

Union Pacific Railroad Oakland Subdivision Corridor Improvement Study Executive Summary

For the:

Alameda County Public Works Agency

Prepared by:

Alta Planning + Design

In Partnership with:

HDR Engineering, Inc. and LSA Associates



January 2010



Funded by:

Alameda County Public Works Agency
Alameda County Transportation Improvement Authority
City of San Leandro



The Union Pacific Railroad Oakland Subdivision Corridor Improvement Study

Executive Summary

A Feasibility Study Analyzing the Potential for a Multi-Use Pathway Following the Oakland Subdivision Including On-Street, Rail-With-Trail and Rail-To-Trail Alternatives

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Acknowledgements

Alameda County Board of Supervisors

Scott Haggerty, District 1
Gail Steele, District 2
Alice Lai-Bitker, President, District 3
Nate Miley, Vice-President, District 4
Keith Carson, District 5

Director of Alameda County Public Works Agency

Daniel Woldesenbet, Ph.D., P.E.

Technical Advisory Committee

Paul Keener, Alameda County Public Works Agency
Rochelle Wheeler, Alameda County Transportation Improvement Authority
Keith Cooke, City of San Leandro
Reh-Lin Chen, City of San Leandro
Mark Evanoff, City of Union City
Joan Malloy, City of Union City
Don Frascinella, City of Hayward
Jason Patton, City of Oakland
David Ralston, City of Oakland
Jay Musante, City of Oakland
Tim Chan, BART Planning
Sue Shaffer, BART Real Estate
Thomas Tumola, BART Planning
Jim Allison, Capital Corridor Joint Powers Authority
Katherine Melcher, Urban Ecology
Diane Stark, Alameda County Congestion Management Agency

Supporting Agencies

Alameda County Transportation Improvement Authority
Alameda County Congestion Management Agency
East Bay Regional Park District
Metropolitan Transportation Commission

Alameda County Staff

Paul J. Keener, Project Manager
Ruben Izon, Associate Engineer
Rory N. MacNeil, Acting Chief, Real Estate Division

Consultant Team

Michael Jones, Principal in Charge, Alta Planning + Design
Ian Moore, Project Manager, Alta Planning + Design
Jennifer Donlon, Project Planner, Alta Planning + Design
Michael Beritzhoff, Directory of Port Development, HDR, Inc.
Shannon Allen, Principal, LSA

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UPRR CORRIDOR IMPROVEMENT STUDY
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Executive Summary

Introduction

This report identifies the opportunity to create nearly 18 miles of multi-use pathway in the heart of the East Bay following the existing Union Pacific Railroad (UPRR) Oakland Subdivision. This multi-use pathway, if constructed, would pass through five cities and unincorporated areas of Alameda County that are home to more than 1.5 million residents. These communities have a great need for increased pedestrian and bicycle transportation options, open space and recreational opportunity, and for improved public safety in the neighborhoods adjacent to the now little used railroad right-of-way.

This report shows clearly that freight rail use on the Oakland Subdivision is waning and that the UPRR is interested in selling some or all of the Oakland Subdivision. Freight can be moved more efficiently if consolidated on the parallel Niles Subdivision. Furthermore, there is a strategic opportunity to align this pedestrian and bicycle project regionally with the Capitol Corridor passenger rail project that is also seeking to purchase the Oakland Subdivision.

The acquisition cost of the Oakland Subdivision is dependent on many factors. It was estimated at \$60 million in 2007 in Regional Rail Plan discussions, but could be far less in an acquisition scheme involving a land swap or other negotiating strategies benefitting both Alameda County as a whole and the UPRR. Construction cost for this regional non-motorized corridor is estimated at approximately \$38 million, an average cost of slightly more than \$2 million per mile. Total cost per mile including acquisition and construction could be as much as \$5.7 million per mile in a cash acquisition, but again could be far less.

While an entirely different type of project, it is instructive to compare this pedestrian and bicycle capital need with the capital requirements for other current planned East Bay transportation projects – the East Bay Bus Rapid Transit project is estimated to cost approximately \$14 Million per mile, the I-880 to Mission Boulevard East-West Connector is estimated to cost approximately \$52 Million per mile. As a matter of public policy, this comparatively small investment in active transportation has the potential to greatly improve quality of life in the East Bay.

Finally, as discussed in this report, this project has the potential to generate extensive and varied community benefits beyond creating infrastructure for pedestrian and bicycle trips including improvements in neighborhood connectivity, improving access to transit, reducing load on parallel congested roadways, supporting community health, reducing greenhouse gas emissions, improving public safety and creating a sense of place along the corridor.

This report was commissioned by Alameda County Public Works Agency to investigate the feasibility of a regional pedestrian and bicycle pathway following the Union Pacific Railroad (UPRR) Oakland Subdivision from Oakland to Fremont. The 18 mile long project study area is shown in **Figure ES-1**. Questions about the future of the Oakland Subdivision have arisen at multiple levels of government over the past thirty years as freight customers diminish and less freight traffic travels along this corridor. Regional rail planning efforts, County elected officials and planners, local government agencies and advocacy groups have all identified the possibility that the Oakland

Subdivision might accommodate a range of transportation and community uses. The presence of an infrequently used and minimally maintained right-of-way in the heart of the East Bay has justifiably attracted a lot of attention. Over the past decade, a multitude of local planning documents have identified the Oakland Subdivision as a potential pedestrian and bicycle pathway.

In response to this growing support, the local advocacy and planning group Urban Ecology developed the East Bay Greenway Concept Plan analyzing the potential for pedestrian and bicycle improvements within the public street rights-of-way and area beneath the elevated BART tracks immediately parallel to the Oakland Subdivision from the Fruitvale BART Station in Oakland to Downtown Hayward. Urban Ecology elected to focus on city streets and BART property based on their assumption the East Bay Greenway could be constructed in tandem with the BART Earthquake Safety Project.

Since the East Bay Greenway Concept Plan was initiated, acquisition of the southern segment of the Oakland Subdivision for regional rail purposes has become a stronger possibility, stimulating interest in analyzing the feasibility of a regional pedestrian and bicycle multi-use pathway for the entirety of the Oakland Subdivision. As a result, this study expands on the support and concept of East Bay Greenway concept and analyzes the feasibility of a multi-use path in the Oakland Subdivision between the Fruitvale and Union City BART stations. This report investigates the feasibility of rail-to-trail and rail-with-trail scenarios in the railroad right-of-way.

In order to analyze the feasibility of rail-to-trail and rail-with-trail scenarios this study attempts to answer several related questions including:

- What is the existing adopted regional and local support for creation of a regional pedestrian and bicycle corridor along the Oakland Subdivision?
- What is the likely future of rail freight service on the Oakland Subdivision within a short-term and mid-term planning horizon?
- What is the future of passenger rail, including BART and Amtrak Capitol Corridor service, on the Oakland Subdivision?
- What is the feasibility of conversion of the Oakland Subdivision to non-motorized pedestrian and bicycle use [Rail-to-Trail]?

