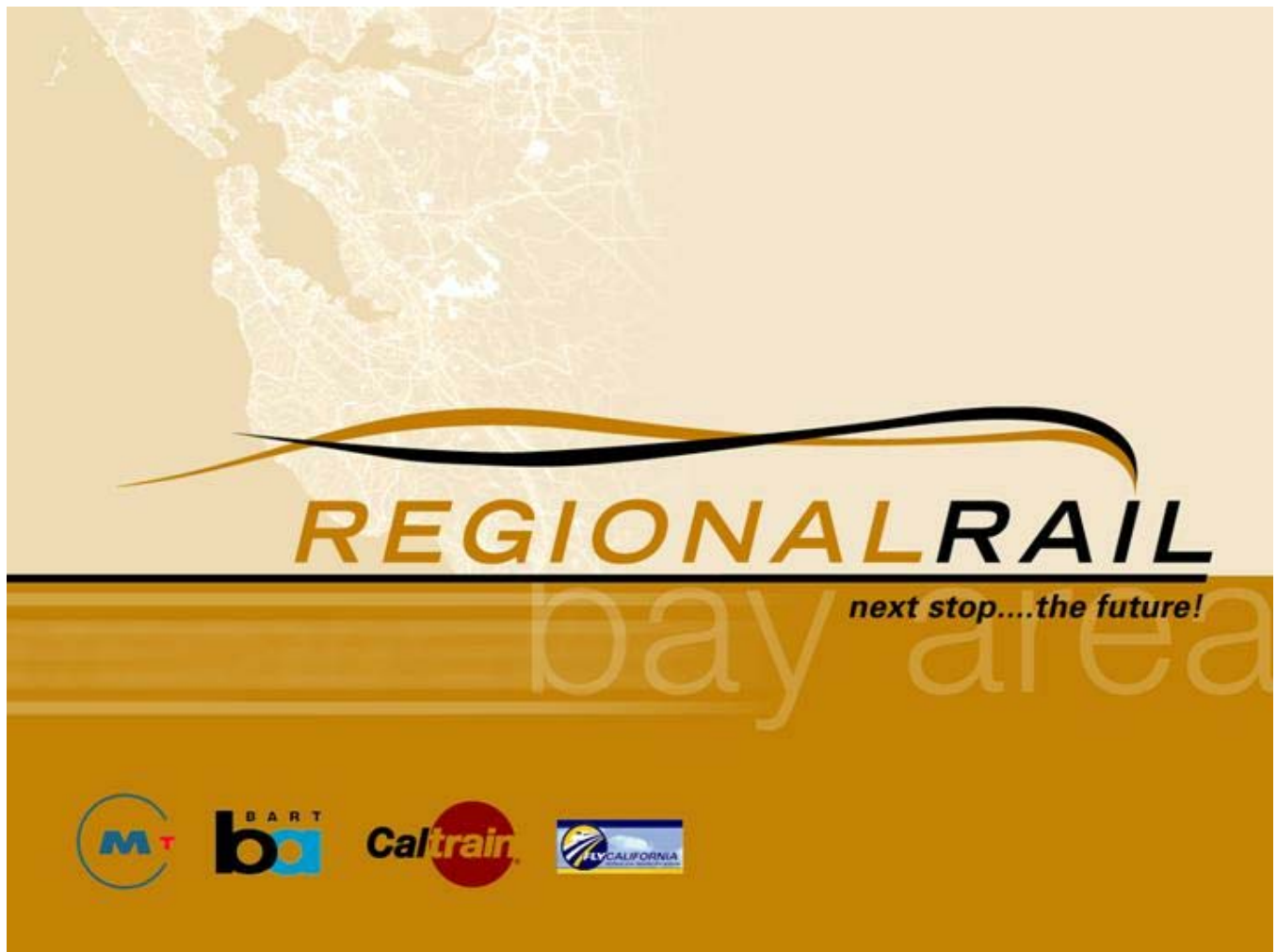


BAY AREA REGIONAL RAIL PLAN

DRAFT EXECUTIVE SUMMARY



July 24, 2007

 **EarthTech** | DMJM HARRIS | AECOM
A **tyco** International Ltd. Company

Table of Contents

- E1. Executive Summary..... 3**
- E1.1 Purpose and Need..... 3
- E1.1.1 Goals and Objectives of Regional Rail Plan 3
- E1.1.2 Regional Rail Elements 4
- E1.1.3 Need for Regional Rail Network 4
- E1.1.4 Regional Rail Vision..... 5
- E1.2 Definition and Evaluation of Alternatives 6
- E1.3 Study Outcomes 7
- E1.3.1 Without High Speed Rail..... 7
- E1.3.2 High Speed Rail Findings 9
- E1.4 Implementation 12
- E1.5 Next Steps 12

E1. Executive Summary

The Metropolitan Transportation Commission (MTC), California High-Speed Rail Authority (Authority), Bay Area Rapid Transit District (BART), and Peninsula Corridor Joint Powers Board (Caltrain), along with a coalition of rail passenger and freight operators, have prepared a Regional Rail Plan for the Bay Area, as required by the voters in the Regional Measure 2 (RM2) Traffic Congestion Relief Program. This Regional Rail Plan examines ways to incorporate passenger trains into existing rail systems, improve connections to other trains and transit, expand the regional rapid transit network, increase rail capacity, and coordinate rail investment around transit-friendly communities and businesses. The plan also includes a detailed analysis of potential high-speed rail routes between the Bay Area and Central Valley.

Overall, the Bay Area Regional Rail Plan identifies potential improvements and extensions of railroad, rapid transit, and high-speed rail services for the near, intermediate, and long-terms. The Regional Rail Plan recommendations considered engineering feasibility, cost, ridership, operational, environmental, and other factors. A corridor-by-corridor description is provided, along with a phasing strategy for implementation through the years 2015, 2030, and 2050. The four study partners, Steering Committee, key stakeholders, and the general public were consulted at key study milestones throughout the development of the plan. The recommended study outcomes and implementation strategies provide a solid framework and vision for the Bay Area regional rail network.

E1.1 Purpose and Need

The purpose of creating the Regional Rail Plan is threefold:

- To comprehensively identify a vision for a robust, interconnected system of Bay Area passenger rail improvements and expansions to guide investment decisions
- To create a safe, fast, reliable, and integrated passenger and freight rail network that addresses the tremendous growth anticipated in transportation demand.
- To sustain and enhance the economic vitality of Northern California, while minimizing the impact on the environment, by providing excellent transit service that strengthens existing downtowns and economic centers.

E1.1.1 *Goals and Objectives of Regional Rail Plan*

The Regional Rail Plan's network and services are intended to:

- Address the combined challenges of moving people and goods;
- Provide people with a link to commercial, employment, and residential centers;
- Expand capacity for goods movements to support the regional economy;

- Serve as the backbone of an integrated regional transit network, with seamless connections at key transit hubs to local transit services;
- Accommodate development of statewide high-speed rail, and enable operation of regional services along high-speed lines, and vice-versa;
- Identify policies and incentives to encourage local governments to create well-designed, walkable communities with a mix of services near transit;

And,

- Explore a governance structure that can develop regional system improvements and deliver coordinated, customer-oriented services.

E1.1.2 *Regional Rail Elements*

There are four components to Regional Rail:

1. Rapid Transit (BART)
2. Railroad-Based Services
3. High-Speed Rail System
4. Interfaces to Other Regional Transportation Modes – Regional Bus and Ferry

E1.1.3 *Need for Regional Rail Network*

Several factors have created a pressing need for planning and creating a regional rail network including:

- On-going growth of the nine-county Bay Area;
- Growth of in-commute from the Sacramento and San Joaquin Valleys;
- Increasing international trade and regional freight movement;
- Development of high levels of traffic congestion;
- Growing cost of inaction to the economy and environment;

And,

- Reduce energy consumption and greenhouse gas emissions.

When combined, these factors create urgency for developing, adopting, and implementing this regional rail vision.

E1.1.4 *Regional Rail Vision*

Key elements of this vision include:

- The Right Technology Should Be Used With The Right Corridor – A broad range of rail technologies, including BART and conventional passenger trains like Amtrak are considered in this plan. Emerging technologies such as non-Federal Railroad Administration compliant Electric Multiple Unit (EMU) trains are also explored. These trains run on standard gauge rail tracks but must be separated from freight trains. They have significant cost and speed advantages over conventional trains and are included in the plan on selected segments.
- The BART System Is The Backbone – The BART system serves as the backbone of the regional rail network and it is clear there will be capacity constraints and renovation needs for the existing system. This reinvestment should be a top regional priority over the next few decades.
- The BART System's Outward Expansion Is Nearly Complete – While BART will always remain at the core of the region's rail system, its outward expansion potential is limited. Once the extension to San Jose is completed, and the existing lines are brought to logical terminals in Livermore, Santa Clara and East Contra Costa County, no additional outward extensions of the BART technology are contemplated. This is important, not only because portions of the existing BART system will be reaching capacity limits, but also because higher-speed express trains would better serve outlying suburban markets. Instead, BART will evolve toward a higher-frequency, highly productive metro system. New BART lines are considered only to alleviate capacity concerns in the Transbay Corridor and to serve dense urban markets in the inner East Bay and San Francisco, and to provide additional connectivity to the regional/inter-city rail system.
- The Bay Area Needs A Regional Rail Network – As the BART system becomes more of a high-frequency, close stop spacing urban subway system, similar to the Paris Metro or Berlin "U-Bahn" network, it would need to be complemented with a larger regional express network serving longer-distance trips. The European counterpart to the metro is the "S-Bahn" in Berlin or the Regional Electric Rail (RER) in Paris. These European rail systems provide a truly integrated inter and intraregional rail system that minimizes transfer barriers for its customers. The next step is to incrementally separate passenger rail rights-of-way from freight rights-of-way and over time develop a higher speed, express regional rail network. These trains would run largely on existing tracks, some shared with freight and others in their own rights-of-way with specialized signaling and dispatch systems. Over the next 40 years, much of the new investment in intercity and suburb-to-city regional rail in Northern California will utilize modern, standard-gauge equipment, following the model of most European and Asian capitals.
- Rail Infrastructure Must Be Expanded To Accommodate Growth In Passenger And Freight Traffic – To allow the region's economy to continue growing while meeting increased passenger needs, the freight and passenger rail systems must be increasingly accommodated. This plan acknowledges that certain freight corridors require additional mainline tracks to support high-frequency freight and passenger services.

