districts (TBAD) are a new form of special assessment district defined by state law, geared specifically toward transit funding. In 2013, SB142 authorized municipal transit operators and other transit agencies to create special benefit districts within a half mile of transit stations specifically to assist in funding the development of transit stations and rail facilities. Unfortunately, Transit Benefit Assessment Districts are subject to the same constraints imposed by Proposition 218: the improvements and services funded by the district must provide a direct and special benefit to the properties subject to the assessment, over and

[2] State of California, Streets and Highways Code, Section 10100.5.

above any general benefit to transit riders accessing the station, other property owners, or the public at large.

Property-Based Business Improvement Districts (PBID) (also called Community Benefits Districts within some jurisdictions, including Oakland and San Francisco) are distinct from other types of districts because they are managed by a board comprised of property or business owners. These districts typically focus on providing services within a commercial business district.

Potential Use for Capitol Corridor: ***Possible***

The special benefit requirement imposed by Proposition 218 places some significant limitations on the use of special assessment districts for transit purposes. Arguably, many of the benefits of transit accrue to the general public. In most cases, a CFD offers greater flexibility and has the potential to generate greater revenues (as long as the higher voter threshold can be met).

The TBAD tool does offer the advantage of being designed specifically for transit use, although no districts have been created to date under the legislation. BART is currently in the process of exploring opportunities to pioneer the use of TBADs within the BART system. Initial research suggests that the tool is most likely to be used for transit-related projects that directly benefit property owners, such as pedestrian improvements, lighting and landscaping, and shuttles or other transportation demand management systems. As BART moves forward in its efforts to implement a TBAD, this may provide greater clarity about ways it might help to provide funding for Capitol Corridor improvements.

Parcel Taxes

A **parcel tax** is a special tax that is levied on properties within a city, county, community college or school district, or other special district. The tax must be based on characteristics of the parcel, rather than on the value of the property being taxed. In California, parcel taxes must be approved by two-thirds of voters within the affected area. They are most commonly used to pay for schools, but may be imposed for a wide variety of purposes, including transit and other transportation uses. The Alameda-Contra Costa Transit District (AC Transit) is funded in part through a parcel tax that has been increased and extended by voters multiple times. However, over time AC Transit appears to be relying increasingly upon funding from county-wide sales tax measures instead of parcel taxes.

Potential Use for Capitol Corridor: ***Unlikely***

Parcel taxes are not commonly used to fund transit and instead are used to help pay for schools, fire, police and other basic services. Because a parcel tax requires a “supermajority” vote, it can be challenging and costly to institute. Sales tax measures are a more common source of funding for transit. One challenge of parcel taxes is because they are charged on a parcel basis, they tend to place a higher burden on residential properties than commercial properties.

Enhanced Infrastructure Financing Districts

Tax increment financing tools divert incremental growth in tax revenues from taxing entities within a district. In California, new TIF tools have recently been created after the dissolution of redevelopment, however examples of their use remain very limited.

Established in 2014, **Enhanced Infrastructure Financing Districts (EIFDs)** are designed to capture incremental growth in property tax revenues over a base year. Revenues may be used

to fund the acquisition or construction of public facilities and infrastructure. The EIFD is governed by a specially constituted public financing authority comprised of elected officials from the participating taxing entities and appointed members of the public. Participating taxing entities may choose to allocate a share of revenues from several other sources in addition to property tax increment. Voter or property owner approval is not required to establish the district, but a 55 percent vote is required prior to bond issuance. If 12 or more registered voters live within in the district boundaries, approval by those registered voters is required. Otherwise, the vote is by the property owners in the district.

Potential Use for Capitol Corridor: ***Possible***

Tax increment financing works best in locations where significant development is planned on the near horizon. As such, this tool could best be used to help fund improvements in specific station areas where development is planned. Where Capitol Corridor improvements help to create new development opportunities, it can help to create a rationale for the creation of an EIFD to help fund those improvements.

Community Revitalization and Investment Authorities

Authorized by the State of California in September 2015, a **Community Revitalization and Investment Authority** (CRIA) is a new type of tax increment financing tool targeting very distressed areas.

A CRIA can be created by a city county or joint powers authority, following a "majority protest proceeding", as long as voters and property owners do not terminate the CRIA through a protest ballot. In addition, affected taxing entities must consent to allocate a share of incremental property tax revenues to the authority. CRIAs may only be formed in areas that meet selected criteria, including lower than average median household incomes, high unemployment and crime rates, and inadequate infrastructure.

A CRIA may provide funding for infrastructure improvements, affordable housing, property acquisition, brownfield cleanup, loans or grants for property owner and tenant improvements, and other specified purposes. The authority may pay for improvements on a pay-as-you-basis, or finance improvements by issuing bonds. Twenty-five percent of revenues must be set aside to pay for low- and moderate-income housing.

Potential Use for Capitol Corridor: ***Unlikely***

CRIA legislation was designed specifically to provide funding for infrastructure to revitalize low-income neighborhoods, and 25 percent of revenues generated must go toward affordable housing. Where a TIF tool can be used, an EIFD will be better suited to Capitol Corridor improvements. Moreover, because this tool targets areas with specific income, crime, unemployment and other characteristics, it will also not be possible to use it in many locations along the Capitol Corridor.