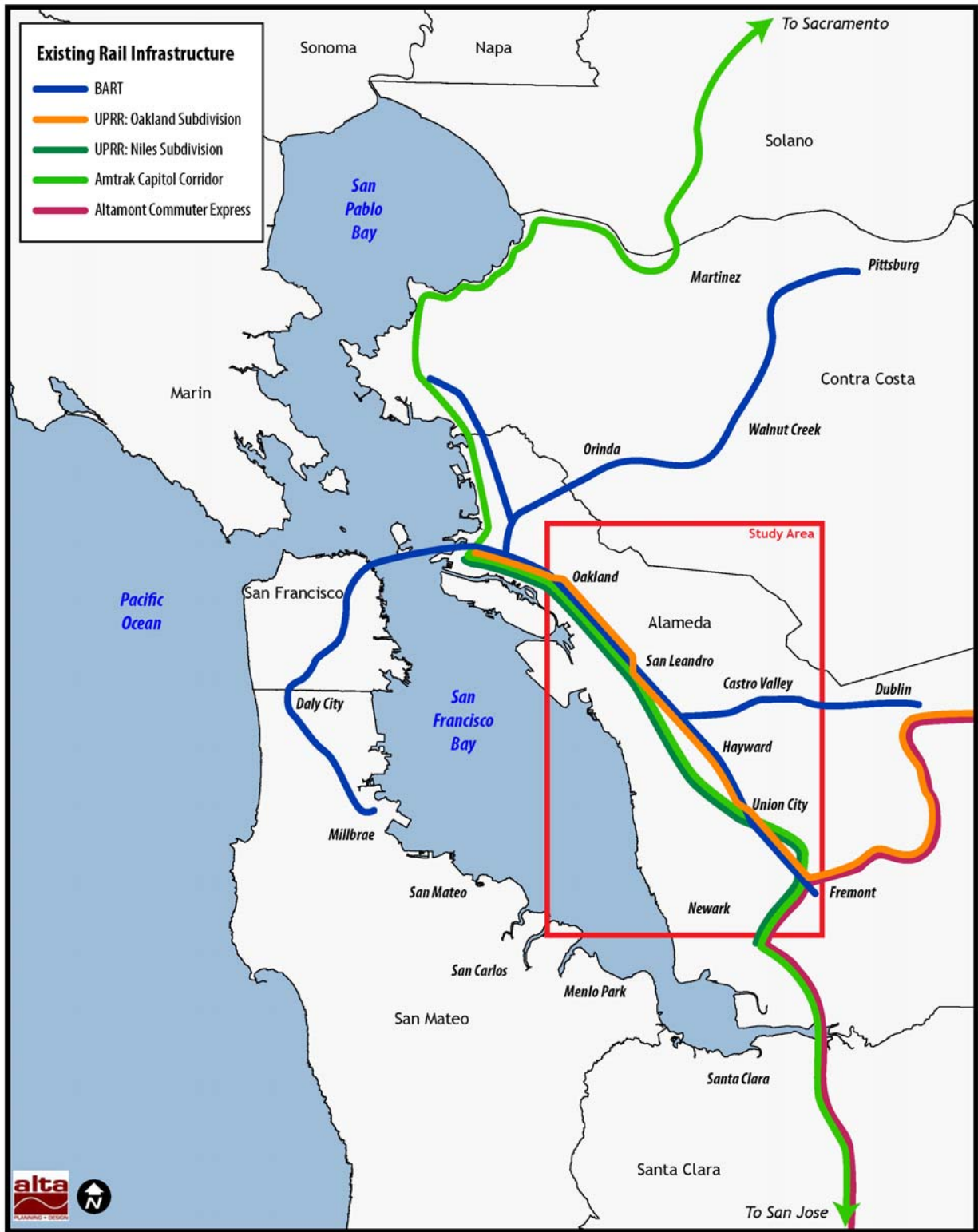


Figure ES-1: Project Study Area

- What is the feasibility of conversion of the Oakland Subdivision to shared pedestrian/bicycle and rail use (including freight and/or passenger service)[Rail-with-Trail]?
- What is the feasibility of parallel on-street pedestrian and bicycle facilities where use of the Oakland Subdivision is not feasible?
- How can the East Bay Greenway recommendations be incorporated in this study so that the two projects are compatible and build upon each other?

Based on the answers to the complex questions posed above, each of which faces a multitude of contingencies, this study addresses these further questions:

- Is the UPRR likely to be a willing seller of the Oakland Subdivision within a short-term and mid-term planning horizon?
- Is the UPRR likely to participate in a land swap for the Oakland Subdivision in the short-term and mid-term planning horizon?
- How might the Oakland Subdivision be acquired and what would it cost?
- What are the estimated costs associated with developing rail-to-trail and rail-with-trail alternatives?
- How might these projects be funded, implemented and maintained?
- Who would lead funding, design, implementation and management of a pedestrian and bicycle facility on the Oakland Subdivision?

Before addressing the major questions outlined above, the Executive Summary first summarizes the value and benefits that would be created through development of regional pedestrian and bicycle infrastructure along the Oakland Subdivision. It is essential to know what the community and environmental benefits are in order to justify the costs associated with acquisition of the Oakland Subdivision and the costs of development of pedestrian and bicycle facilities. Urban Ecology's East Bay Greenway Concept Plan identified environmental justice, community health, sustainable transportation, and public safety benefits that are reiterated here.

Why Create a Regional Bicycle and Pedestrian Corridor?

There are many reasons to improve the Oakland Subdivision for pedestrian and bicycle connectivity. The East Bay Greenway Concept Plan presents extensive documentation summarized here. The chief benefits of a regional non-motorized transportation corridor include environmental justice, community health, sustainable transportation, and public safety benefits.

Environmental and Social Justice

As documented in **Chapter 2** of this study and in the East Bay Greenway report, the communities within a one-mile radius of the Oakland Subdivision are predominately low-income with high

percentages of youth and seniors. Several other regional transportation equity programs, including the Metropolitan Transportation Commission's (MTC) Lifeline Transportation Program and Community-Based Transportation (CBTP) planning program, have identified the low-income neighborhoods in Central and East Oakland, Cherryland (unincorporated Alameda County), and South Hayward as suffering from a variety of transportation inequities. Mapping completed for the East Bay Greenway Concept Plan and **Chapter 2** of this study, clearly illustrates how poverty and low rates of vehicle ownership are concentrated around the Oakland Subdivision corridor. These are standard indicators of transit and walking dependency that begin to demonstrate the value of pedestrian and bicycle access improvements to the population of the study area.

Community Health

Communities within the project study area suffer from a variety of negative health trends coupled with poor access to outdoor recreational opportunity. The East Bay Greenway Concept Plan presents health data related to obesity, diabetes, and coronary heart disease demonstrating that many neighborhoods in close proximity to the Oakland Subdivision are at one and half times the Alameda County rate for each of these three diseases. According to the Centers for Disease Control (CDC), people who live within walking distance of recreation areas are more likely to exercise than those that live further away. Mapping presented in **Chapter 2** of this document illustrates the limited access to open space characterizing the project study area. The creation of a regional pedestrian and bicycle facility providing safe walking and bicycling opportunities for many neighborhoods that currently lack such facilities can begin to combat these trends.

Sustainable Transportation

Creation of improved pedestrian and bicycle connectivity and safety along the Oakland Subdivision corridor has the potential to enhance existing and ongoing public investment in Transit-Oriented Development (TOD), BART station access improvements, and Interstate 880 congestion relief. TODs are being planned and implemented at all of the BART stations along the study corridor including Fruitvale, Oakland Coliseum, San Leandro, Bay Fair, Hayward, South Hayward and Union City. These TOD projects will build nearly 9,000 new residential units, 2.5 Million square feet of commercial lease space, and 360,000 square feet of retail development (Source: respective TOD plans). Development of improved pedestrian and bicycle access between existing neighborhoods near these TOD projects and near existing BART stations has the potential to increase non-motorized travel to retail, jobs, AC Transit and BART. The potential synergy between the East Bay TOD trend and a regional pedestrian/bicycle corridor is significant. The pedestrian/bicycle and transit trip linking options up and down the corridor present a viable alternative to the highly congested Interstate-880 corridor. For example, a Union City Intermodal Station TOD resident working in the Lake Merritt area of Oakland could readily walk or bike to BART at both ends of her commute trip, and vice versa. Likewise, residents in older neighborhoods in Cherryland or Hayward could take advantage of safe pedestrian and bicycle access to BART to reach a variety of employment destinations.

Chapter 5 presents specific strategies for forecasting levels of pedestrian and bicycle traffic and the associated transportation and environmental benefits associated with a regional non-motorized corridor improvement.

Public Safety Benefits

Crime and public safety are a major concern in communities throughout the corridor study area. The East Bay Greenway study presents important data demonstrating why residents would like to see the Oakland Subdivision, BART corridor, and parallel streets more actively managed. The greatest potential of a facilities generating more active use of the corridor is to increase “eyes on the street.” Development of pedestrian and bicycle facilities cannot solve the crime problems but they can bring more law-abiding and caring citizens who can displace unwanted illegal and illicit activities from unmanaged environments. Finally, as discussed in the East Bay Greenway study, residents of the neighborhoods along the Oakland Subdivision frequently use the rail corridor for walking and bicycling, even in its current state. The pedestrian risk at the frequent uncontrolled and unimproved railway crossings can be greatly improved upon with development of facilities meeting current non-motorized facility design standards. BART, through its Bay Fair BART Station Area Improvement Plan and other public agencies are actively addressing public safety in the corridor and any corridor improvements to the Oakland Subdivision should be viewed as having potential to address public safety as well.

Planning Context

Support for a Pedestrian and Bicycle Corridor on the Oakland Subdivision

Decades of observation and interest in the declining use of the Oakland Subdivision have fueled a variety of visions, advance planning, and adopted policies pointing toward a multi-use pathway along this corridor. Elected officials, agency staff, commissions, advisory groups and nonprofit advocacy groups all recognize that there is great potential to create a north-south pedestrian and bicycle corridor along the Oakland Subdivision. This vision has manifested itself in adopted policies and implementation programs in a variety of long-range planning documents including but not limited to General Plan circulation elements, pedestrian plans, bicycle plans, regional parks master plans, local parks master plans and transit station area plans.