- High-Speed Rail Provides Opportunities to Enhance and Accelerate Regional Rail Improvements – High-Speed Rail complements and supports the development of regional rail – a statewide high speed train network would enable the operation of fast, frequent regional services along the high-speed lines and should provide additional and accelerated funding where high-speed and regional lines are present.

E1.2 Definition and Evaluation of Alternatives

After developing a broad range of conceptual regional rail alternatives for the Bay Area network, a screening and refinement process was conducted. This effort resulted in a narrowing of the alternatives for advancement into the final evaluation.

Since the existing services are already in place and the MTC's Resolution 3434 includes the Baseline improvements, the regional rail analysis primarily focused on Alternatives 1 and 2 to identify those elements that are the most promising for the Bay Area network without high-speed rail. The evaluation was conducted on a corridor-by-corridor level using criteria such as engineering feasibility, capital costs, travel demand, operational impacts, connectivity, environmental, and implementation issues. As a result, some elements of either Alternative 1 or Alternative 2 emerged as recommended improvements for the different corridors, resulting in a hybrid alternative. The recommended high-speed rail networks were then developed using the recommended hybrid regional rail alternative as the basis.

Following are the final study alternatives that were identified with and without high-speed rail:

- **Existing:** Includes existing Capitol Corridor, Amtrak San Joaquin, Altamont Commuter Express (ACE) and Caltrain standard passenger rail, along with BART services; these systems currently integrate with local rapid transit to provide end-to-end mobility.
- **Baseline – Year 2030:** Encompasses MTC's Regional Transit Expansion Program (Resolution No. 3434), including nine new rail extensions and significant service expansions to existing rail lines; introduces Sonoma-Marín Rail Transit Project (SMART), Dumbarton, and eBART, as well as enhancements to the Capitol Corridor, Amtrak San Joaquin, ACE and Caltrain. It also includes BART "Core Capacity" improvements.
- **Alternative 1 – Year 2050 – Regional Rail with BART Systemwide Expansion Focus:** No high-speed rail; standard passenger rail shared with freight (capacity improvements as needed); freight dispatching optimized on shared lines; separate freight and passenger tracks on high capacity corridors; short-haul freight between Port of Oakland and Central Valley via Altamont; BART "Regional Expansion;" New BART Transbay Tube; and new San Francisco Subway. Improvements to construct this system are estimated to cost nearly \$40-billion in present day (2006) dollars. Systemwide regional rail ridership on an average weekday would reach 1.35-million riders by Year 2050.
- **Alternative 2 – Year 2050 – Regional Rail with Railroad-Based Services Expansion Focus:** No high-speed rail; lightweight passenger rail system separated from freight on high volume corridors (higher speed, grade separated and electrified system); Transbay rail tunnel to allow extension of Peninsula electrified service to connect with East Bay; freight operating practices independent from passenger operations; and BART "Mass Transit" provider with additional

stations and short extensions. Alternative 2 is expected to cost \$37-billion in present day (2006) dollars and would carry nearly 1.20-million rail passengers on an average weekday in Year 2050.

- **High-Speed Rail – Year 2050 – Entry from East via Altamont Pass:** Starting with the recommended Regional Rail network without High-Speed Rail, revisions were made to the regional network to reflect the inclusion of a high-speed alignment entering the Bay Area from the East. These revisions include the additional investment in corridors where high-speed rail would operate as well as consideration for operation of regional services operating on the high-speed lines and opportunities to accelerate improvements to regional corridors affected by the Altamont alignment.
- **High Speed Rail – Year 2050 – Entry from South via Pacheco Pass:** Starting with the recommended Regional Rail network without High-Speed Rail, revisions were made to the regional network to reflect the inclusion of a high-speed alignment entering the Bay Area from the South. These revisions include the additional investment in corridors where high-speed rail would operate as well as consideration for operation of regional services operating on the high speed lines and opportunities to accelerate improvements to regional corridors affected by the Altamont alignment.

For the definition and evaluation of alternatives, the Bay Area Regional Rail Plan was divided into the following corridors:

- BART System (all lines)
- US 101 North Corridor (Marin ↔ Sonoma)
- North Bay Corridor (Marin ↔ Solano)
- I-80 Corridor (Auburn ↔ Oakland)
- East Bay Corridor (Oakland ↔ San Jose)
- Transbay Corridor (San Francisco ↔ Oakland)
- Peninsula Corridor (San Francisco ↔ San Jose)
- South Counties Corridor (Santa Cruz, Monterey, San Benito)
- Dumbarton Corridor (Redwood City ↔ Union City)
- I-680 & Tri-Valley Corridor (Contra Costa & Southern Alameda)
- Central Valley Corridor (Sacramento ↔ Merced)
- Grade Crossings and Grade Separations (all lines)

E1.3 Study Outcomes

The Regional Rail study explores three study outcomes:

1. Regional Rail without High Speed Rail
2. Regional Rail with High Speed Rail entering from East (Altamont Pass)
3. Regional Rail with High Speed Rail entering from South (Pacheco Pass)

E1.3.1 Without High Speed Rail

This section identifies the recommended services and improvements for the Bay Area Regional Rail Plan that emerged from the evaluation of Alternatives 1 and 2, assuming no high-speed rail. Absent high-speed rail, the recommended regional rail network would have the following key characteristics:

- BART – Reinvest in existing system to improve reliability and make the following improvements:
 - Improve Core Capacity by making modifications to vehicles and stations as well as track and signals to accommodate passenger growth over the long term
 - Implement connectivity improvements to connect BART with standard railroad services and regional bus lines in various corridors
 - Construct 4th track through Oakland to facilitate throughput and improve transfer convenience between East Bay and Transbay lines
 - Develop Infill stations at various locations keyed to local land use opportunities in accordance with BART station planning policies
 - Further define “Metro” service plan to increase capacity, coverage and reliability to inner Bay Area including the Oakland - Transbay – San Francisco zone
 - Pursue construction of a second Bay Crossing with new subway line to improve coverage to San Francisco in the long term (paired with rail tunnel)
- US 101 North – Implement SMART project and make capacity and operational improvements over the long term to support ridership levels
- North Bay – Preserve corridor in near term and develop north-south and east-west services using standard equipment in the long term
- I-80 & East Bay – Expand the East Bay rail network from San Jose to Sacramento to 3 tracks with 4 track sections from Oakland to Richmond and in Solano County to support operation of standard higher speed railroad equipment compatible with freight traffic
- Transbay – Provide near term investments in BART Core Capacity including provision of higher-capacity cars, track and signaling and operational improvements; provide new transbay tube and San Francisco BART line paired with rail tunnel in long term future
- Peninsula – Expand Caltrain to 3 or 4 tracks where feasible and operate with lightweight electric multiple-unit equipment to for rapid acceleration and frequent express and local service on the Peninsula
- South Counties – Develop rail services in South Bay cities and provide rail connections to various Monterey Bay Area destinations by accommodating expanded standard services south of San Jose through Gilroy
- Dumbarton – Enhance the connection across the Dumbarton Bridge to support operation of lightweight compatible with Peninsula train operations over the longer term
- Tri Valley / I-680 – Expand the Altamont and Tri Valley corridor lines by adding trackage to the existing UPRR line and/or putting segments of the abandoned SPRR back in service to support expanded and improved passenger service along the ACE rail corridor and to accommodate regional freight trains; develop regional bus options in I-680 corridor

- Central Valley – Extend and expand rail service in the Central Valley to provide a regional corridor service between Sacramento and Merced over the long term, interlined with ACE services and complementing the San Joaquin long haul trains
- Grade Crossings and Grade Separations (All Lines) –
 - Staged, prioritized improvements are implemented in accordance with train and highway conflict levels to improve grade crossing safety and implement “Quiet Zones” in the near-term and to provide grade separations where needed in the long-term.

Attached to this Executive Summary is an evaluation chapter which provides an evaluation table and a corridor-by-corridor discussion of the evaluation.