Development Impact Fees

A development impact fee is a one-time charge to new development, designed to mitigate impacts directly resulting from development activity, and cannot be used to fund existing infrastructure deficiencies (i.e., repair or maintenance of existing infrastructure). Where improvements will benefit existing as well as new development, impact fees can only pay for the portion of the improvement that benefits the new development.

Impact fees do not require voter or property owner approval, but must be adopted based on findings of a "nexus" (or reasonable relationship) between the development paying the fee, the size of the fee, and the use of fee revenues. Because impact fees are dependent on new development projects, they are not usually consistent or predictable enough to serve as security for the issuance of bonds.

San Francisco recently approved a new "transportation sustainability fee", designed to generate revenues to invest in the city's transportation network, including both Muni and BART.

Potential Use for Capitol Corridor: ***Possible***

It is possible that a development impact fee could help to pay for some specific Capitol Corridor improvements, if it can be shown that the enhanced access provided by the Capitol Corridor is needed to support new development. A nexus study would need to show that the fee would pay for a transit improvement that would mitigate a need generated by future new development.

Development fees are typically implemented within a single jurisdiction, and sometimes within a smaller district. Transit agencies do not have the authority to impose impact fees. This tool is most likely to be used in conjunction with a city such as Oakland, San Jose or Sacramento, where transit improvements will help to enable more intensive development.

Community Benefits Program/ Development Agreement

Local jurisdictions in California can also obtain funding for local infrastructure through a community benefits program or development agreement. Cities may directly negotiate with individual developers as they seek entitlements, or create a community benefits program that provides a structure for developer contributions, typically in exchange for additional density and/or height. Under these programs, development may be eligible for a pre-defined increase in density or floor area ratio (FAR) in exchange for providing public benefits (which may be selected from a list of improvements), or funding at a pre-determined, per-square-foot price (which the city uses to pay for district-wide improvements).

Potential Use for Capitol Corridor Improvements: ***Possible (But Limited)***

In certain circumstances it may be possible to negotiate with major property owners to contribute to station area improvements, particularly in locations where transit improvements are accompanied by rezoning, or where major development projects are planned. The CCJPA would need to work closely with a city to include transit improvements in negotiations.

Public Section Real Estate Strategies

Transit agencies and other public entities can also generate revenues through management of their real estate assets. Revenues may be generated through a land sale, ground lease, sale of "air rights" or other type of transaction involving publicly-owned land. However, public agencies also face limitations on how they may use or dispose of property. For example, the California Surplus Lands Act places specific requirements on cities and counties that choose to sell surplus properties, including requiring that a right of first refusal be offered to affordable housing developers. Similarly, where transit agencies used federal funds to purchase land, they face some restrictions on how the proceeds from a land sale may be used.

Potential Use for Capitol Corridor: ***Possible***

Opportunities may exist to leverage properties owned by the Capitol Corridor or other public entities to generate value through sale of land or air rights, however this source is not likely to generate enough revenue to constitute a major source of capital funding.

CONCLUSION

Table 2 summarizes preliminary findings about the potential use of property-based tools to pay for the capital investments described in the CCVIP. Improvements are grouped in categories that are relevant for funding, taking into consideration geographic scale, whether the improvement is likely to have a direct impact on nearby property owners and development potential, and characteristics of the funding tools. Tunnels were listed separately from bridges, viaducts and other major improvements because in some locations (e.g., Oakland's Jack London District) they have the potential to impact street-level activity and development potential. Each of the categories is discussed in greater detail below.

Table 6-2 Summary of Potential for Property-Based Funding

Category	Description/Example	Potential for Property-Based Funding
Corridor-wide improvements	Electric train infrastructure	Limited
	Upgraded signaling systems	
	Curve straightening/grade leveling	
	Intersection improvements (grade separation)	
New storage and maintenance facility	New facility near Tamien Station	Limited
Improvements to existing stations	Enhancements to existing stations	Possible
	Santa Clara Station reconstruction	
	Improvements to Diridon Station to allow it to function as a high-capacity hub	
New stations	New station near Dumbarton Bridge	Possible
	New station(s) in Oakland-Richmond segment	
	New intermodal Oakland Coliseum station	
	New JLS subway station (in conjunction with second Transbay Tube)	
New bridges and viaducts	New viaduct in the Oakland Subdivision	Limited
	New Carquinez Straight crossing	
New tunnels	Jack London District - tunnel below 2nd Street (and possible freight rail tunnel beneath Embarcadero)	Possible but limited relative to total cost
	Tunnel under Downtown Sacramento	
	Franklin Canyon tunnel	
Additional tracks, double tracking and expansion of existing right-of-way	New tracks in Oakland-San Jose segment	Limited
	Oakland-Richmond segment ROW improvements	