The majority of these documents identify the Oakland Subdivision and/or BART right-of-way as a recommended Class I multi-use pathway – a dedicated pedestrian and bicycle facility developed separate from streets that accommodate cars and trucks. **Table ES-1** presents a summary of the facility type recommendations from each major land use jurisdiction along the corridor. Each of the documents referenced in the table is a policy-level or planning level document that references the Oakland Subdivision corridor, and has not specifically analyzed the feasibility of specific alignments or designs within the identified rights-of-way. **Table 2-1** in **Chapter 2** of this study presents additional planning support from a broader cross section of land use and transportation plans.

Table ES-1: Adopted Pedestrian and Bicycle Facility Recommendations for the UPRR Oakland Subdivision/BART Right-of-Way

Local Agency	Reference Document (Year of Adoption)	Recommended Facility Type for the Oakland Subdivision/BART Right-of- Way	Implementation Priority
Alameda County	Alameda County Bicycle Master Plan for Unincorporated Areas (2007)	Class I Multi-Use Pathway	High Priority Project

Local Agency	Reference Document (Year of Adoption)	Recommended Facility Type for the Oakland Subdivision/BART Right-of- Way	Implementation Priority
Alameda County Transportation Improvement Authority (ACTIA)/ Alameda County Congestion Management Agency (ACCMA)	Alameda Countywide Strategic Pedestrian Plan (2006)	Class I Multi-Use Pathway	Area of Countywide Significance
Alameda County Transportation Improvement Authority (ACTIA)/ Alameda County Congestion Management Agency (ACCMA)	Alameda Countywide Bicycle Plan (2006)	Class I Multi-Use Pathway (portions)	Second High Priority Project (San Leandro only)
East Bay Regional Park District	Regional Parks Master Plan (2007)	Class I Multi-Use Pathway	Potential Trail Project
City of Oakland	Bicycle Master Plan (2007)	Class I Multi-Use Pathway	Priority Project
City of Hayward	Bicycle Master Plan (2007)	Class I Multi-Use Pathway	N/A
City of San Leandro	Bicycle and Pedestrian Master Plan (2004)	Class I Multi-Use Pathway	Priority Project
City of Union City	Bicycle and Pedestrian Master Plan (2006)	No facility recommended; on-street bicycle routes parallel to the UPRR right-of-way on 6 th Street, E Street, and 11 th Street	Priority Project

This widespread support of the Oakland Subdivision as a pedestrian and bicycle corridor must be considered in the context of regional rail planning discussed below.

Future Freight Service on the Oakland Subdivision

This study asks the question, what is the likely future of rail freight service on the Oakland Subdivision within a short-term and mid-term planning horizon? The starting point for this study is MTC’s Regional Rail Plan which assumes that short-haul freight will operate over the Oakland Subdivision to the East Oakland Yard and Port of Oakland through 2015. In the longer term, freight trains will use the Niles Subdivision. This study has added detail about likely future freight service in the short- and mid-term, presented in **Table ES-2** and discussed in the narrative below.

Table ES-2: Future Freight Service on the Oakland Subdivision by Segment

Segment (Length)	Summary Area Description	Future Freight Service
47 th Avenue to 98 th Avenue (3.2 miles)	Central East Oakland; Coliseum BART and TOD	Port of Oakland connection via the Niles Subdivision north of 47th Avenue; service on the Oakland Subdivision south from 47th Avenue to 98th Avenue serving Central Oakland rail freight customers
98 th Avenue to Industrial Parkway (9.5 miles)	East Oakland to South Hayward	Freight service discontinued on the Oakland Subdivision and consolidated on the Niles/Coast Subdivision
Industrial Parkway to Union City Intermodal Station (3.2 miles)	South Hayward to Union City Intermodal Station	Freight service discontinued on the Oakland Subdivision and consolidated on the Niles Subdivision/Coast Subdivision; Planned Capitol Corridor commuter rail service to operate on the Oakland Subdivision

Based on a review of current freight customer demand, the City of Oakland’s desire to maintain green industrial jobs, and current goals of the UPRR and Port of Oakland, it is likely that freight rail service will continue on the Oakland Subdivision between 47th Avenue and 98th Avenue in Oakland for the short-term and mid-term planning horizon.

The same information sources that point to continued freight use of the 47th Avenue to 98th Avenue segment indicate that freight use will likely be discontinued on the segment from 98th Avenue to Industrial Parkway in the short- to mid-term. This conclusion is based on factors including lack of remaining freight customers on this segment and assumed efficiencies of consolidating upgraded passenger and freight with offset peak periods of operation on the Niles Subdivision, located immediately parallel to the Oakland Subdivision.

As discussed below, the UPRR is entertaining sale of the Oakland Subdivision for use by Amtrak Capitol Corridor. This scenario would result in discontinuation of freight service on this segment as well, however, the right-of-way characteristics and operational characteristics of the commuter rail service and BART service make pedestrian and bicycle access along this segment infeasible.

Future Passenger Rail Service on the Oakland Subdivision

This study asks the question, what is the future of passenger rail, including BART and Amtrak Capitol Corridor service, on the Oakland Subdivision? As with freight, the starting point for future rail scenarios is MTC's Regional Rail Plan. The Regional Rail Plan identifies that the Oakland Subdivision will be purchased and passenger services will be shifted to south of Industrial Parkway in Hayward, thus providing new intermodal connectivity with BART and Dumbarton trains at Union City by 2015. This scenario is assumed for purposes of this study based on existing completed preliminary engineering and environmental clearance, Dumbarton Rail Policy Advisory Committee (DRPAC) authorization of Capitol Corridor Joint Powers Authority (CCJPA) to lead property acquisition negotiations with the UPRR, and available funding for exploration of purchase. Expanded BART service in the corridor was considered as well however this study determined that future expansions are too far in the future to enable reasonable documentation of possible location and configuration at this time. As summarized above, passenger rail service on the Oakland Subdivision between Industrial Parkway and Union City Intermodal Station makes pedestrian and bicycle access along this segment infeasible.

Project Design

The planning and policy context, physical conditions, and likely rail scenarios set the stage for the development of a range of pedestrian and bicycle facility design strategies. The complex conditions along the Oakland Subdivision require a broad pedestrian and bicycle facility design toolkit. Depending on the specific segment of the Oakland Subdivision in question on-street facilities, rail-to-trail, and rail-with-trail segments are all necessary to create a continuous regional corridor in the short- to mid-term.

Design Strategies

In order to respond to the diverse range of conditions, four distinct facility types are included in the design toolkit for this project, including on-street bicycle and pedestrian facilities, multi-use pathways immediately adjacent to public street rights-of-way, rail-to-trail, and rail-with-trail. These facility types meet minimum and recommended Caltrans Highway Design Manual standards for Class I multi-paths and Class III signed shared roadway. Basic definitions and operational considerations for each are provided below. A list of facility types and planning level costs assigned to each are presented below in **Table ES-3**.

On-Street Bicycle Facilities

On-street alignments are required for some segments where there is not a feasible alignment option in the Oakland Subdivision railroad right-of-way. These on-street bicycle facilities are consistent with Caltrans Class III bike routes. Class III bike routes have bike route signs where vehicles and bicycles share a travel lane. **Figure ES-2** shows recommended standards for these bikeways. The typical cost for a bicycle route is \$15,000 per mile in an urban setting, as show in **Table ES-3**.

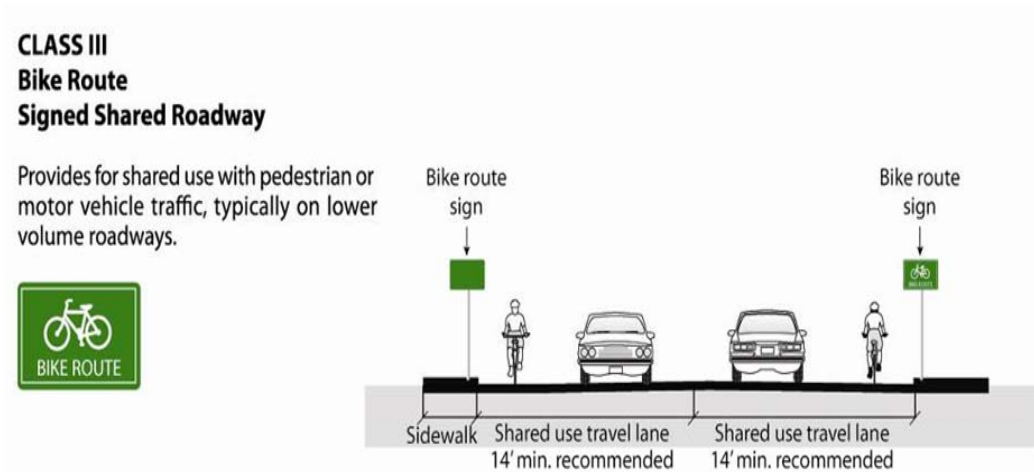


Figure ES-2: Class III Bike Route

Multi-Use Pathway Adjacent to Public Street Right-of-Way

Multi-use pathways adjacent to a public street are an important design option for segments of the Oakland Subdivision corridor where access to the railroad right-of-way is not feasible yet the boundary between the railroad right-of-way and immediately adjacent public street rights-of-way offers some flexibility. This design solution is recommended in the East Bay Greenway study for many segments.