E1.3.2 *High-Speed Rail Findings*

Background

- High-Speed Rail would enter the Bay Area either via the Pacheco Pass through the Gilroy area to San Jose and points north and/or via Altamont Pass through the Tri Valley area to Fremont and the inner Bay Area
- High-Speed Rail would provide an opportunity to operate “regional overlay” services between regional stops located along the high speed network using compatible equipment
- Additional investment may be required to support the combined operation of regional overlay and long distance trains on the high speed rail network
- In the event the High-Speed Rail Bond measure passes, the combined funding for statewide high speed rail and local funding for regional rail will result in accelerating development of services in a corridor where there is both high speed rail and regional rail present
- A phasing plan contemplated by the California High-Speed Rail Authority envisions development of a Bay Area segment, a Central Valley segment and a Southern California segment in the first phase
- The Central Valley segment would provide service between Bakersfield and Merced and would demonstrate operation of train speeds of 220 mph; the ultimate Central Valley plan would include a connection to Sacramento

High-Speed Rail Entering from the East via Altamont Pass

- A promising alignment from the east would include a new alignment segment over Altamont Pass, a segment following the UPRR corridor between Livermore and Pleasanton and then a tunnel segment under Niles Canyon to Fremont
- From Fremont, the alignment could branch to serve San Jose and Oakland via the East Bay alignment or could cross the Dumbarton Bridge to serve San Jose and San Francisco via the Peninsula alignment

- The Regional Rail plan anticipates that the Peninsula alignment would be upgraded to accommodate lightweight electric multiple unit equipment without high speed rail
- The Regional Rail plan also includes provision of passenger-only tracks between the Peninsula and Union City
- High-Speed Rail trains could be operated across the Dumbarton and along the Peninsula provided the Dumbarton crossing were upgraded to include a high-level two-track bridge and the Peninsula were upgraded to provide four tracks between San Jose and San Francisco – these improvements should be accelerated with Regional Rail funds combined with High-Speed Rail funds
- Long term service to Oakland could be provided either by developing a future branch in the East Bay or by crossing over to Oakland from San Francisco via a new Transbay rail tunnel. Given the fact that adding a branch in Fremont would result in splitting of long distance services three-ways and that there is a provision in the Year 2050 plan for a new Bay Crossing between Oakland and San Francisco, the ultimate High Speed network could provide service to Oakland as a back leg to San Francisco. An Oakland termination would allow the San Francisco terminus to operate as a through station, thereby increasing the capacity of the station.
- High-Speed Rail entering the Bay Area via Altamont Pass would result in a major investment in rail passenger infrastructure in the corridor between Lathrop and Newark. This investment could be leveraged to accelerate the delivery of higher quality regional services operating between the Northern San Joaquin Valley and Bay Area.
- With the ultimate extension of High-Speed Rail to Sacramento, there would be an opportunity to provide regional services between Sacramento and Bay Area destinations through Altamont Pass in addition to operation of trains along the Peninsula and between the Peninsula and Central Valley.

High-Speed Rail Entering from the South via Pacheco Pass

- As noted with respect to High-Speed Rail entering from the East, the Peninsula segment will be compatible with operation of High Speed Rail equipment under the provisions of the Regional Rail plan.
- By upgrading the Peninsula to provide a four-track line between San Francisco and San Jose and by connecting the Peninsula segment to the Central Valley segment via a Pacheco Pass alignment, High-Speed Rail could be operated between the Bay Area and Los Angeles.
- An ultimate plan to provide service to Oakland could be made by providing a new Bay Crossing between Oakland and San Francisco or by constructing a new high-speed line the entire length of the East Bay. As noted with respect to the Altamont Pass alignment, the ultimate Regional Rail plan would include a new Bay Crossing between San Francisco and Oakland. Utilizing this route to reach Oakland would avoid the need to split high-speed service at San Jose and would also avoid the need to build a new high speed line the entire length of the East Bay.

- High-Speed Rail entering the Bay Area via Pacheco Pass would result in a major investment in rail passenger infrastructure in the corridor between Merced and San Jose. This investment could be leveraged to accelerate the delivery of higher quality regional services operating between the Central San Joaquin Valley, the South Counties and Bay Area.
- With the ultimate extension of High-Speed Rail to Sacramento, there would be an opportunity to provide regional services between Sacramento and Bay Area destinations through the Pacheco Pass in addition to operation of trains along the Peninsula and between the Peninsula and Central Valley.

Trade-Offs Between Altamont Pass and Pacheco Pass

- High-Speed Rail over Altamont Pass would require a branch in the operating plan at Redwood City to serve both San Jose and San Francisco whereas a branch would not be required if High Speed Rail would enter via Pacheco. As a result, San Francisco and San Jose would receive a higher level of service with statewide trains operating to and from Southern California with a Pacheco Pass alignment.
- High-Speed Rail operating over Altamont Pass would result in faster service between Sacramento / Northern San Joaquin Valley and the Bay Area; High-Speed Rail operating via Pacheco Pass would result in faster and more frequent service between Los Angeles and San Jose.
- High-Speed Rail operating over Altamont Pass would provide better access to greater East Bay destinations including Contra Costa County, the Tri Valley area and Tracy; High Speed Rail operating over Pacheco Pass would provide better access to southern Santa Clara County and the Monterey Bay cities.
- Most of the Regional Rail network which would be developed without high-speed rail would remain in place with the addition of high-speed rail; e.g., improved conventional rail trackage would need to be provided in the San Jose – Gilroy reach and in the Niles – Lathrop reach to accommodate freight traffic and regional passenger services using standard equipment with or without high-speed rail.
- Whereas either the Altamont option or the Pacheco option would result in higher service levels and acceleration of regional services on the Peninsula, development of high-speed rail over Altamont Pass would accelerate delivery of higher quality regional services between the Northern San Joaquin Valley and Tri Valley areas and the inner Bay Area whereas development of high-speed rail over Pacheco Pass would accelerate delivery of higher quality regional services between the Central San Joaquin Valley and the South Counties and the inner Bay Area.
- In the event both an Altamont Pass and Pacheco Pass alignments were ultimately constructed, the Altamont Pass route could be developed as a two-track regional route which would minimize the right-of-way requirements and adjacency impacts in urbanized areas along the route in the Livermore – Pleasanton – Fremont – Newark reach.

E1.4 Implementation

Implementation of the Bay Area Regional Rail Plan will require a comprehensive approach. Attached to this Executive Summary is a possible phasing for the plan. The following key considerations pertain to plan implementation:

- **Phasing** – The Regional Rail Plan report identifies a possible phased implementation plan which addresses near term (Year 2015) medium term (Year 2015 – 2030) and long term (post Year 2030 to Year 2050 and beyond) timeframes
- **Funding** – Assembly of nearly \$50-billion present-day dollars for development of the Northern California regional rail network, including Resolution 3434 commitments and BART reinvestment, will require significant new sources of funds; funding is a top priority concern
- **Governance / Rights-of-Way Arrangements** – The Regional Rail planning process considered governance and right-of-way issues which need to be addressed to fund, obtain rights-of-way, build, maintain and operate the regional rail network. Opportunities for joint programs or for new initiatives, which could be undertaken in the near term under a federation of existing operators, were identified and may be pursued further as part of potential new legislation. In the longer term, a regional rail authority could provide an umbrella under which negotiations with freight rail operators for acquisition of rights-of-way and operating rights could proceed.
- **Land Use Policies** – Existing policies developed separately by BART, MTC and other entities governing station area developments could be unified and broadened to pertain to the Northern California “mega-region” to assure that the highest densities are developed along rail corridors and around stations/major connectivity points, thereby establishing the ridership markets and providing convenient access to the regional rail network.

E1.5 Next Steps

Projects advanced under the Regional Rail Plan would be implemented in accordance with existing project planning, funding and project development procedures.

The following specific follow-on efforts are recommended:

- **Evaluation Measures** – MTC adopted rail system expansion and improvement criteria during the development of its Resolution 3434 transit expansion program, and is currently developing a Resolution 3434 Strategic Plan to provide a framework for successful program and project delivery. This Strategic Plan helps inform the next generation of rail expansion beyond Resolution 3434.
- **Travel Market and Ridership Analysis** – Detailed ridership studies to evaluate corridor service options
- **Land Use Analysis** – Sensitivity testing should be performed for Regional Rail projects to reflect on-going refinements to land use visioning, particularly more focused land use patterns

- Service Model – Additional analysis and testing should be used to identify specific operating plans including routings and frequencies
- Cost Analysis – Cost estimates prepared for the Regional Rail plan are planning-level, order-of-magnitude cost and will be refined to reflect the level of detail of the project description as projects are further developed
- Environmental Clearance & Community Impacts – As rail projects and services are developed, full environmental review and public involvement will be provided to refine project specifics and identify mitigation measures
- BART Operations – BART will be leading its own effort to address passenger needs including development of criteria for infill stations, how to best implement its 30-year capital plan and strategic vision, constructing higher frequency line segments, skip-stop services and other improvements considered in this plan
- High-Speed Rail – The California High-Speed Rail Authority has released a Draft Environmental Impact Report/Environment Impact Statement (EIR/EIS) for the Bay Area to Central Valley portion of a statewide high-speed rail system which provides information on high-speed rail options, costs, benefits and potential impacts. The Authority will be accepting comments through September 2007 on the draft environmental document as well as input from interested parties to inform the decision making process regarding preferred high-speed rail alignments and station locations within the Bay Area to Central Valley study area. The final Regional Rail Plan will provide additional detail regarding the cost, benefits and effects of the high-speed rail network on the Regional Rail network. The Regional Rail process will provide input to the Authority as it prepares its final environmental document and decides on the preferred routing for high-speed rail between the Bay Area and Central Valley.

Regional Rail Alternatives Evaluation

The two systemwide alternatives were evaluated on a corridor-by-corridor basis taking into consideration the following factors:

- Engineering Feasibility
- Capital Cost
- Ridership Potential
- Operational Impacts
- Coverage & Connectivity
- Environmental Issues
- Implementation Factors

For each corridor, a recommended corridor treatment has been identified. The recommended alternative was developed based upon the evaluation factors for the services in the corridor with consideration for adjacent corridors and the overall regional rail network. In some cases, the recommended alternative consists of a blend of the two system alternatives or includes refinements suggested by the evaluation process.