- **Corridor-wide improvements**: Investments at the corridor-level are least likely to be funded using property-based funding sources, because the improvements will generate benefits throughout the entire corridor, rather than in a specific area. A parcel tax at the county or county sub-district level could in theory help to fund this scale of improvements, however there is limited precedent for this, and it could be very difficult to obtain the 2/3 vote necessary to institute the tax. While AC Transit has been successful in passing parcel taxes to help fund transit, the service they provide is spread more evenly throughout a broader service district. It is also possible that a city-sponsored transportation impact fee could contribute funding to corridor-level improvements.
- **Storage and maintenance facility**: While the planned facility is technically located within one city/neighborhood, it nevertheless serves a function that is corridor-wide. In theory a parcel tax or development impact fee might be structured to help pay for a portion of the facility. Local district-based financing tools such as a CFD, SAD or EIFD are unlikely sources.
- **Improvements to existing stations**: Station improvements that generate value for the surrounding neighborhood, including improved lighting, streets, sidewalks or other benefits, offer potential for a CFD or SAD. Both of these tools require a vote, and therefore must have local support. Similarly, an EIFD could help to pay for station improvements, but a 55 percent vote would be required to issue a bond based on the revenues generated. In theory, an impact fee could also contribute to station improvements, if the city were to choose to implement a fee, and if it could be shown that the improvements mitigate a transportation need generated by new development (see new stations, below).
- **New stations**: New stations create a strong rationale for property-based financing tools, because they offer a clear benefit to adjacent property owners who previously did not have direct access to the transit service. In some cases, property owners may be willing to contribute in the form of a special assessment or special tax (CFD). The city and other taxing entities may in some cases also be willing to assist with funding improvements through an EIFD or by instituting a development fee. It is important to note that all of these tools are most likely to be viable in locations with relatively strong real estate markets and significant development opportunities.
- **New bridges and viaducts**: Similar to the maintenance facility discussed above, it is unlikely that nearby property owners will vote to assist with funding a nearby elevated transitway. These types of improvements might be included as part of a development fee, or there may be circumstances where a bridge or viaduct is part of a broader set of improvements that help to create development opportunities, and thus might be partially funded through an EIFD.
- **New tunnels:** in most cases, the potential to fund tunnels using property-based sources is likely to be similar to bridges and viaducts above (i.e., limited). However, to the extent that relocating trains underground has a positive impact on surrounding properties – or helps to create new development opportunities – there may be opportunities to use a district-based financing mechanism such as a CFD, SAD or EIFD. In addition, it is conceivable that a city could contribute to the cost of a new tunnel through a development impact fee.
- **Additional tracks and expansions to right-of-way:** These types of improvements will be challenging to fund using property-based tools because they provide a benefit that

is system wide, rather than directly linked to specific properties or development opportunities.

Broadly, the Capitol Corridor investment – and the many far reaching economic benefits it will provide – suggests state or county-level funding sources as the most appropriate. However, this preliminary analysis suggests that there are some circumstances where property-based tools should be considered. Most property-based tools require consent by property owners (or voters), and thus are most likely to be successful where there is a clear value proposition for nearby property owners, particularly where the improvements will directly help to create or enhance development opportunities. For the same reason, these funding sources are more likely to be viable in relatively strong real estate markets. Because the potential for these funding sources depends on the land use and market context, funding opportunities will require further study as the CCJPA proceeds with the project. However, this memo can serve as a preliminary guide for identifying the most likely opportunities for the use of property-based funding sources.

Table 6-3 Property-Based Funding Mechanisms in California

Mechanism	Administering Entity	Geographic Scale	Revenue Source	Voting Requirements	Nexus or Special Benefit Requirement?[a]	Permitted Uses of Funds
Mello-Roos Community Facilities District (CFD)	City, county, special district, school district, joint powers authority	District	Special tax on property	2/3 of property owners or registered voters[b]	No	Construction or acquisition of public facilities (e.g., transit, parks, schools, libraries). May also fund specified ongoing services (e.g., fire, police, lighting). May not fund transit operations.
Special Benefit Assessment District	City, county, special district, or transit agency	District; occasionally jurisdiction-wide	Assessment, usually of property	50% plus one of property owners (weighted by financial obligation of each property under proposed assessment)	Use of assessment must provide special benefit to property owners, and size of assessment must be proportional to special benefits received by property owners	Uses are specified in various assessment acts; typically includes local street, sidewalk, lighting and landscaping improvements and maintenance.
Transit Benefit Assessment Districts (TBADs)	Transit agency	District	Assessment of property	50% plus one of property owners (weighted by financial obligation of each property under proposed assessment)	Use of assessment must provide special benefit to property owners, and size of assessment must be proportional to special benefits received by property owners	Transit-related capital improvements and services. May not fund routine operations or maintenance of the transit system.
Property/Business Improvement District (PBID or BID); Community Benefit District (CBD)	Board comprised of business or property owners (or city or county)	District	Assessment of properties or businesses	50% plus one of property or business owners (weighted by financial obligation of each property or business under proposed assessment)	Use of assessment must provide special benefit to assessees, and size of assessment must be proportional to special benefits received by assessees	Districts may provide services that include safety, maintenance, marketing, capital improvements, economic development, and special events.
Parcel Taxes	City, county, special district, school district	Jurisdiction-wide	Special tax on property	2/3 of registered voters	No	Flexible; typically pay for local government services that benefit the community at large. Most commonly used for schools but have been used to fund transit and local infrastructure maintenance.
Enhanced Infrastructure Finance District (EIFD)	Established by a city or county; administered by a separate Public Financing Authority	District	Future increases in revenues from the existing property tax rate, as well as other specified sources	No vote required for formation; however, 55 percent of property owners or registered voters must approve issuance of tax increment bonds[c]	No	Construction or acquisition of public facilities and infrastructure, including transit facilities. May not fund routine operations or maintenance.
Community Revitalization and Investment Authority[d]	Established by a city, county, or joint powers authority	District	Future increases in revenues from the existing property tax rate	Protest process, and 50 percent plus approval by a combination of property owners and voters required in specific situations	No	Rehabilitation, repair, upgrade, or construction of infrastructure; may not be used to fund operations or maintenance.
Development Impact Fee	City, county, special district, school district	District or jurisdiction-wide	One-time fee on new development, authorized under the Mitigation Fee Act	None	Requires reasonable relationship ("nexus") between the development paying the fee, the size of the fee, and the use of fee revenues	Funds may only be used to mitigate impacts caused by new development, which may include impacts on a transit system.
Community Benefits Fee/Agreement	Land use authority (city or county)	Development site	Negotiated contribution or fee structure (e.g., through development agreement or conditions of approval)	None	No nexus required so long as contribution is voluntary	Negotiable.
Public Sector Real Estate Strategies (e.g. joint development, land sale)	Transit agency or other public land owner	Development site	Sale or ground lease of publicly owned land	None	No	May be subject to limitations, e.g., requirements for property purchased with federal dollars.