Multi-use pathway facilities immediately adjacent to public streets carrying car traffic have special design and safety concerns including setback from vehicle travel lanes, driveway conflicts, interaction with transit stops and station areas where there is high pedestrian use. Setback from existing roadway travel lanes is an important consideration for this project on these segments. Caltrans specifies that the edge of the paved surface of a Class I facility shall be five feet minimum from the edge of an adjacent paved highway. In an urban street context, a variety of features may mitigate this requirement such as a combination of clear buffer, on-street parking, use of vertical fixed barriers and landscaped buffers. **Figure ES-3** shows recommended standards for these pathways.

The costs associated with constructing multi-use pathways adjacent to public streets can vary tremendously depending on context. This study assumes \$1.2 Million per mile not including major roadway crossing improvements as summarized in **Table ES-3**.

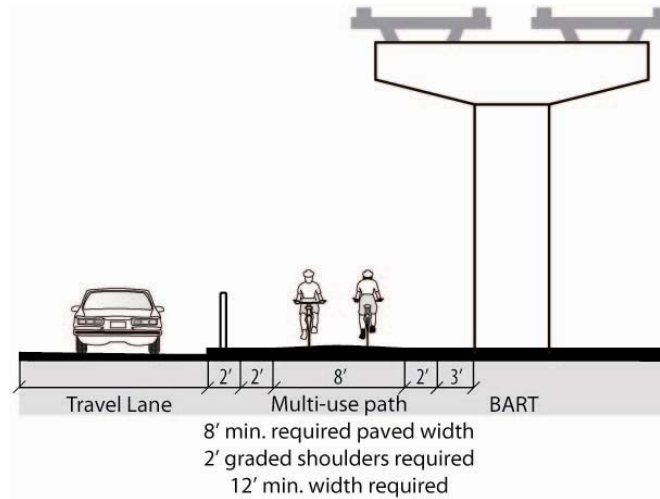


Figure ES-3: Multi-Use Pathway Adjacent to Public Street Right-of-Way

Rail-to-Trail

Rail-to-trail is recommended where it may be feasible to remove the existing rails from the corridor and construct a multi-use pathway in the former railroad corridor. As **Figure ES-4** shows, these paths must be a minimum of eight feet wide with two-foot clear shoulders on each side in order to meet Caltrans standards. A more typical standard width for the Bay Area is 12 to 16 feet wide in order to accommodate higher use levels, emergency vehicles and ease of maintenance access. This study assumes a minimum 12-foot wide facility with a planning level cost of \$1.2 Million per mile.

CLASS I Multi-Use Path

Provides a completely separated right of way for the exclusive use of bicycles and pedestrians with crossflow minimized.

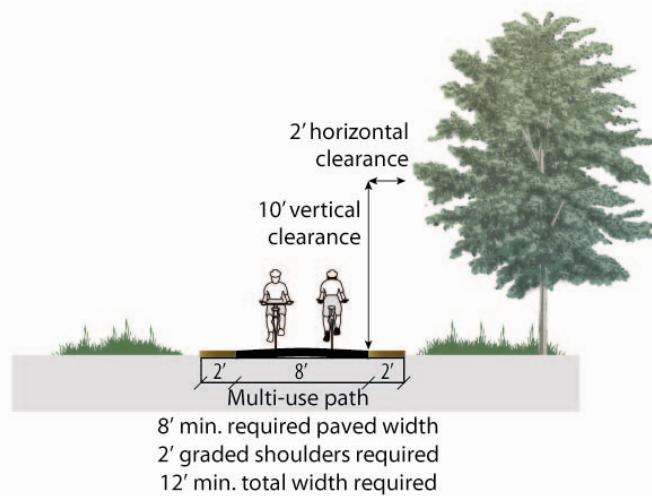
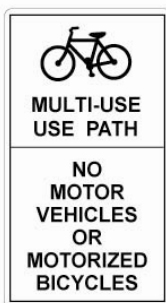


Figure ES-4: Class I Multi-Use Path

Rail-with-Trail

A rail-with-trail (RWT) multi-use path is where rail is likely to remain in place, a multi-use pathway is feasible in conjunction with the operating rail, and alignment options adhere to generally accepted rail-with-trail design guidelines. As with the rail-to-trail, the recommended total width is a minimum of 12 feet paved surface. **Chapter 3** provides detail on primary design characteristics for RWT

facilities including setback distance from the centerline of active railroad tracks, barrier separation requirements, railroad crossing design, and roadway crossing standards. Generally, privately operated freight railroads and high-speed commuter rail have higher setback and separation requirements from 25 feet to as much as 50 feet, as is the case with the UPRR. Low-speed freight spurs and some light-rail and commuter-rail facilities exist with extremely narrow setback (10 feet or less) at constrained segments and roadway crossings. **Figure ES-5** shows a typical rail-with-trail setback. This study assumes a minimum 12-foot wide facility with limited separation fencing at a cost of \$1.2 Million per mile not including major roadway crossing improvements.

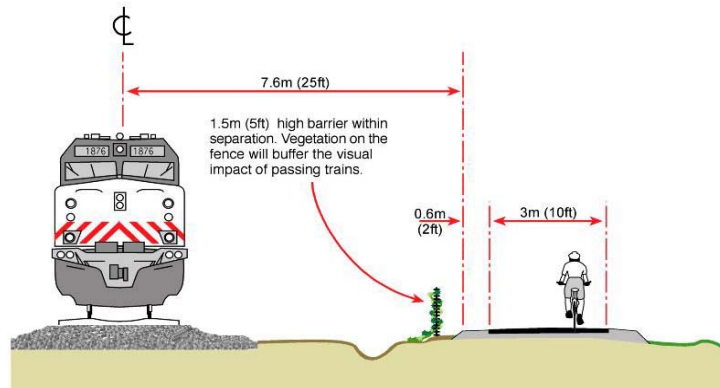


Figure ES-5: Rail-with-Trail Typical Setback

Other Design Elements

Other design elements incorporated in the recommendations and cost estimates include pedestrian crossing safety improvements, retrofit and improvement of existing rail bridges for pedestrian and bicycle use, and major roadway crossings and required traffic controls. These unit costs are incorporated into the recommended segment costs presented in **Table ES-3**. Landscaping and other amenities benefiting trail users including but not limited to benches, water fountains, and public art have not been included in the cost estimates.

Table ES-3: Pedestrian and Bicycle Corridor Improvement Options and Planning Level Cost Estimates

Facility Type/Improvement	Summary Description	Cost
Class I Multi-use Pathway	Twelve foot wide paved surface for shared pedestrian and bicycle use; California MUTCD regulatory and wayfinding signage; minor intersection safety improvements	\$1,200,000 per mile
Class I Multi-use Pathway Barrier Separation	Barrier fencing along multi-use path immediately adjacent to roadway	\$105,000 per mile
Class III Bicycle Route	On-street bicycle wayfinding signage; on-pavement shared-use pavement arrows	\$15,000 per mile
High Visibility Crosswalks	Ladder crosswalks	\$1,000 per crosswalk
One-to-Two Way Conversion	Street restriping, traffic signal improvements	\$150,000 each
Railroad bridge fencing	Fencing along existing rail trestle or bridge	\$50 per linear foot
Rail-to-Trail Multi-use Pathway	Twelve foot wide paved surface for shared pedestrian and bicycle use; California MUTCD regulatory and wayfinding signage; minor intersection safety improvements	\$1,200,000 per mile
Rail-with-Trail Multi-use Pathway	Twelve foot wide paved surface for shared pedestrian and bicycle use; California MUTCD regulatory and wayfinding signage; minor intersection safety improvements; 6-foot fence separation between trail and active rail	\$1,200,000 per mile
N/A	Class I multi-use path annual operation and maintenance costs	\$14,000 per year per mile

Recommended Alignments

This study developed responses to the following key design questions for a regional pedestrian and bicycle corridor along the Oakland Subdivision:

- What is the feasibility of rail-to-trail?
- What is the feasibility of rail-with-trail?
- What is the feasibility of parallel on-street pedestrian and bicycle facilities?
- How can the East Bay Greenway recommendations be incorporated in this study?