Each corridor is discussed below; also refer to the attached evaluation table. Corridors are listed in the following sequence:

- BART System (all lines)
- US 101 North Corridor (Marin ↔ Sonoma)
- North Bay Corridor (Marin ↔ Solano)
- I-80 Corridor (Auburn ↔ Oakland)
- East Bay Corridor (Oakland ↔ San Jose)
- Transbay Corridor (San Francisco ↔ Oakland)
- Peninsula Corridor (San Francisco ↔ San Jose)
- South Counties Corridor (Santa Cruz, Monterey, San Benito)
- Dumbarton Corridor (Redwood City ↔ Union City)
- I-680 & Tri-Valley Corridor (Contra Costa & Southern Alameda)
- Central Valley Corridor (Sacramento ↔ Merced)
- Grade Crossings and Grade Separations (all lines)

BART System

BART options have been addressed within each of the individual corridors; this section provides a summary of all of the BART considerations. Alternative 1 included all of the major BART system expansion options including the Transbay, I-80, I-680 and I-580 corridors in addition to Resolution 3434 projects (Warm Springs and Santa Clara BART, eBART and Oakland Airport Connector). By contrast, system expansion in Alternative 2 was limited to the Resolution 3434 projects with a one-station extension and connectivity enhancement in the I-580 corridor.

Alternative 2 anticipates that BART would develop more like a “Metro” system to provide mass transit in the inner Bay Area. As such, Alternative 2 would include the potential for infill stations and other improvements in system capacity, coverage and operational reliability. The corridor-by-corridor analysis indicates that the BART system expansion options do not significantly add to the corridor ridership levels compared to the railroad-based options provided in Alternative 2. One segment which may require system expansion is in the Oakland – San Francisco Transbay corridor where the highest ridership is present. In the near term, a construction of a fourth track

through Oakland would improve line connectivity and capacity including providing for cross-platform transfers between all of the various lines. A new Bay Crossing and San Francisco subway would not only relieve the existing transbay tube and Market Street stations, but would provide an opportunity to improve coverage in San Francisco. The Regional Rail plan tested two alignments resulting in similar cost and ridership levels. Further study of alignments in San Francisco would be appropriate at such time as a new tube were to be advanced for project development.

Plan Provision: Alternative 2 with further development of Metro operating plans and infrastructure; fourth track through Oakland; long term new Bay Crossing and San Francisco subway line (alignment to be determined)

US 101 North

The US 101 North corridor has moderate ridership potential. Alternative 1 includes the SMART service between Larkspur and Cloverdale with capacity and operational improvements to address long term growth in travel. Alternative 2 includes a rail connection across the I-580 bridge to connect the SMART line with the Capitol Corridor in Richmond. The cost of Alternative 2 would be nearly four times the capital cost of Alternative 1. However, the ridership in the US 101 corridor was found to be similar and the ridership on the East Bay connection was relatively low. As a result, Alternative 1 is recommended.

Plan Provision: Alternative 1

North Bay

The North Bay corridor between Marin and Solano Counties has low to moderate ridership potential. Only one rail service alternative was tested in the North Bay – An “X” service plan including an east-west line with a timed transfer to a north-south line at Napa Junction.

Plan Provision: Preserve corridor in near term and develop rail services in phased plan over the longer term

I-80

The I-80 corridor has high ridership potential which is served by BART and Capitol Corridor along the Eastshore area with Capitol Corridor extending beyond to Sacramento. Alternative 1 would develop the Capitol Corridor line between Oakland and Sacramento with a range of capacity and operational improvements. Given the high existing level of freight traffic and the expectation that goods movement to and from the Port of Oakland will grow significantly, the line would need to be expanded to 3 or 4 main tracks where possible over the long term. The BNSF transcontinental freight line connects to the UPRR in Richmond; BNSF considers this line to be a vital freight connection to the Port of Oakland and does not to encumber the existing line with passenger traffic. (In fact, existing passenger trains entering the Bay Area from Stockton on the BNSF are shifted to the UPRR line east of Martinez near Port Chicago.) Passenger improvements would be focused on the UPRR line including a new high level passenger bridge at Benicia, and curve flattening between Pinole and Martinez. Alternative 2 considered provision of separate passenger-only tracks within the UPRR right-of-way to support the operation of lightweight passenger equipment. This alternative also included a revised alignment north of Hercules to follow I-80 across a new Carquinez bridge at Vallejo and continuing on to reconnect with the UPRR corridor near Cordelia. Although Alternative 2 resulted in significant travel time

savings and higher ridership compared to Alternative 1, the capital cost of Alternative 2 was about twice the cost of Alternative 1. In addition, implementation of separate passenger-only tracks for lightweight equipment is in conflict with UPRR policies as well as the long range plan for the Capitol Corridor. Given that significant service improvements can be provided using standard equipment shared with freight, the evaluation indicates that Alternative 1 is the most appropriate solution for the corridor. The BART extension to North Hercules would add \$1.5 to \$1.8 billion to the cost of the network making the total investment in the corridor similar between Alternative 1 and Alternative 2. However, with shared operation of the freight trackage and expansion to 4 tracks between Oakland and Richmond, there would be adequate track capacity to provide overlay services such as a “wBART” local train operating on conventional rail in lieu of extending the BART system. However, given the physical and operational constraints of the single-track BNSF line, the operation would be confined to the UPRR.

Plan Provision: Alternative 1 with potential for local passenger services on expanded UPRR line

East Bay

The East Bay corridor between Oakland and San Jose has very high ridership potential and is served by BART and the Capitol Corridor. Alternative 1 would result in expansion of the Niles Subdivision to provide 3 main tracks for operation of passenger services shared with freight. Alternative 2 considers construction of a new passenger line for lightweight equipment operating between Oakland and San Jose along the UPRR right-of-way north of Fremont and via I-880, Trimble Road and the Caltrain corridor south of Fremont. Provision of a new passenger-only line would require more than twice the investment required to upgrade the existing Capitol Corridor route and would not significantly reduce the travel time or ridership. In addition, Alternative 2 would require right-of-way to be obtained from UPRR and is not consistent with the Capitol Corridor long range plan.

Plan Provision: Alternative 1

Transbay

The Transbay market between Oakland and San Francisco has the highest transit and rail ridership demand compared to any corridor or segment in the Regional Rail system – Under Year 2050 Baseline conditions without either Regional Rail Alternative, the Transbay corridor market potential is over 400,000 daily trips. Alternative 1 addresses this demand by providing a new BART Transbay Tube paired with a new San Francisco subway to provide station capacity to distribute patrons to stations and connect with regional and local services. Track connections could be made to the existing Market Street line to improve system reliability by providing alternate means of routing trains between Oakland and San Francisco. By contrast, Alternative 2 would make a track connection via a rail tunnel between trackage in the East Bay and Caltrain, thereby allowing movements such as interlining trains between the Capitol Corridor and Caltrain. However, with Capitol Corridor operating standard equipment and Caltrain tracks devoted to lightweight equipment, regulatory provisions – either a change in Federal Railroad Administration rules or rules waivers in conjunction with improved signaling to allow mixed flow would be required if trains were to interline between the East Bay and Peninsula. Analysis of the transbay peak period ridership indicates BART will be constrained Year 2030 and over-capacity by Year 2050. Therefore, a new Transbay Tube has been indicated in the long-range scenario. Given the significant environmental review process, regulatory approvals, and high cost of such an investment, it is recommended that, should a new Bay Crossing to be provided, that a four track main tunnel would be developed to provide a conventional rail connection as well. This

cost of this additional provision would be lower as a combined project than if separate BART and rail tunnels were to be built.

Plan Provision: Alternative 1 with Alternative 2 (both options in long term future)

Peninsula

The Peninsula corridor between San Francisco and San Jose has high ridership which is served by Caltrain and, north of Millbrae, by BART. Both Alternatives 1 and 2 would include provision of electrification, additional trackage and grade separations included in the Caltrain long range development plan to allow the service to operate with approximate 7.5 minute headways during peak periods. However, Alternative 2 includes a rail tunnel connection to the East Bay (cost included as part of “Transbay” corridor) and interlining of the Capitol Corridor trains through the Peninsula to San Jose. In the East Bay, the previously-mentioned Oakland – San Jose service on the new passenger alignment would provide service to the existing Capitol Corridor market. Alternative 2 would operate with lightweight equipment – electric multiple unit trains as indicated in the Caltrain Project 2025 plan. The primary factor resulting in higher cost in Alternative 2 is associated with providing a connection to the Transbay rail tunnel. In view the similar costs and ridership, Alternative 2 is recommended for consistency with the Caltrain desire to deploy lightweight equipment.

Plan Provision: Alternative 2

South Counties

The South Counties corridor extending south from San Jose to the Monterey Bay cities has moderate ridership potential. Both Alternative 1 and Alternative 2 would develop a network of standard rail services operating both along the UPRR Coast Subdivision as well as along a “wharf-to-wharf” line between Monterey and Santa Cruz with transfer points at Castroville and Pajaro. Alternative 2 would develop a separate higher speed passenger only line south from San Jose to Gilroy with an extension to Hollister which could be served by lightweight Caltrain equipment interlined to Peninsula destinations. The evaluation indicated that either alternative would have similar ridership potential. However, Alternative 2 would require nearly twice the capital investment to provide separate higher speed passenger tracks and would also require riders to transfer at Gilroy for Peninsula services. As a result of the evaluation, Alternative 1 is recommended. It should be noted that when Caltrain converts the Peninsula line between San Francisco and San Jose to operation of lightweight equipment, standard equipment trains operating in the South Counties and into the Bay Area may not be able to operate north of San Jose. Such trains could, however, proceed north along tracks shared with freight in the East Bay. Therefore, interlining South Counties services with East Bay services may be appropriate in the longer term.