Mechanism	Administering Entity	Geographic Scale	Revenue Source	Voting Requirements	Nexus or Special Benefit Requirement?[a]	Permitted Uses of Funds
Notes: Requirement for a "nexus" (or reasonable relationship) between the entities paying the fee, the amount they pay, and the benefit they receive, or a “special benefit” to the property owners subject to the assessment, over and above any general benefits to other property owners or the public at large. CFDs may be approved by a two-thirds majority of property owners in the proposed district, so long as there are no more than 12 registered voters living within the proposed boundary. If there are more than 12 registered voters living within the boundary, two-thirds approval by voters living within the district is required. Tax-increment bond issuances may be approved by a 55 percent majority of property owners in the proposed district, so long as there are no more than 12 registered voters living within the proposed boundary. If there are more than 12 registered voters living within the boundary, 55 percent approval by voters living within the district is required. Community Revitalization and Investment Authorities may only be formed in areas where the annual median household income is less than 80 percent of the statewide median, and three of the following four conditions are met: the unemployment rate is 3 percent higher than the statewide median; crime rates are 5 percent higher than the statewide median; infrastructure is deteriorated or inadequate; commercial or residential structures are deteriorated. Source: Strategic Economics, 2016. Adapted from “Value Capture Toolkit”, prepared for the Metropolitan Transportation Commission by Strategic Economics, December 2015.						

7 POTENTIAL IMPACTS OF BART PLANS

The Initial Study Corridor recommended by this effort includes a new, underground station at Jack London Square in Oakland. The precise location of this station is undefined. This is in part because of remaining uncertainty about whether BART will eventually construct a new line through Jack London as part of a second Transbay Tube project, and if so, which alignment it would follow. If BART were to add a station at Jack London, any new Capitol Corridor station should be connected to it. A second Transbay Tube could also, potentially, include standard-gauge tracks that could be used by Capitol Corridor trains or by other trains operating on Capitol Corridor tracks, impacting Capitol Corridor plans.

BART has studied second Transbay Tube alignments as part of the Vision and Core Capacity Study projects (the latter a collaboration with other agencies including MTC). Potential alignments it has studied would run north-south through Jack London, crossing a Capitol Corridor tunnel under Embarcadero or 2nd. Alignments that have been studied are under Franklin and extending from the Interstate 980 right-of-way under Howard Terminal.

An underground Capitol Corridor station at Jack London could connect to a Jack London BART station along either of these alignments, via pedestrian tunnels and vertical circulation. As BART trains would be just a few minutes from San Francisco at this point, this would become an intermodal hub of regional significance, providing access into San Francisco, via a relatively seamless transfer, from as far away as Sacramento. Capitol Corridor riders could also easily connect to BART stations along the new BART line in Downtown Oakland.

Inclusion of standard-gauge tracks in a second Transbay Tube could have a greater impact on Capitol Corridor plans and operating patterns. A branch from the tube extending under Alameda Point and Mandela Parkway in West Oakland, for example, could allow direct standard-gauge service from Emeryville to San Francisco (and potentially beyond the city, to the Peninsula and South Bay, if the Tube connected to the Caltrain corridor at the Transbay Transit Center). If such a plan were to be adopted, the Initial Study Corridor would need to adapt to it.