As introduced above, the answer to these questions depends greatly on the segment in question, on the future rail scenarios, and on the ability of the region to join forces and collaboratively pursue acquisition of the Oakland Subdivision. Depending on the specific segment of the Oakland Subdivision under discussion, on-street facilities, rail-to-trail, and rail-with-trail segments are all necessary to create a continuous regional corridor in the short- to mid-term.

Project Segments

For the purposes of this study, the corridor is organized into five map areas that generally correspond to jurisdictional boundaries of the City of Oakland, City of San Leandro, Unincorporated Alameda County, City of Hayward and City of Union City. Each of these map areas is further divided into representative segments based on similar right-of-way characteristics, adjacent land use character, and parallel alignment options. This segment framework has been used throughout the feasibility analysis and the segment definitions are the same as those in the appendices which present earlier technical analyses completed for the project.

Summary of Recommended Alignment

Figure ES-6 presents the entire recommended alignment while **Figure ES-7** through **Figure ES-11** present the recommended alignment according to each of the project segments.

The recommended alignment includes facilities in the UPRR Oakland Subdivision, BART, and local jurisdiction rights-of-way can be summarized as follows:

- 37th Avenue to 54th Avenue in Oakland is recommended as on-street Class III bicycle lanes based on the fact that the Oakland Subdivision is either physically occupied by industrial land uses or will likely provide continued freight service to the Port of Oakland. These recommendations are also consistent with City of Oakland circulation and bicycle planning. Neither rail-to-trail nor rail-with-trail are feasible for these segments in the short- to mid-term.
- 54th Avenue in Oakland to Industrial Parkway in Hayward is recommended as Class I multi-use pathway including segments parallel to San Leandro Boulevard from 54th Avenue south to 98th Avenue and rail-to-trail from 98th Avenue south to Industrial Parkway. Freight service is likely to continue north of 98th Avenue and the project recommendations in this

study are consistent with the recommendations in the East Bay Greenway – a multi-use pathway parallel to San Leandro Street/Boulevard. South of 98th Avenue to Industrial Parkway the Oakland Subdivision will not likely have freight or passenger rail service and is prime candidate for acquisition by regional and local government agencies for development of a rail-to-trail.

- Industrial Parkway in Hayward south to the Union City Intermodal Station is recommended as on-street Class III bicycle lanes in response to planned Capitol Corridor commuter rail use of this segment of the Oakland Subdivision, complex grade separation and property access issues, and in response to Union City’s circulation and bicycle planning efforts. Neither rail-to-trail nor rail-with-trail are feasible for these segments in the short- to mid-term.

Cost Summary

The estimated total construction cost for the recommended alignment is \$22,749,000 dollars. The addition of design documents, permitting and environmental clearance, and a 30 percent planning level cost contingency results in a grand total of approximately \$37,536,000 not including corridor acquisition cost.

Table ES-4 presents these summary costs. The basic unit costs incorporated for each segment include the pedestrian-bicycle facility type (bike route, multi-use pathway), minor crossing improvements, major crossing improvements, rail bridge retrofit, and barrier separation where required.

Table ES-4: Recommended 18 Mile Alignment Cost

Description	Cost
Total Construction Cost	\$22,749,000
Design Cost/PS&E (20%)	\$4,550,000
Permitting and Environmental Clearance (15%)	\$3,412,000
Planning Level Cost Contingency (30%)	\$6,825,000
TOTAL	\$37,536,000

Maintenance and operation costs per year per mile for the multi-use path facilities are presented below in **Table ES-5** by corridor segment. The basic unit of cost is an estimate of \$13,900 per year per mile.

Table ES-5: Annual Maintenance and Operation Cost Estimate

Description	Cost
Oakland	\$40,000
San Leandro	\$66,000
Alameda County	\$54,000
Hayward	\$58,000
Union City	\$5,700
TOTAL	\$223,300

Feasibility Findings

Rail-with-Trail

Rail-with-trail has limited potential while the Oakland Subdivision is owned by UPRR due to UPRR's setback requirements. It is not possible to comply with UPRR's stated requirement for 50 foot setbacks between the multi-use pathway and the centerline of the active rail tracks. Under a corridor acquisition scenario, where a public entity owned the Oakland Subdivision, a reduced setback may be negotiated or, as assumed under the recommended alternative, the elimination of approximately 11 miles of rail service between 98th Avenue and Industrial Parkway would lead to a rail-with-trail scenario, discussed below.

An additional factor limiting a rail-with-trail scenario is the engineering and financial feasibility the number of grade separated crossings over major arterials where the right-of-way is occupied by separate BART and UPRR bridges with limited remaining right-of-way. With rail service remaining in place new pedestrian-bicycle bridges would be required. Yet, there is insufficient right-of-way to expand the existing bridge abutments to accommodate a third bridge in these locations. The only alternative in these situations would be to route the multi-use pathway around these grade separated crossings on surface streets. The long block lengths fronting the Oakland Subdivision and lack of neighborhood street connectivity through many of the adjacent neighborhoods means that this routing would result in an indirect facility with no value as a regional bikeway.

Rail-to-Trail

Rail-to-trail has great potential based on the existing policy support, future rail scenarios, and right-of-way physical characteristics. Assuming the elimination of freight service between 98th Avenue in the north and Industrial Parkway in the south and potential public acquisition of the Oakland Subdivision, a 9.5 mile rail-to-trail is a feasible project in the short- to mid-term planning horizon. The average 100-foot wide Oakland Subdivision provides adequate width to provide for multi-use pathway well separated from elevated and at-grade BART structures. The available width also provides room for variation of the pathway placement in the right-of-way where there are utilities, BART structures, and adjacent property separation requirements. In contrast to the rail-with-trail scenario, the rail-to-trail scenario enables use of existing rail bridges over major roadway grade separations, creeks, and drainage channels. Provisions for local access to the regional trail at these major grade-separated roadway crossings will require special attention but the important continuity of the regional pedestrian-bicycle corridor is provided for in this alternative.

On-Street Facilities

The Oakland Subdivision cannot feasibly accommodate a multi-use pathway on either the northernmost or southernmost segments identified for this study area. In Oakland, the expectation that freight service will continue along the rail corridor, the fact that portions of the former railroad right-of-way are occupied by buildings, and the fact that the local industrial serving streets cannot be reapportioned to create the width for a multi-use pathway leads to the need for on-street solutions. The bicycle route segments included in the recommended alignment have been studied by the City of Oakland as a part of their circulation and bicycle planning efforts and are supported by the East Bay Greenway study as well. In South Hayward and Union City, south of Industrial Parkway, the combination of at-grade BART tracks, BART maintenance and layover yards, and planned Capitol Corridor commuter rail service means that the Oakland Subdivision cannot safely accommodate

public access. Existing and planned multi-use pathway segments parallel to Industrial Parkway and Mission Boulevard and existing and planned bicycle routes along neighborhood streets in Union City provide a feasible alternative.

Recommended Alignment Compared to the East Bay Greenway

Direct comparison of the Oakland Subdivision Corridor Improvement Study recommendations with the East Bay Greenway Concept Plan recommendations raises several important points. **Figure 4-2** (Chapter 4) graphically illustrates where the recommendations from the two studies overlap and where they are separate.

From the northern limit of both projects at 35th Avenue in Oakland south to the southern terminus of the East Bay Greenway Concept Plan study area at Hayward BART, there are significant differences in recommended facility types summarized in **Table ES-6**. While this Oakland Subdivision study recommends 9.05 miles of multi-use pathway, the East Bay Greenway recommends 5.85 miles of multi-use pathway. Clearly, acquisition and use of the Oakland Subdivision right-of-way creates far greater opportunity for a separated multi-use pathway than does the BART and public street right-of-way project corridor defined by the East Bay Greenway. **Table ES-7** summarizes and compares the recommended facilities over the entire length of the Oakland Subdivision Corridor Improvement study area illustrating the obvious point that with a longer corridor yet more continuous multi-use pathway mileage can be achieved.

Chapter 5 highlights strategies for integrating analysis of the recommendations of this Oakland Subdivision study into the forthcoming East Bay Greenway environmental analysis to be led ACTIA.

The narrative discussion of each segment includes more detailed discussion of the relationship between this study’s recommendations and the East Bay Greenway Concept Plan.