Plan Provision: Alternative 1

Dumbarton

The Dumbarton corridor between Redwood City on the Peninsula and Union City via Fremont has low to moderate ridership potential. Alternative 1 includes the cost of restoring the bridge connection as a single-track bridge as well as additional improvements necessary to provide a connection to the Union City BART station along the Oakland Subdivision including provisions to separate passenger and freight traffic south of Industrial Boulevard in Hayward by routing

freight traffic via the Niles Subdivision and passenger only traffic via the Oakland Subdivision. Alternative 2 would include construction of a new 2-track, high-level bridge connection suitable for interlining lightweight equipment between Union City and points along the Peninsula. The evaluation indicated that ridership would be significantly higher if trains from Union City could operate on Peninsula trackage. However, providing a new bridge connection would nearly double the cost of the project. The recommended alternative, therefore, is provision of separate passenger tracks through Fremont over to Union City operating over a rehabilitated bridge as included in Alternative 1 – there would be adequate capacity for the purpose of the Dumbarton operating plan to utilize the existing single-track low-level bridge.

Plan Provision: Blend (Separate passenger tracks with rehabilitated low-level bridge)

I-680 & Tri Valley

The I-680 / Tri Valley corridor has moderate ridership potential with an east-west market paralleling I-580 and a north-south market paralleling I-680. Alternative 1 includes a high capital cost BART line in the I-680 corridor as well as a longer extension in I-580 to Greenville Road. By contrast, Alternative 2 has a regional bus option in the I-680 corridor, a shorter BART extension to a new ACE intermodal at Isabel/Stanley, and a significant upgrade of the ACE service to near high-speed rail performance by providing separate passenger-only tracks with a new alignment over Altamont Pass and a tunnel under Niles Canyon. Alternative 2 resulted in significantly higher ridership due to the east-west improvements however the ridership gain was not high enough to justify the expenditure of four times the capital cost of Alternative 1 for rail improvements. Additionally, the freight rail line would need to remain in service to accommodate freight traffic between the Central Valley and East Bay / South Bay, and improvements could be made to the existing line and/or on the parallel abandoned Southern Pacific line to improve the reliability and frequency of ACE services shared with freight. Bus in the I-680 corridor would be more cost effective than a new BART line and review of the station boardings indicated that most of the high ridership locations were concentrated in the San Ramon – Pleasanton reach which could be served by bus in the corridor connecting to existing BART lines. A one-stop BART extension to meet ACE would improve connectivity and coverage with less cost than an extension in the median of I-580 all the way to Greenville Road.

Plan Provision: Blend (Alternative 1 for Rail plus Alternative 2 for BART)

Central Valley

The Central Valley corridor has relatively low ridership potential compared to most of the other Regional Rail corridors. Alternative 1 would provide trackage improvements for shared operation of passenger services north-south along the corridor as well as connecting services through the Tri Valley area to the inner Bay Area. Alternative 2 would provide separate passenger-only trackage suitable for operation of lightweight trains provided such trains could operate into this territory from the inner Bay Area which would require treatment similar to Alternative 2 to be provided through the Tri Valley. Regardless of the development of regional corridor trains serving the Central Valley, the Amtrak San Joaquins would continue to provide long-haul services on less frequent schedules. As shown in the evaluation, Alternative 2 would be about twice the cost of Alternative 1 but was not found to carry significantly more riders in the north-south direction (although significantly higher ridership to the East Bay would result as shown in the evaluation of the Tri Valley corridor.) The overall level of corridor ridership between the Central Valley and the Bay Area was not deemed high enough to justify the very high cost of providing separate trackage for lightweight equipment in the Central Valley, even if it could

operate through the Tri Valley area. Therefore Alternative 1 is recommended. However, UPRR has indicated that the north-south lines are approaching capacity and does not want to consider accommodating passenger traffic or selling right-of-way at this point in time. Accordingly, assembly of additional right-of-way paralleling the UPRR north-south alignment would be required to implement corridor passenger service along the UPRR alignment.

Plan Provision: Develop separate passenger right-of-way paralleling the UPRR right-of-way for operation of standard equipment

	Capital Cost (\$-million 2006)	Travel Demand *1		Operational Impacts	Coverage & Connectivity	Environmental Issues	Implementation Issues	
		Market Potential	Relative Performance					
BART System								
Alt 1	BART \$21,700 – \$26,500 *2	Extremely High (System ridership exceeds 800,000 daily riders)	Higher	<ul style="list-style-type: none"> Addresses transbay demand by providing new line to San Francisco New Transbay connection improves reliability 	<ul style="list-style-type: none"> New SF subway line adds coverage to Alameda & NW San Francisco Capitol Corridor / BART at West Oakland (existing lines) & Jack London (new bay crossing) ACE / BART at Greenville/ I-580 in Livermore 	<ul style="list-style-type: none"> New Bay Crossing Tunneling & subway construction impacts Impacts to freeway facilities Impacts to adjacent properties 	<ul style="list-style-type: none"> Extensive planning process required to finalize extension alignments and stations Very large funding requirement Possible service disruption during construction 	
Alt 2	BART \$6,400 – \$7,900 *3		<ul style="list-style-type: none"> Addresses Transbay demand by increasing service in core and modifying car configuration 		<ul style="list-style-type: none"> Capitol Corridor / BART at West Oakland ACE / BART at Isabel/ Stanley in Livermore Infill stations 	<ul style="list-style-type: none"> Overall fewer impacts due to less system expansion 	<ul style="list-style-type: none"> Refine policies to address infill stations 	
<p><u>*1 – Corridor Market Potential</u> Low – Less than 20,000 daily riders Moderate – 20,000 to 75,000 daily riders High – Greater than 75,000 daily riders</p>		<p><u>*1 – Relative Performance</u> Similar – Ridership within 10% Higher – 10% to 20% higher Ridership Significantly Higher – More than 20% higher</p>		<p><u>*2 – BART Cost Breakout: Includes Resolution 3434 extensions to Warm Springs and Santa Clara, eBART and 4th Track through Oakland</u></p>			<p><u>*3 – BART Cost Breakout: Includes Resolution 3434 extensions to Warm Springs and Santa Clara, eBART and Infill Stations</u></p>	

	Capital Cost (\$-million 2006)	Travel Demand *1		Operational Impacts	Coverage & Connectivity	Environmental Issues	Implementation Issues
		Market Potential	Relative Performance				
US 101 North							
Alt 1	\$430 – \$530	Moderate	Similar	<ul style="list-style-type: none"> Stand-alone service 	<ul style="list-style-type: none"> Regional Bus and Ferry Connection to North Bay corridor at Ignacio 	<ul style="list-style-type: none"> Nominal; mostly within rail right-of-way 	
Alt 2	\$1,600 – \$1,950		Similar	<ul style="list-style-type: none"> Service interlined with East Bay Services; more complex operating plan 	<ul style="list-style-type: none"> Rail, Regional Bus and Ferry Connection to North Bay corridor at Ignacio Connection to Capitol Corridor at Richmond 	<ul style="list-style-type: none"> New Bay Crossing 	<ul style="list-style-type: none"> Schedule integration with East Bay services
North Bay							
Alt 1	\$670 - \$810	Low – Moderate		<ul style="list-style-type: none"> North-south plus east-west corridor requires complex operating plan to serve all market patterns 	<ul style="list-style-type: none"> Rail and Ferry Ties US 101 North rail corridor to I-80 rail corridor; only existing rail connection 	<ul style="list-style-type: none"> Wetlands along east-west alignment 	<ul style="list-style-type: none"> Schedule coordination of N/S with E/W service & E/W service with SMART, ferries and Capitol Corridor
Alt 2			Significantly Higher *4				
*4 – Alternatives 1 & 2 are same within corridor but corridor performance higher with Alt 2 systemwide network							

	Capital Cost (\$-million 2006)	Travel Demand *1		Operational Impacts	Coverage & Connectivity	Environmental Issues	Implementation Issues
		Market Potential	Relative Performance				
I-80							
Alt 1	Rail \$1,950 – \$2,380 BART \$1,500 – \$1,800	High		<ul style="list-style-type: none"> Critical freight corridor most suitable for operation of standard passenger equipment Oakland – Sacramento travel time 92 mins 	<ul style="list-style-type: none"> Bus, Amtrak & BART in East Bay; Bus, Amtrak & Sacramento Regional Transit LRT at Sacramento Maintains connectivity with San Joaquin long haul services at Martinez I-80 BART extension 	<ul style="list-style-type: none"> Bay edge track improvements Pinole – Martinez, new bridge at Benicia, improvements through Suisun marsh and Yolo Causeway may result in impacts to SF Bay, US waters, wetlands and sensitive habitat Grade separation r/w and circulation impacts 	<ul style="list-style-type: none"> Environmental clearance UPRR has accepted track improvements to provide passenger slots Grade separations and road closures developed incrementally in conjunction with four-track sections
Alt 2	Rail \$3,730 – \$4,560		Significantly Higher	<ul style="list-style-type: none"> Oakland – Sacramento travel time 63 mins 	<ul style="list-style-type: none"> Bus, Amtrak & BART in East Bay, Bus, Amtrak & Sacramento Regional Transit LRT at Sacramento Provides direct rail service to Vallejo; does not serve Martinez Amtrak Connects with new Oakland – San Francisco rail tunnel 	<ul style="list-style-type: none"> Slightly less overall impact compared to Alt 1 but new water crossing (Carquinez) and improvements at Yolo Causeway may result in impacts to SF Bay, US waters, wetlands and sensitive habitat Grade separation r/w and circulation impacts 	<ul style="list-style-type: none"> Environmental clearance Higher speed passenger tracks and four-track sections will require grade separations and closure of minor roads Construction of high speed passenger tracks in rail r/w conflicts with UPRR