Date: November 10, 2016
From: David B. Kutrosky
To: CCJPA Board
Subject: Managing Director's Report – November 2016

Service Performance Overview

Growth on the Capitol Corridor from FY 16 continues into October 2016, the first month of the CCJPA's FY 16-17. A total of 137,413 passengers rode the Capitol Corridor trains in October 2016, 2.4% above October 2015 with revenues were up a solid 5.1%. The System Operating Ratio was 52%, slightly above the FY 17 standard of 51%. On-Time Performance (OTP) for October was 92%, which dropped slightly compared to October 2015 primarily due to delays from trespasser incidents and signal disruptions. Customer Satisfaction scores are not yet available for October 2016.

Standard	Oct. 2016	Oct. 2015	YTD	vs. Prior YTD	vs. FY17 Plan
Ridership	137,413	2.4%	137,413	2.4%	9.0%
Revenue	$2,786,923	3.8%	$2,786,923	3.8%	4.8%
Operating Ratio	52%	56%	52%	-5.9%	2.3%
OTP	92%	94%	92%	94.4%	2.4%
Customer Satisfaction	n/a	90	n/a	n/a	n/a

The following are ridership highlights for October 2016:

- Average weekend ridership for October grew by 2% compared to October 2015, thanks to strong ridership to/from Raider and 49er football games.
- Average weekday ridership for October continues positive gains with a 4% Year-Over-Year (YOY) increase attributed by strong growth on morning trains.

Detailed performance results are not yet available from Amtrak for October 2016.

State Legislation

Efforts continue to pass the special session legislation [SBX1-1/Beall and ABX1-26/Frazier] that would address the state's transportation funding deficit. Unfortunately, these bills do not include dedicated capital funding for the state's successful intercity passenger rail (IPR) services/program. To that end, the CIPR agencies are working with interested parties to ensure this legislation includes a dedicated state funding source for the CIPR services, including the Capitol Corridor. It is unclear if these legislative proposals will be taken up in the lame duck session (November 9-30, 2016) or if this proposal will be re-introduced in the next 2-year legislative session [2017-2018].

FY 2017 Federal Appropriations

The short-term Continuing Resolution (CR) passed by Congress to keep the federal government funded expires December 10, 2016. After the 2016 General Election, Congress will need to reconvene to determine how to keep the federal government operating after the CR expires. Such actions taken by Congress for FY 2017 may include limited funding for federal rail title programs that could provide funding to the Capitol Corridor:

Customer Service Program Upgrades

CCJPA Bike Access Program. Installations of station platform eLockers has begun at the first of the eleven stations and will continue into December 2016. CCJPA is in discussions with an interested

vendor to reconfigure on-train parking to determine if additional bike spaces can be provided on select passenger rail cars. The folding bicycle rental delivery partners are meeting with the CCJPA to see if a partnership can form which would then allow CCJPA to procure these services in the near term.

Richmond Station Platform Improvements. Site visits have taken place with CCJPA and its engineering support team that will help with the design plans for the proposed installation of the Flashing Beacon Signal and Parking Validation Machine at the Richmond station. These project are being closely coordinated with BART and will improve intermodal connectively for BART passengers transferring to Capitol Corridor trains and also allow Capitol Corridor passengers to pay for parking in the BART parking garage using a Clipper Card.

Safety Initiatives

State Rail Safety Month (September 2016). As part of this year's California Rail Safety month, on September 28, the CCJPA joined Union Pacific, Amtrak and local law enforcement agencies on a safety train that traveled between the Richmond and Martinez stations. Local enforcement was positioned at numerous crossings to make citations and keep trespassers off the tracks. It was determined that there were sites along the right of way that needed fencing repairs and upgrades. The next safety train is planned to be in January 2017.

Station Signage and Platform Safety Upgrades. The procurement process has begun to construct improved informational signage at selected Capitol Corridor stations. These glass-front display signs will display train schedules, safety and other pertinent information, following the signage standard adopted at the September 2015 meeting. CCJPA has contracted with Amtrak to install security cameras at the Auburn, Rocklin, Roseville and Suisun stations. Separately, CCJPA has contracted with Amtrak to install lighting and a standby power system at the Auburn layover site. Amtrak anticipates completion of these projects by the end of December 2017.

Positive Train Control Update. The Union Pacific Railroad has continued to advance PTC implementation on their system. The Union Pacific's testing of the PTC system now includes the Los Angeles area as well as the Northern California area. The testing includes only select Union Pacific trains, and at this time does not include any operating partners such as Amtrak, Capitol Corridor or ACE. The CCJPA has received and is reviewing initial information from UPRR on the expected testing procedures, and the costs to install and maintain PTC for the Capitol Corridor.

Installation of the PTC hardware (electronic equipment) on the state-owned rail equipment is currently complete for the Northern California intercity rail fleet (supporting the Capitol Corridor and San Joaquin trains) with all locomotives and cab cars equipped; however certain radio hardware is subject to a manufacturer's recall and is being returned for retrofit. Some software installation and programming remains, and will be completed prior to beginning testing of the PTC system. Lastly, Amtrak is continuing with its installation of a Back Office Server that will communicate the location of Amtrak-operates trains from this server to the host railroad dispatch centers. Taken together, the testing for the implementation of PTC for the Capitol Corridor will likely begin in mid-2017. Caltrain has begun testing their PTC system known as CBOSS, but they have not yet extended their testing to any other operating partners.