Table ES-6: Facility Comparison 35th Avenue to Hayward BART

Facility Type	UPRR Oakland Subdivision Recommend Alignment (miles)	East Bay Greenway Preferred Route Alignment (miles)
Class I Multi-use Pathway	9.05	5.85
Class II Bicycle Lane	0.18	3.59
Class III Bicycle Route	1.44	2.14
Total Miles	10.67	11.58

Table ES-7: Facility Comparison 35th Avenue to Union City Intermodal Station

Facility Type	UPRR Oakland Subdivision Recommend Alignment (miles)	East Bay Greenway Preferred Route Alignment (miles)
Class I Multi-use Pathway	16.90	5.85
Class II Bicycle Lane	0.18	3.59
Class III Bicycle Route	1.31	2.14
Total Miles	18.39	11.58

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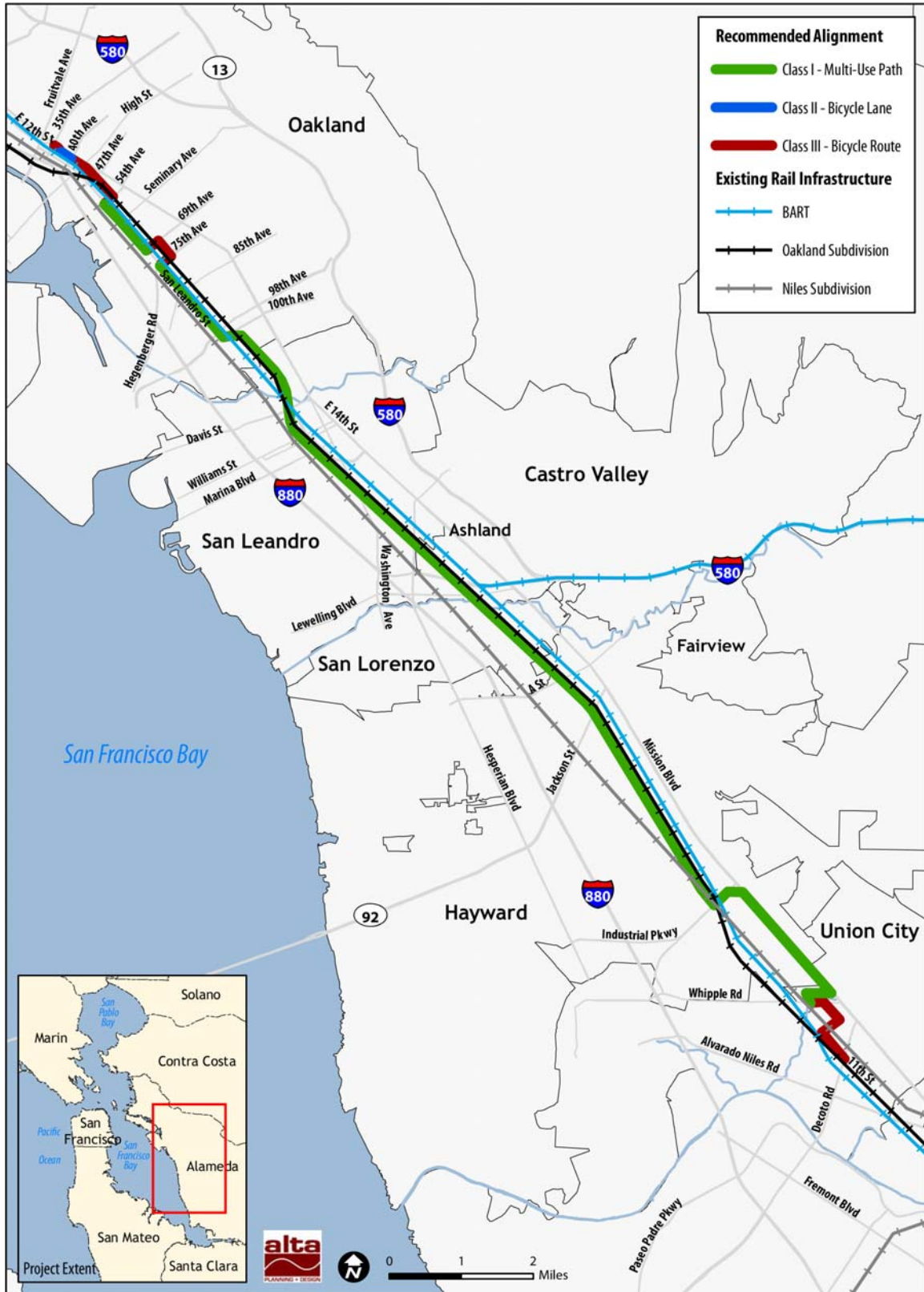