	Capital Cost (\$-million 2006)	Travel Demand *1		Operational Impacts	Coverage & Connectivity	Environmental Issues	Implementation Issues
		Market Potential	Relative Performance				
East Bay							
Alt 1	\$1,110 – \$1,350	Very High	Similar	<ul style="list-style-type: none"> Freight corridor provides connection to Coast Subdivision; used to return empty containers to Port of Oakland Potential for short haul freight Oakland – San Jose travel time 53 mins 	<ul style="list-style-type: none"> Bus, Amtrak & BART in East Bay; Caltrain and Valley Transportation Authority LRT in San Jose; Oakland Airport 	<ul style="list-style-type: none"> Mostly within rail right-of-way Trestle along Bay edge Newark – Alviso 	<ul style="list-style-type: none"> UPRR has accepted track improvements to provide slots for passenger service
Alt 2	\$2,540 – \$3,100		Similar	<ul style="list-style-type: none"> Freight would remain on existing lines with new passenger alignment Oakland – San Jose travel time 56 mins 	<ul style="list-style-type: none"> Bus, Amtrak & BART in East Bay; Caltrain and Valley Transportation Authority LRT in San Jose; Oakland Airport & San Jose Airport Great America station not served; replaced with I-880 / Montague 	<ul style="list-style-type: none"> Mostly within rail right-of-way Development of passenger tracks requires full grade separation using aerial structure or modification of local roadways and circulation 	<ul style="list-style-type: none"> Not consistent with Capitol Corridor long range plan Construction of high speed passenger tracks in rail r/w conflicts with UPRR

	Capital Cost (\$-million 2006)	Travel Demand *1		Operational Impacts	Coverage & Connectivity	Environmental Issues	Implementation Issues
		Market Potential	Relative Performance				
Transbay							
Alt 1	BART *5 \$10,200 – \$12,500	Extremely High (More than 400,000 daily riders)	Similar	<ul style="list-style-type: none"> Addresses Transbay demand with BART Construction of new BART tube and SF subway line improves BART system reliability 	<ul style="list-style-type: none"> Bus, Amtrak & BART in Oakland; Bus, BART, Caltrain & MUNI LRT in San Francisco Construction of new BART SF subway line improves coverage to San Francisco 	<ul style="list-style-type: none"> New Bay Crossing (BART) 	<ul style="list-style-type: none"> Approvals for new Bay Crossing
Alt 2	Rail *6 \$1,910 – \$2,330		Similar	<ul style="list-style-type: none"> Provides option to route East Bay & I-80 Corridor trains to San Francisco 	<ul style="list-style-type: none"> Improves connectivity of Peninsula and East Bay rail networks 	<ul style="list-style-type: none"> New Bay Crossing (Rail Tunnel) 	<ul style="list-style-type: none"> Approvals for new Bay Crossing East Bay equipment not compatible with Peninsula equipment over long term Trade-offs between sunken tube & bored tunnel
<p>*5 – BART cost includes new SF subway line; cost of transbay crossing and SF subway to Market Street is \$7,200 – \$8,800 *6 – Rail cost includes transbay rail tunnel only</p>							

	Capital Cost (\$-million 2006)	Travel Demand *1		Operational Impacts	Coverage & Connectivity	Environmental Issues	Implementation Issues
		Market Potential	Relative Performance				
Peninsula							
Alt 1	\$3,050 – \$3,720	High	Similar	<ul style="list-style-type: none"> Maintains ability to operate passenger shared with freight San Jose – San Francisco travel time 72 mins 	<ul style="list-style-type: none"> Bus, BART & MUNI LRT in San Francisco; Bus, BART, Amtrak, Santa Clara Valley Transit Authority LRT, ACE, Capitol Corridor in San Jose; SFO Airport & San Jose Airport 	<ul style="list-style-type: none"> Mostly within rail right-of-way Grade separation r/w and circulation impacts 	<ul style="list-style-type: none"> Use of standard equipment not consistent with Caltrain long range plan for corridor Narrow r/w sections require tunneling or aerial track segments for express track
Alt 2	\$3,170 – \$3,880		Similar	<ul style="list-style-type: none"> Freight accommodated at night (temporal separation) San Jose – San Francisco travel time 60 mins 	<ul style="list-style-type: none"> Bus & MUNI LRT in San Francisco; Bus, BART, Amtrak, Santa Clara Valley Transit Authority LRT, ACE, Capitol Corridor in San Jose; SFO Airport & San Jose Airport Connects to rail tunnel to East Bay at San Francisco 	<ul style="list-style-type: none"> Mostly within rail right-of-way Grade separation r/w and circulation impacts 	<ul style="list-style-type: none"> Use of lightweight equipment consistent with Caltrain long range plan for corridor Narrow r/w sections require tunneling or aerial track segments for express track

	Capital Cost (\$-million 2006)	Travel Demand *1		Operational Impacts	Coverage & Connectivity	Environmental Issues	Implementation Issues
		Market Potential	Relative Performance				
South Counties							
Alt 1	\$1,440 – \$1,760	Moderate	Similar	<ul style="list-style-type: none"> Standard equipment may not operate north of San Jose on Peninsula in the event Caltrain is converted to lightweight equipment 	<ul style="list-style-type: none"> Bus, Amtrak, BART, ACE, Caltrain& Capitol Corridor at San Jose Monterey Bay cities at Pajaro & Castroville 	<ul style="list-style-type: none"> Mostly within rail right-of-way 	<ul style="list-style-type: none"> Use of standard equipment compatible with existing freight corridor UPRR has accepted track improvements to provide slots for passenger service (San Jose to Gilroy)
Alt 2	\$2,280 – \$2,790			<ul style="list-style-type: none"> Lightweight equipment can interline on Peninsula Standard equipment could not operate on trackage with lightweight equipment; would remain on freight track(s) 	<ul style="list-style-type: none"> Bus, Amtrak, BART, ACE, Caltrain& Capitol Corridor at San Jose Monterey Bay cities at Pajaro & Castroville Forced transfer at Gilroy to lightweight equipment for trips between Bay Area and South Counties 	<ul style="list-style-type: none"> Mostly within rail right-of-way 	<ul style="list-style-type: none"> Requires high cost re-build of Monterey Highway to fit separate passenger tracks in narrow right-of-way Construction of high speed passenger tracks in rail r/w conflicts with UPRR

	Capital Cost (\$-million 2006)	Travel Demand *1		Operational Impacts	Coverage & Connectivity	Environmental Issues	Implementation Issues
		Market Potential	Relative Performance				
Dumbarton							
Alt 1	\$680 – \$830	Low – Moderate	Significantly Higher	<ul style="list-style-type: none"> Use of standard equipment may require forced transfer at Redwood City due to capacity constraints on Caltrain and use of lightweight equipment on Peninsula 	<ul style="list-style-type: none"> Alts 1 & 2 similar – BART, Capitol Corridor & ACE in East Bay and Caltrain on Peninsula 	<ul style="list-style-type: none"> Repair, replace missing bridge sections and return to service with single track bridge resulting in possible impacts to SF Bay waters, wetlands, wildlife preserve, sensitive habitat 	
Alt 2	\$1,130 – \$1,380			<ul style="list-style-type: none"> Lightweight equipment can interline on Peninsula Standard equipment from East Bay could not operate on trackage with lightweight equipment 		<ul style="list-style-type: none"> Replacement Bay Crossing with 2-track high level bridge resulting in possible impacts to SF Bay waters, wetlands, wildlife preserve, sensitive habitat Higher potential for disruption compared to Alt 1 	

	Capital Cost (\$-million 2006)	Travel Demand *1		Operational Impacts	Coverage & Connectivity	Environmental Issues	Implementation Issues
		Market Potential	Relative Performance				
I-680 & Tri Valley							
Alt 1	Rail \$820 – \$1,010 BART I-580 \$1,000 – \$1,200 BART I-680 \$3,500 – \$4,300	Moderate		<ul style="list-style-type: none"> Standard equipment compatible with Capitol Corridor and existing Coast Subdivision Newark – San Jose Maintains ability to operate freight trains between East Bay and Central Valley using shared track 	<ul style="list-style-type: none"> Bus, BART & ACE at Greenville/ I-80 New BART line provides coverage to I-680 corridor and connects Martinez Amtrak, existing BART lines and Silicon Valley BART 	<ul style="list-style-type: none"> Mostly within rail right-of-way 	<ul style="list-style-type: none"> Rail options in Altamont corridor would include expansion of UPRR subdivision and/or returning sections of abandoned SPRR to service
Alt 2	Rail \$3,510 – \$4,290 BART I-580 \$500 – \$600 Bus I-680 \$230 – \$280		Significantly Higher	<ul style="list-style-type: none"> Central Valley lines need to be fully separated from freight Freight track(s) would need to remain in service to provide connection between East Bay and Central Valley Potential to interline with Peninsula with Alt 2 network to west 	<ul style="list-style-type: none"> Bus, BART & ACE at Isabel / Stanley I-680 Regional Bus line provides coverage to I-680 corridor and connects Fairfield/Suisun Amtrak; Martinez Amtrak; BART, ACE and Santa Clara Valley LRT 	<ul style="list-style-type: none"> Constrained r/w Livermore – Pleasanton makes fitting trackage and grade separations difficult as existing freight track(s) would need to remain in service 	<ul style="list-style-type: none"> Rail options in Altamont corridor include costly new rail tunnel under Niles Canyon and new alignment over Altamont Pass Bus alternative in I-680 corridor consistent with Contra Costa County long range plans