Project Updates

Travel Time Savings Project: The CCJPA has executed its agreements with UPRR to start the infrastructure upgrades as part of the CCJPA-funded Travel Time Savings Project, with the intent to reduce run times by up to 10 minutes for Capitol Corridor trains between Sacramento and San Jose. The work is expected to be completed by mid-2017.

Oakland-San Jose Phase 2 Track Project: The engineering and environmental consultants continue

working for CCJPA on the Newark-Albrae and Great America double track segments. The results of the initial surveys are now being incorporated into the conceptual design plans. Stakeholder meetings are occurring to chart a path to implement the needed track and signal improvements in the sensitive wetlands areas. Concurrently, Caltrain is completing the design and environmental plans for the track upgrades into and out of the San Jose Diridon Station terminal facility as a means to accommodate additional Capitol Corridor trains.

Sacramento-Roseville 3rd Track Project: Phase 1 of the Project is fully funded with the CCJPA seeking allocation of the state funds by early 2017. Once the necessary funding agreements are executed, UPRR and CCJPA will move into final design for the Phase 1 effort.

Outlook – Closing

With the start of a new fiscal year (FY16-17), the performance of the Capitol Corridor service for October 2016 carries forward the positive trends experienced from the recording-breaking prior fiscal year (FY 15-16). These results show sustained growth in ridership and revenues that exceed budget projections and set a strong path for continued success for FY 16-17 that is based on a safe, reliable, customer-focused service plan for the Capitol Corridor trains. The CCJPA will continue to advance Positive Train Control installation and other safety and customer service upgrades while implementing service enhancement plans (Sacramento-Roseville 3rd Track Phase 1 and Travel Time Savings projects) for the Capitol Corridor.

2016-2017

Capitol Corridor- Completed/Proposed
Marketing & Communications Activities Calendar

Modified 11/4/2016

July

- ✓ Oakland A's promotion ongoing
- ✓ USA Gymnastics promotion and discount
- ✓ Renewal of contracts with marketing vendors
- ✓ Continue budget close out of FY16
- ✓ Sacramento River Cats promotion continues
- ✓ Special service (delayed train) to International Champions Cup soccer match
- ✓ PedalFest promotion

August

- ✓ River Cats and A's promotions continue
- ✓ San Jose Jazz Festival
- ✓ Group Travel Planning for FY16
- ✓ New Timetable, 8/22
- ✓ Café Car Menus published
- ✓ Oakland Raiders promotion begins
- ✓ Cal Athletics promotion begins

September

- ✓ Oakland A's and River Cats promotions end
- ✓ Take 5 and Senior Midweek offers end
- ✓ KHTK Oakland Raiders radio promotion begins
- ✓ Visit Sacramento/Gold Rush Days promotion
- ✓ Rail Safety Month: video, social media
- ✓ Eat Real Food Festival promotion
- ✓ Rider Appreciation/Cappy Hour onboard event
- ✓ SHN/Lion King promotion begins
- ✓ Outreach at University of California Davis

October

- ✓ Golden 1 Center opening/Sacramento Kings
- ✓ "Outside my window" Social Media photo contest
- ✓ 2017 Transit Transfers, Placer Step-Up Coupons
- ✓ Begin design/production of Annual report
- ✓ Pier 39/Rocketboat, SF Giants, A's, Rivercats and Great America promotions end

November

- Cal, Raiders promos continue
- SHN/Lion King promotion/train wrap
- 25th Anniversary planning
- Advertising RFP
- "Outside my window" photo contest voting and announcement of winners

December

- 25th Anniversary event, promotion and fare offer
- SHN/Lion King promotion/train wrap
- Harlem Globetrotters promotion

January

- Business Plan– draft and Public Workshops

February

- Stitch 'n' Ride Discount Offer
- Annual Report published & mailed

March

April

- BART Blue Sky Event – San Francisco
- Possible Schedule Change

May

- Local Bike to Work Day events

June

- Contract/Vendor planning for FY18

Status Report – CCJPA Marketing: 11/4/2016

ADVERTISING, PROMOTIONS & EVENTS

Advertising/Promotions

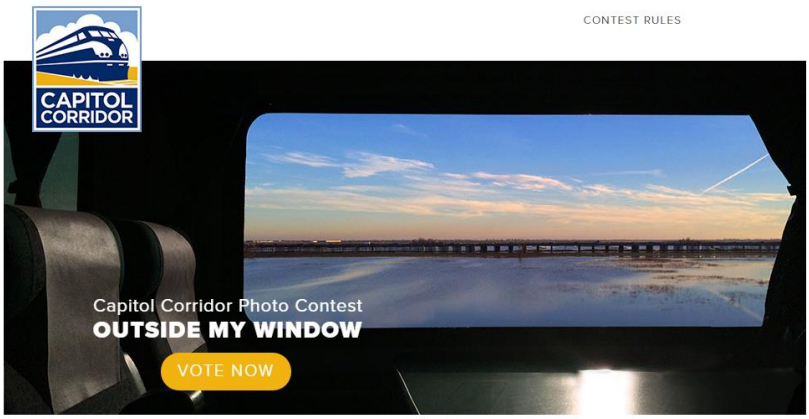
- Continued Friends & Family promotion
- Take 5 and Senior Midweek advertising campaign, July-Sep
- KHTK Raiders radio promotion