Figure ES-6: Proposed Alignment



Figure ES-7: Proposed Map 1 Alignment

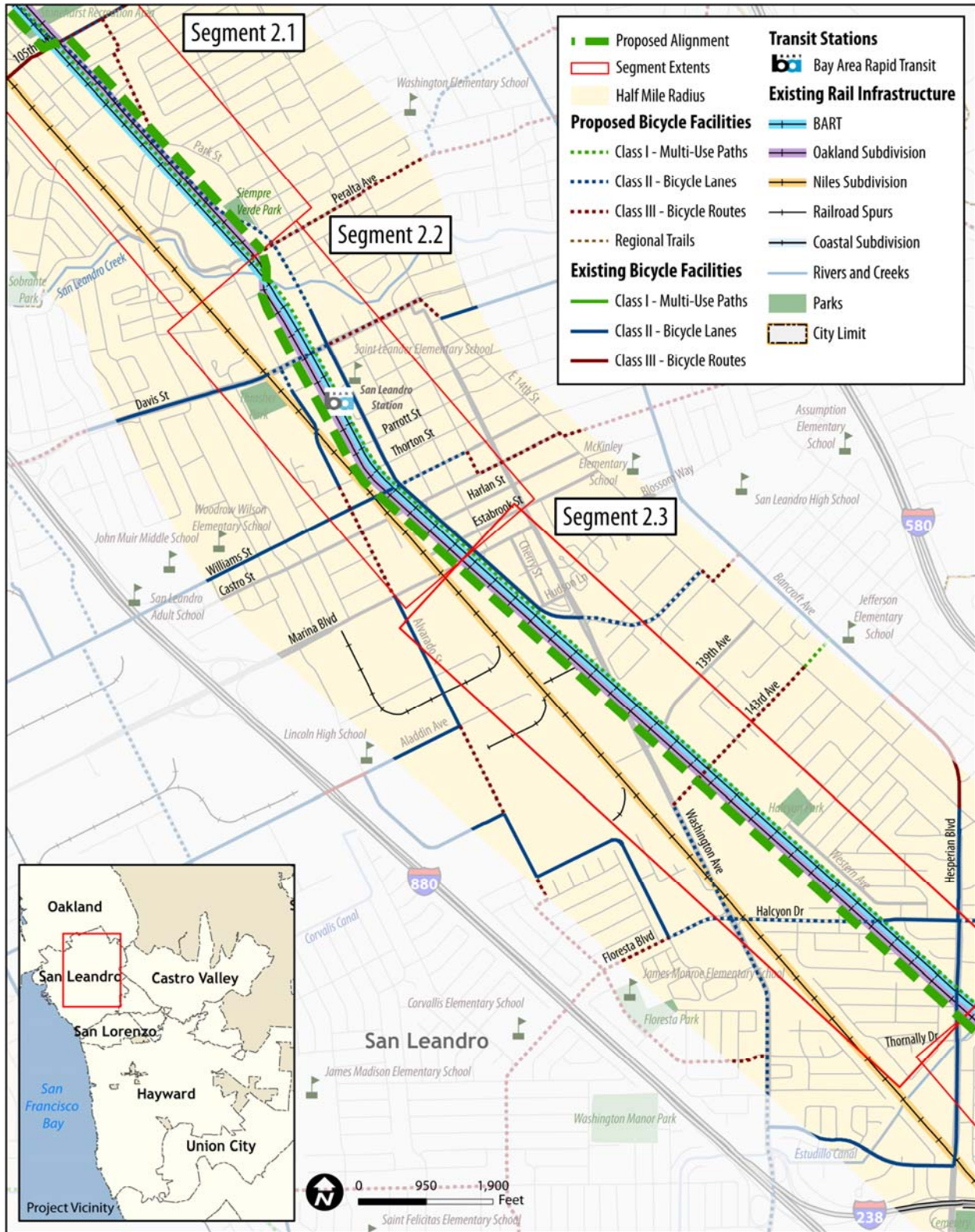


Figure ES-8: Proposed Map 2 Alignment

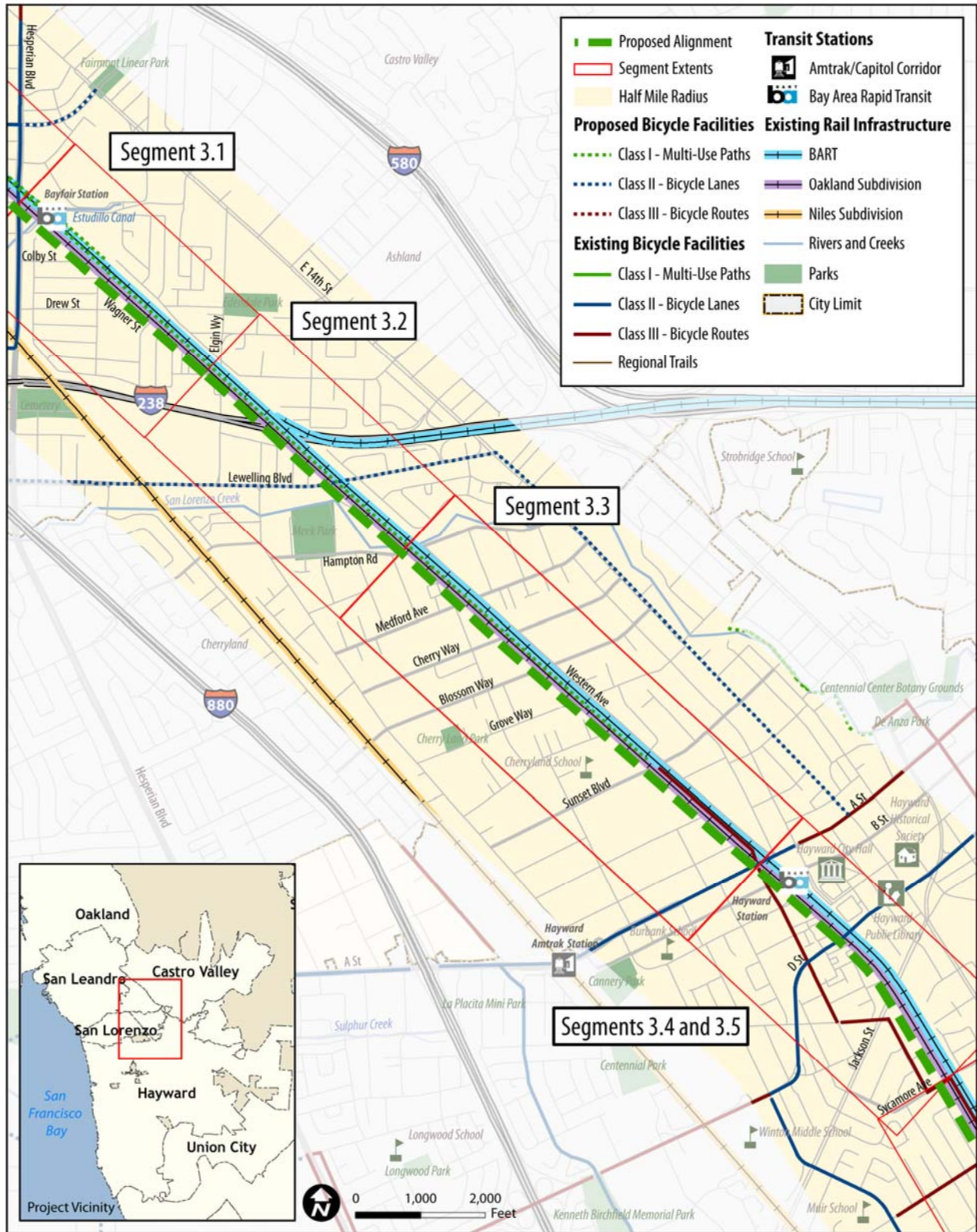


Figure ES-9: Proposed Map 3 Alignment

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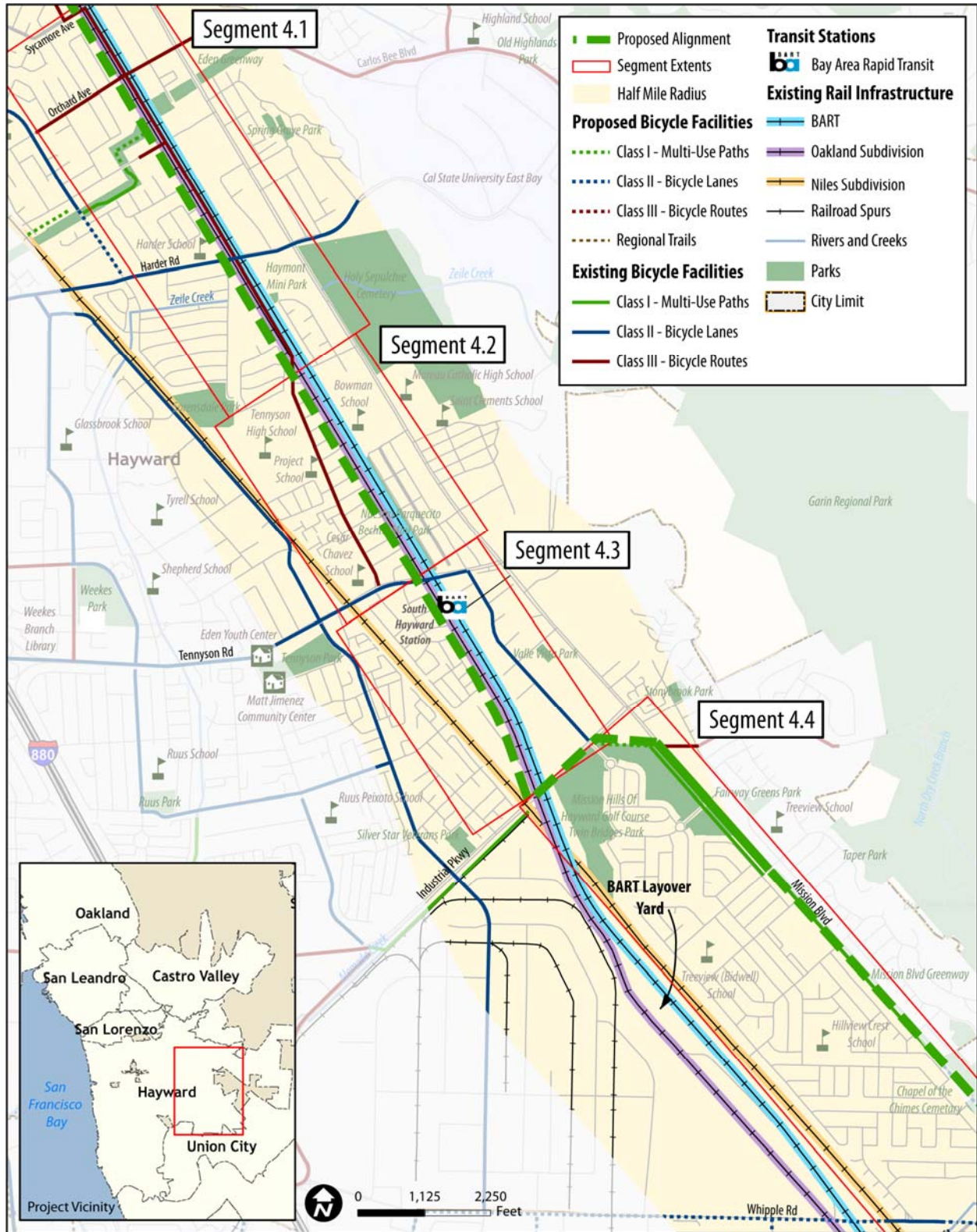