	Capital Cost (\$-million 2006)	Travel Demand *1		Operational Impacts	Coverage & Connectivity	Environmental Issues	Implementation Issues
		Market Potential	Relative Performance				
Central Valley							
Alt 1	\$3,320 – \$4,050	Low	Similar	<ul style="list-style-type: none"> UPRR line approaching capacity; would require significant expansion in track capacity to accommodate passenger services 	<ul style="list-style-type: none"> eBART extension to Tracy; Tracy to Patterson service ACE expanded to Sacramento – Merced Bus, Amtrak, Capital Corridor, LRT at Sacramento; ACE/eBART at Tracy; Amtrak/ACE at Stockton 	<ul style="list-style-type: none"> New structures at riparian crossings 	<ul style="list-style-type: none"> UPRR wants to preserve existing corridor for freight only
Alt 2	\$5,490 – \$6,710		Similar	<ul style="list-style-type: none"> Would require development of lightweight line over Altamont and down to San Jose to support existing ACE Lightweight network allows interlining on all branches 	<ul style="list-style-type: none"> eBART extension to Tracy; Tracy to Patterson service ACE expanded to Sacramento – Merced Bus, Amtrak, Capital Corridor, LRT at Sacramento; ACE/eBART at Tracy; Amtrak/ACE at Stockton 	<ul style="list-style-type: none"> Grade separation r/w and circulation impacts New structures at riparian crossings 	<ul style="list-style-type: none"> UPRR wants to preserve existing corridor for freight only

	Capital Cost (\$-million 2006)	Travel Demand *1		Operational Impacts	Coverage & Connectivity	Environmental Issues	Implementation Issues
		Market Potential	Relative Performance				
Summary – All Corridors							
Alt 1	\$36,070 – \$44,040						
Alt 2	\$33,330 – \$40,800						

Regional Rail Phased Implementation

The evaluation of systemwide alternatives resulted in the identification of recommended options to address regional markets with improvements selected to suit corridor-specific conditions while providing systemwide consistency. The resulting plan provisions on a corridor-by-corridor basis are as follows:

- BART – Reinvest in existing system to improve reliability and make the following improvements:
 - Improve Core Capacity by making modifications to vehicles and stations as well as track and signals to accommodate passenger growth over the long term
 - Implement connectivity improvements to connect BART with standard railroad services and regional bus lines in various corridors
 - Construct 4th track through Oakland to facilitate throughput and improve transfer convenience between East Bay and Transbay lines
 - Develop Infill stations at various locations keyed to local land use opportunities in accordance with BART station planning policies
 - Further define “Metro” service plan to increase capacity, coverage and reliability to inner Bay Area including the Oakland - Transbay – San Francisco zone
 - Pursue in the long term construction of a second Bay Crossing with new subway line to improve coverage to San Francisco
- US 101 North – Implement SMART project and make capacity and operational improvements over the long term to support ridership levels
- North Bay – Preserve corridor in near term and develop north-south and east-west services using standard equipment in the long term
- I-80 & East Bay – Expand the East Bay rail network from San Jose to Sacramento to 3 tracks with 4 track sections from Oakland to Richmond and in Solano County to support operation of standard higher speed railroad equipment compatible with freight traffic
- Transbay – Provide near term investments in BART Core Capacity including provision of higher-capacity cars, track and signaling and operational improvements; provide new transbay tube and San Francisco BART line paired with rail tunnel in long term future
- Peninsula – Expand Caltrain to 3 or 4 tracks where feasible and operate with lightweight electric multiple-unit equipment to for rapid acceleration and frequent express and local service on the Peninsula
- South Counties – Develop rail services in South Bay cities and provide rail connections to various Monterey Bay Area destinations by accommodating expanded standard services south of San Jose through Gilroy

- Dumbarton – Enhance the connection across the Dumbarton Bridge to support operation of lightweight compatible with Peninsula train operations over the longer term
- Tri Valley / I-680 – Expand the Altamont and Tri Valley corridor lines by adding trackage to the existing UPRR line and/or putting segments of the abandoned SPRR back in service to support expanded and improved passenger service along the ACE rail corridor and to accommodate regional freight trains; develop regional bus options in I-680 corridor
- Central Valley – Extend and expand rail service in the Central Valley to provide a regional corridor service between Sacramento and Merced over the long term, interlined with ACE services and complementing the San Joaquin long haul trains

The Regional Rail Plan is financially unconstrained, and funding availability is an important consideration when determining phasing. For purposes of this plan, considerations for phasing include the size of the potential market for various services in each corridor, the development of the systemwide network over time, and the potential to defer high-cost options until later phases. The phasing plan included herein will help to inform the investment decisions to be made in both the financially constrained and vision elements of MTC's long-range Regional Transportation Plan (RTP).

Resolution 3434 defines various improvements in the Regional Rail corridors which are potentially fundable by Year 2030. The Regional Rail plan includes provisions which would result in greater investment in regional services over a timeframe extending to Year 2050. In addition, the Regional Rail plan also identifies near term provisions which would be desirable in conjunction with development of projects defined in Resolution 3434.

In general, services and improvements which are high priority and potentially fundable in the near term given existing Resolution 3434 commitments were indicated in the near term. Projects which are very high in cost and which could potentially be deferred or which appear to have promise but are not needed in the near or intermediate term were included in the ultimate plan under the Year 2030 – 2050 category.

A possible phasing plan including brief description of the corridor services is presented in the following table. The phasing plan is for Regional Rail without High Speed Rail. This plan is provided to show how the system could be improved in phases; development of projects and services would be tied to future project development activities to confirm travel market demands, project descriptions and costs as well as project and service implementation priorities.

Corridor	Synopsis	Present – Year 2015	Year 2015 – Year 2030	Year 2030 – Year 2050
BART System	<ul style="list-style-type: none"> • Core Capacity investments to accommodate passenger growth and system expansion • Resolution 3434 projects: <ul style="list-style-type: none"> ○ Warm Springs Extension ○ Silicon Valley Extension ○ eBART ○ Oakland Airport Connector • Infill stations • Operating plan refinements potentially including skip-stop and turn-back service • Livermore extension to connect with ACE • Completion of Oakland 4th track • New transbay tube and SF subway line 	<ul style="list-style-type: none"> • Warm Springs extension • Oakland airport connector • eBART service between Pittsburg and Byron (vehicle technology to be determined) 	<ul style="list-style-type: none"> • Silicon Valley extension including San Jose airport connector • Peplemover connection to new West Oakland Capitol Corridor station • Fourth BART track and Oakland subway lower level platforms Mac Arthur – Oakland Wye • Livermore BART extension and ACE intermodal Dublin/Pleasanton – Isabel/Stanley (actual phasing to be determined by more detailed ridership and engineering analysis) • Infill Stations (developed in accordance with BART policies) 	<ul style="list-style-type: none"> • New Transbay Tube and subway line Oakland – Alameda – San Francisco (specific alignment to be studied further)

Corridor	Synopsis	Present – Year 2015	Year 2015 – Year 2030	Year 2030 – Year 2050
US 101 North (Marin – Sonoma)	<ul style="list-style-type: none"> • Sonoma-Marín Rail Transit Project (SMART) is implemented (Resolution 3434) • SMART service operates with compliant equipment allowing some freight traffic during off-peak periods 	<ul style="list-style-type: none"> • Track, signal and station Improvements to support Larkspur – Cloverdale service (SMART startup) 	<ul style="list-style-type: none"> • Operational improvements to support expanded operations 	<ul style="list-style-type: none"> • Operational improvements to support expanded operations • Potential extension to San Quentin ferry terminal with I-580 bus link
North Bay (Marin – Solano)	<ul style="list-style-type: none"> • Napa-Solano rail services are developed connecting between SMART line and Capitol Corridor • Service operates with compliant equipment compatible with connecting lines 	<ul style="list-style-type: none"> • Corridor preservation plan 	<ul style="list-style-type: none"> • Track, signal and station improvements to support initiation of Vallejo – Napa service 	<ul style="list-style-type: none"> • Track, signal and station improvements to extend north-south service to St. Helena • Track, signal and station improvements to support initiation of east-west service between San Rafael and Fairfield/Vacaville with Napa Junction timed transfer

Corridor	Synopsis	Present – Year 2015	Year 2015 – Year 2030	Year 2030 – Year 2050
<p>I-80 (Auburn – Oakland)</p>	<ul style="list-style-type: none"> • Capitol Corridor regional services between Auburn and San Jose are extended to Colfax with long-haul service to Reno/Sparks; capacity and operational improvements as well as new stations and grade separations are developed to support improved operation of corridor shared with high levels of freight traffic (Resolution 3434) • Investments are made in UPRR main line between Port of Oakland and Nevada to support activities of Port of Oakland, California trade, and to allow long-haul freight service to be concentrated on the “Central Corridor” to free up other lines for regional passenger and freight movements • Peplemover connection to new Capitol Corridor station at West Oakland • Overlay services are provided operating on passenger tracks in the East Bay between Hercules and Oakland 	<ul style="list-style-type: none"> • Third main track Oakland – Richmond • Operational improvements to support extension of service to Colfax • Hercules station • Fairfield/Vacaville station • Colfax station • Outer Harbor Intermodal Terminal and new freight leads (Port of Oakland) • Donner Summit tunnel improvements to allow operation of double-stack freight movements 	<ul style="list-style-type: none"> • Fourth main track Oakland – Richmond • Relocate BNSF / UPRR junction from Stege to North Richmond • Third main track Benicia – Auburn • Dixon station • Swanston station • Peplemover connection to new Capitol Corridor station at West Oakland • Bridge rehabilitation for Martinez and I Street bridges 	<ul style="list-style-type: none"> • Revise passenger alignment Richmond – Ozol to add third track and improve operating speeds • wBART type service on UPRR (actual phasing to be determined by more detailed ridership and engineering analysis) • Bridge replacements at Martinez and I Street bridges