Marketing Partnerships

- 9/12 & 10/6 Special late return trains for Levis Stadium/ SF 49ers games
- ***Sports Partnerships:*** Oakland Raiders: 25% fare discount for 2016 season, Oakland A's: 25% fare discount for 2016 season, Cal Athletics: 25% fare discount for 2016 football season, River Cats, San Francisco Giants
- **Destination Partnerships:** Great America, Pier 39/Rocket Boats
- **Event Partnerships:** San Jose Jazz Fest, Eat Real Festival – Jack London Square, Oakland
- **Theater Partnerships:** SHN/Lion King

Public/Media Relations, Announcements & Events:

- "Outside my window" Social Media photo contest



Status Report – CCJPA Marketing: 11/4/2016

WEBSITE/ E-MAIL/ BLOG/SOCIAL MEDIA/ ON BOARD WI-FI

- **Capitol Corridor Communications: Service Alerts/CC Rail Mail/Blog/Wi-Fi Landing Page**

CC Rail Mail E-Newsletter	**Service Alerts (Email and Text)**	**Get On Board Blog**
3,581 subscribers	2,718 subscribers	711 subscribers

- **Get On Board (www.capitolcorridor.org/blogs/get_on_board) –** CCJPA staff recently developed eight destination-based, lifestyle articles that can be promoted via the blog throughout the year. These articles, which feature destinations along our route, are in addition to the various other features written by CCJPA staff, including the increasingly-popular *Weekend Picks*, which highlights weekend events along the route, and other news-related posts. Staff has also established other administrative tools to assist in managing publication of content via the many social media channels.

- **Blog Activity for September/October 2016:**
  - Blogs posted: 17
  - Blog pageviews: 6,018
  - Top 3 blog posts (by pageviews):
    1. Golden 1 Center Service
    2. Start of Football Season
    3. European Vacation via the Capitol Corridor

- **Onboard Wi-Fi Landing Page for October 2016:**
  - 67,234 pageviews (41,690 unique pageviews)
  - New Content updates include: Lion King/SHN, Oakland Raiders offer, San Jose Jazz Fest music tracks, Sactown magazine, "Docks to Delta" podcast, "Outside my window" photo contest

- **Twitter, Facebook, Instagram**

Facebook Fans = 11,536	Twitter Followers = 4,378	Instagram Followers = 956

JOINT COMMUNITY/MEMBER AGENCY PROJECTS

- **Yolobus Y Shuttle** – Coordinated special return service & PR on the Y Shuttle for travel between Sacramento and Davis after late-night Golden 1 Center events.
- **Placer County Transportation Planning Agency -** Coordinated with staff on outreach to promote the Sac/Roseville project, including printing of brochures and editing of informational video for PCTPA to use in advertising. FY17 agreement still pending.

ONGOING OFFERS

- **20% coupon** – This coupon is used primarily to offer a discount to single travelers and/or assist with customer service, so this is not in major distribution. New coupon began February 2016 and expires January 2017.
- **Friends & Family** – This discount is for small groups of two to six passengers, offering 50% off up to 5 companion fares with the purchase of one full-fare ticket. Friends & Family tickets must be purchased online, 2 days in advance. The promotion officially ends January 2017; however, we will renew the offer, as it is now established as an ongoing, small-group fare offer.

Status Report – CCJPA Marketing: 11/4/2016

PROMOTIONS REPORT

Take 5 for $5	Jun	Jul	Aug	Sep	Total YTD	Trend
Ridership	587	2269	2437	1461	6754	
Revenue	$ 7,331	$ 26,331	$ 27,953	$ 15,810	$ 77,425	

Senior 50% Midweek	Jun	Jul	Aug	Sep	Total YTD	Trend
Ridership	1370	2251	2650	157	6428	
Revenue	$ 17,928	$ 29,487	$ 34,761	$ 1,994	$ 84,170	

Friends & Family	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total YTD	Trend
Ridership	582	847	862	1,272	1,194	784	557	433	839	7,370	
Revenue	$ 10,834	$ 14,544	$ 15,576	$ 22,969	$ 20,244	$ 14,426	$ 10,185	$ 8,399	$ 16,045	$ 133,222	

Oakland A's	Mar	Apr	May	Jun	Jul	Aug	Sep	Total YTD	Trend
Ridership	4	479	537	383	382	490	630	2,905	
Revenue	$ 58	$ 9,438	$ 10,340	$ 7,452	$ 7,104	$ 9,946	$ 12,508	$ 56,847	

Oakland Raiders	Aug	Sep	Total YTD	Trend
Ridership	46	464	510	
Revenue	$ 886	$ 9,309	$ 10,195	