Corridor	Synopsis	Present – Year 2015	Year 2015 – Year 2030	Year 2030 – Year 2050
<p>East Bay (Oakland – San Jose)</p>	<ul style="list-style-type: none"> • Capitol Corridor services are expanded and improved with capacity and operational improvements as well as new stations for services operating between Oakland and San Jose (Resolution 3434) • Oakland Subdivision is purchased; passenger services are shifted to it south of Industrial Parkway in Hayward providing new intermodal with BART and Dumbarton at Union City • Niles Subdivision is improved to handle all traffic between Oakland and South Hayward; the line becomes freight-only south of Industrial Parkway in Hayward • Regional freight operates over existing UPRR lines between the Port of Oakland and Niles / Newark; in longer term, freight trains use Niles Subdivision south of Industrial Parkway in Hayward and former Southern Pacific through Niles Canyon • • 	<ul style="list-style-type: none"> • Purchase Oakland Subdivision Oakland – Niles • Restore track connection along Oakland Subdivision between Melrose (High Street, Oakland) and East Oakland yard for short haul freight (interim operations) • Union City station, Shinn and Industrial connections and second track on Oakland Subdivision for passenger-only operation Hayward – Niles • Second main track on Coast Subdivision Alviso – Santa Clara • Second main track on Coast Subdivision Alviso – Santa Clara 	<ul style="list-style-type: none"> • Track, signal and grade separation improvements on Oakland Subdivision for passenger-only operation Union City – South Hayward • Construct separate passenger tracks within Niles Subdivision between South Hayward and 5th Avenue, Oakland • Route freight traffic over Niles Subdivision between Oakland and Niles Junction, then either to and from the south via Warm Springs Subdivision to Milpitas or to and from the east via the former SPRR line through Niles Canyon 	<ul style="list-style-type: none"> • Second main track on Coast Subdivision Newark – Alviso • Extend third main track between Market Street and Jack London Square in Oakland; revise roadway configuration and waterfront access and circulation

Corridor	Synopsis	Present – Year 2015	Year 2015 – Year 2030	Year 2030 – Year 2050
<p>Transbay (Oakland – San Francisco)</p>	<ul style="list-style-type: none"> • BART Core Capacity improvements are accomplished to address Transbay demand in early years • Additional BART “Metro” provisions are implemented to increase service in core areas • In long term, new Transbay BART tube and San Francisco subway is developed to reduce demand on Market Street subway and to improve coverage in San Francisco • A four-track central segment is constructed to provide a conventional rail connection between Oakland and San Francisco; ultimately Caltrain and Capitol Corridor services may interline with signal improvements and revised regulations 	<ul style="list-style-type: none"> • BART Core Capacity improvements 	<ul style="list-style-type: none"> • BART Metro improvements (to be defined) 	<ul style="list-style-type: none"> • New BART Transbay crossing and San Francisco subway (alignment to be defined) • New standard rail Transbay crossing (service plan to be defined)

Corridor	Synopsis	Present – Year 2015	Year 2015 – Year 2030	Year 2030 – Year 2050
Peninsula (San Francisco – San Jose)	<ul style="list-style-type: none"> • Caltrain develops over time into a three and four track, grade separated, railway to support operation of lightweight electrified multiple-unit consists between San Francisco and Tamien Station in San Jose (Resolution 3434) • Service to Gilroy is handled with standard equipment shared with freight operating on Coast Subdivision 	<ul style="list-style-type: none"> • Grade separations and third/fourth main track 	<ul style="list-style-type: none"> • Grade separations and third/fourth main track • Electrification and lightweight EMU consists San Francisco – Tamien • Transbay transit center 	

Corridor	Synopsis	Present – Year 2015	Year 2015 – Year 2030	Year 2030 – Year 2050
<p>South Counties (Santa Cruz, Monterey, San Benito)</p>	<ul style="list-style-type: none"> • Service between San Jose and Gilroy is extended to Salinas and Monterey; in longer term, when Peninsula converts to lightweight electrified equipment, the South Counties may be served by Capitol Corridor trains using standard equipment shared with freight on Coast Subdivision • “Wharf to Wharf” service between Santa Cruz and Monterey is implemented using standard equipment connecting to the Salinas trains with timed transfers at Pajaro and Castroville • A shuttle connection is provided between Gilroy and Hollister to meet all corridor trains 	<ul style="list-style-type: none"> • Second main track San Jose – Gilroy • Track, signal and station improvements to support service extensions to Salinas 	<ul style="list-style-type: none"> • Modified service plan to serve San Jose – Salinas territory using standard equipment operating on the Colfax – San Jose line • Line restoration, track and signal upgrades and stations to support Santa Cruz – Monterey service and Monterey corridor trains 	<ul style="list-style-type: none"> • Track, signal and station improvements to support passenger shuttle to Hollister meeting all trains at Gilroy

Corridor	Synopsis	Present – Year 2015	Year 2015 – Year 2030	Year 2030 – Year 2050
<p>Dumbarton (Redwood City – Union City)</p>	<ul style="list-style-type: none"> • Dumbarton Rail project is implemented (Resolution 3434) • The service operates with standard equipment in the near term; separate passenger trackage is developed in the Centerville line over the longer term allowing operation of lightweight equipment between points along the Peninsula and the greater East Bay 	<ul style="list-style-type: none"> • Bridge, track and signal improvements are made to support initiation of service between Redwood City and Union City across the Dumbarton Bridge 	<ul style="list-style-type: none"> • Passenger only tracks constructed between Newark and Niles to allow operation of lightweight consists between Peninsula and East Bay 	

Corridor	Synopsis	Present – Year 2015	Year 2015 – Year 2030	Year 2030 – Year 2050
<p>I-680 & Tri Valley (Contra Costa & Southern Alameda)</p>	<ul style="list-style-type: none"> • Near term investments are made to Oakland Subdivision to improve reliability of ACE services sharing with freights; in the longer term, sections of the former SPRR are put back into service west of Pleasanton allowing freights to be separated from passenger lines • Regional bus services are developed in I-680 corridor connecting with regional rail • An intermodal connection is made by extending BART to meet ACE in Pleasanton • Regional freight operates between the San Joaquin Valley and Bay Area over the Altamont lines 	<ul style="list-style-type: none"> • Track and signal improvements to Oakland Subdivision Niles – Tracy • Regional bus in I-680 corridor 	<ul style="list-style-type: none"> • Restore SPRR to service Niles – Hearst (Pleasanton); use to provide direct freight connection to Niles Subdivision • Construct passenger-only tracks between Hearst (Pleasanton) – Vasco Road (Livermore) to improve reliability of operations • Livermore BART extension and ACE intermodal Dublin/Pleasanton – Isabel/Stanley (actual phasing to be determined by more detailed ridership and engineering analysis) • Extend eBART to Tracy with intermodal connection to ACE 	<ul style="list-style-type: none"> • Construct second main track between Vasco Road (Livermore) and Lathrop to improve reliability of operations • Track, signal and station Improvements to West Side Line to extend service from Tracy – Patterson

Corridor	Synopsis	Present – Year 2015	Year 2015 – Year 2030	Year 2030 – Year 2050
Central Valley (Sacramento – Merced)	<ul style="list-style-type: none"> ACE services are expanded in stages along a new passenger-only line constructed in phases along the UPRR Fresno Subdivision between Sacramento and Merced 	<ul style="list-style-type: none"> R/W plan for Central Valley lines Construct passenger-only line along UPRR Fresno Subdivision Stockton – 65th Street, Sacramento Construct new passenger platforms for San Joaquin trains at Stockton diamond and provide rubber-tired shuttle to Channel Depot (Stockton) 	<ul style="list-style-type: none"> Extend passenger-only line along UPRR Fresno Subdivision Lathrop – Modesto Develop rail/rail grade separation between north-south UPRR line and east-west BNSF line in Stockton to improve capacity and operations; relocate Stockton passenger platforms for UPRR and BNSF trains to crossing to provide vertical transfer 	<ul style="list-style-type: none"> Extend passenger-only line along UPRR Fresno Subdivision Modesto – Merced
Grade Crossings and Grade Separations (All Lines)	<ul style="list-style-type: none"> Staged, prioritized improvements are implemented in accordance with train and highway conflict levels to improve grade crossing safety and implement “Quiet Zones” in the near term and to provide grade separations where needed in the long term 	<ul style="list-style-type: none"> Grade separation studies to define improvements and required r/w (corridor specific) Construct high priority grade separations along principal lines Construct “Sealed Corridor” safety improvements and implement “Quiet Zones” along crossings which remain at grade 	<ul style="list-style-type: none"> Construct second priority grade separations along principal lines 	<ul style="list-style-type: none"> Construct grade separations needed for high speed operation along principal lines