Status Report – CCJPA Marketing: 11/4/2016

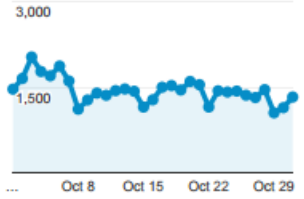
WEBSITE STATISTICS – OCTOBER 2016

CCJPA Dashboard Oct 1, 2016 - Oct 31, 2016

All Users
100.00% Sessions

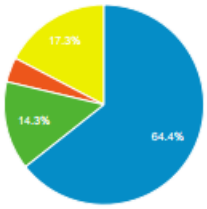
Visits

Sessions



Visits by Source

google (direct) amtrakcalifornia.com Other



Pageviews by Page path level 1

Page path level 1	Pageviews
/	19,306
/stations/	16,649
/schedules/	16,572
/tickets/	5,592
/route-map/	4,653

Avg. Visit Duration

00:01:58
Avg for View: 00:01:58 (0.00%)

Bounce Rate

61.20%
Avg for View: 61.20% (0.00%)

Pageviews

82,863
% of Total: 100.00% (82,863)

% New Visits

65.01%
Avg for View: 65.01% (0.00%)

Pages/Visit

1.86
Avg for View: 1.86 (0.00%)

Unique Visitors

32,659
% of Total: 100.00% (32,659)

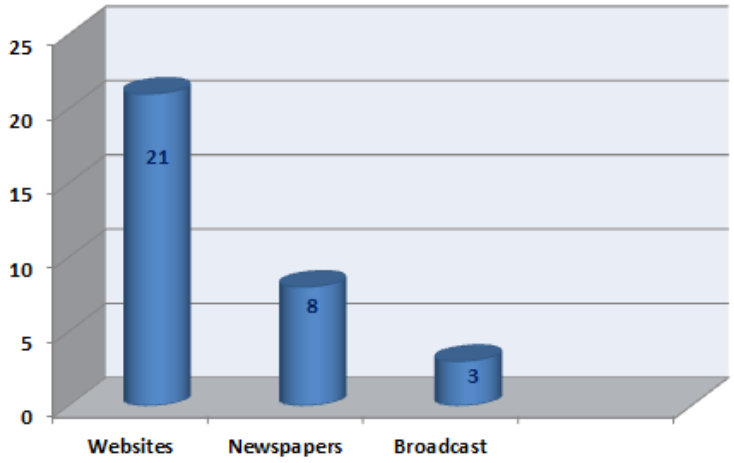
Status Report – CCJPA Marketing: 11/4/2016

EARNED MEDIA REPORTS – September 2016

September 2016	
TOTAL EARNED MEDIA VALUE	**$ 492,007**

Media Type Analysis:

Capitol Corridor generated a total of 32 articles for the month of September 2016.



Newspapers published 8 articles. The prominent newspapers were San Jose *Mercury News*, *the Sacramento Bee*, *the Napa Valley Register* and *East Bay Times.*
Broadcast generated 3 clips from *KRON* and *KCRA*.
Websites contributed 21 articles from *Pinole Patch*, *San Leandro Patch*, *Alameda Patch*, and *Piedmont Patch.*

Trend of Coverage:

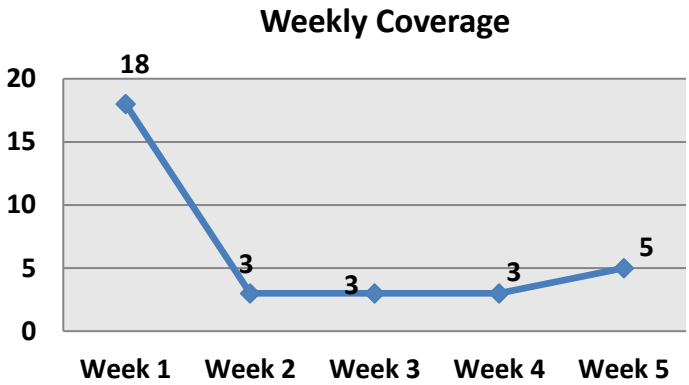
Week 1 contributed **eighteen** articles. Top theme:
- A Man being hit by Capitol Corridor's No.736 train traveling between Oakland and Sacramento

Week 2 generated **three** articles. Major theme was:
- A Car being hit by Capitol Corridor train in Union City

Week 3 generated **three** articles. Major theme was:
- Pedestrian being struck by Capitol Corridor train in Oakland

Week 4 had **three** articles. Prominent themes were:
- Capitol Corridor Service adding late night trains in Downtown Sacramento

Week 5 saw **five** articles. Major theme included:
- Capitol Corridor trains availing from west of Sacramento cities for Kings games



FY 2017 ENCUMBERED CONTRACTS & PURCHASE ORDERS
CAPITOL CORRIDOR JOINT POWERS AUTHORITY

Encumbered Contracts	Sep-16	Oct-16	Prior FY 17 Expenditures	FY 17 Total
Transit Transfers [Printing]	$ 9,000.00			
Miscellaneous	$ 5,280.00			
Sub-total	**$ 14,280.00**	**$ -**	**$ 217,940.00**	**$ 232,220.00**
Purchase Orders				
Miscellaneous	$ 2,800.00	$ 1,600.00		
Sub-total	**$ 2,800.00**	**$ 1,600.00**	**$ 264,010.00**	**$ 268,410.00**
TOTAL	**$ 17,080.00**	**$ 1,600.00**	**$ 481,950.00**	**$ 500,630.00**