Figure ES-10: Proposed Map 4 Alignment

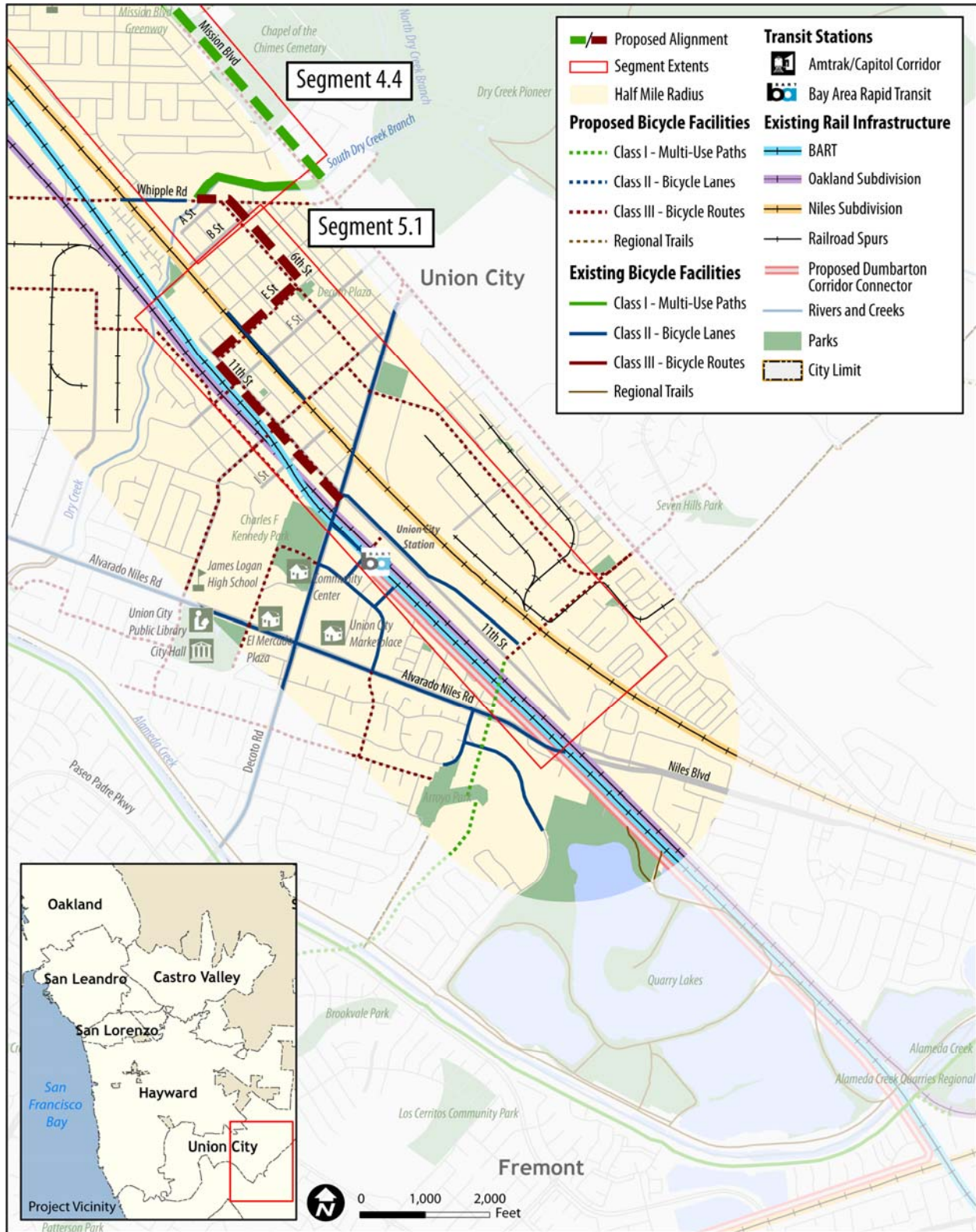


Figure ES-11: Proposed Map 5 Alignment

Action Plan

This section presents that actions that need to be completed, by whom and when in order to create a regional pedestrian and bicycle facility along the Oakland Subdivision in a cost effective and strategic manner.

Short-Term Actions

Lead Agency Commitment

This complex project will require continued leadership on many fronts including ongoing planning and environmental review, coordination of local jurisdictions, monitoring of activities along the corridor, pursuit of major acquisition and capital funding, and other related activities. Alameda County Public Works Agency has provided this leadership over the course of this current study with strong support and direct funding from the Alameda County Transportation Improvement Authority (ACTIA). As of the writing of this report, ACTIA is also determining the scope of its East Bay Greenway planning and environmental review, discussed in greater detail below. Ongoing study and implementation of the East Bay Greenway and Oakland Subdivision Corridor Improvement recommendations concurrently requires policy choices and design decisions that require a regional perspective and expertise in allocating scarce funding among competing projects. ACTIA is one possible agency which could take the lead coordination role. Alameda County and the East Bay Regional Park District could offer direct support to ACTIA in real estate analysis, operations and maintenance expertise, and other critical technical areas. Each of the cities along the corridor will also play a continuing role in identifying local needs and priorities to guide the lead agency.

Corridor Acquisition

Acquisition of the Oakland Subdivision by the local agencies with support from the County and Regional agencies is critical to the implementation of the recommended alignment. Acquisition of the corridor will require identification of a lead agency for negotiation, completion of environmental due diligence, preparation of appraisal, and acquisition negotiation at a minimum. As of the preparation of this study, the Capitol Corridor Joint Powers Authority (CCJPA) is authorized to lead investigation of purchase of Oakland Subdivision. The funding for the investigation and right-of-way (ROW) purchase comes from MTC's Regional Measure 2 Dumbarton Rail Project funding. The project's remaining funding, after \$91 million was redirected to the Warm Springs BART Station, is approximately \$35 million and is currently allocated for securing and purchase of the needed rail rights-of-way along UPRR's Oakland Subdivision for the operation of the Dumbarton trains from Industrial Parkway in Hayward to the Shinn Yard in Fremont.^{ES-1}

Acquisition of the entire Oakland Subdivision may be addressed in this current negotiation if proposed by the UPRR. Any expansion of CCJPA's purpose will be required for consideration by MTC.

The only data available on potential acquisition cost of the Oakland Subdivision from the Port of Oakland to the Shinn Yard in Fremont is from the 2007 MTC Regional Rail Plan supporting

^{ES-1} Capitol Corridor Joint Powers Authority Meeting Minutes
<http://www.capitolcorridor.org/included/docs/board_meetings/ccjpa_agenda_081119.pdf> and Resolution No. 08-15.

documentation when the cost was estimated at \$60 Million. Accounting for inflation this is \$65 Million in 2009 dollars.

Alameda County, ACTIA, ACCMA, and all participating cities will need to work with MTC, BART and CCJPA to demonstrate the interest and value of acquiring this corridor. Corridor acquisition now would create the opportunity for a significant rail-to-trail project from 98th Avenue in the north to Industrial Parkway in the south for a total of 9.5 miles.

Pursue Major Funding for Acquisition

Regional, county and local agencies will need to secure a minimum of \$30 Million in the short term in order to acquire the Oakland Subdivision north of Industrial Parkway in Hayward. This amount greatly exceeds the typical maximum requests associated with competitive grant programs that fund non-motorized transportation projects. Obtaining \$30 Million will require a dedicated legislative campaign such as the Active Transportation legislative effort currently being led by ACTIA, or other strategies that can be accommodated in the 2009 reauthorization of the 6-year federal transportation bill. This will require continued partnership building.

East Bay Greenway and Environmental Documentation

The recommended alignment for this study is largely consistent with the recommended alternatives presented in the East Bay Greenway study from 54th Avenue in Oakland south to Peralta Avenue in San Leandro. The upcoming preparation of environmental documents for the East Bay Greenway project will advance the corridor project from 54th Avenue to Peralta Avenue.

Completion of the East Bay Greenway environmental documentation as proposed by Urban Ecology and funded by ACTIA will provide documentation of key environmental constraints and refine the proposed design strategy for Urban Ecology's recommended alignment. Urban Ecology was awarded \$527,000 of Measure B Bicycle and Pedestrian Countywide Discretionary Program Funding for this project. The grant will fund completion of the environmental documentation for the twelve mile recommended greenway from Oakland to Hayward, and begin developing design documents for part of all of the project.

Further discussion should be conducted regarding which projects should be developed where the East Bay Greenway and this project differ in facility type and alignment. A possible outcome may include developing the on-street East Bay Greenway segments as the first phase in the development of a pathway corridor. Public input and Oakland Subdivision ownership may also influence which proposed alignments are developed.

Local Plan Updates and Projects

Each county and city agency and regional planning agency embarking on local plan updates should clearly include this study's recommended alignment and funding estimates and focus on supplementing and adding to the analysis prepared for this feasibility study. For example, the City of San Leandro intends to update its Bicycle and Pedestrian Master Plan in 2009-2010 and can further investigate design options and provide design development and traffic analysis pursuant to the recommended improvements outlined in this study. TOD and Station Area Plans should also include this study's recommended alignment. The City of Oakland, City of Hayward, Alameda County, City of Union City, MTC and BART can all place a priority on further analysis and priority

implementation of the recommended improvements identified here. Regardless of the ultimate details that are implemented, each of these plan updates and projects needs to focus on assembling and connecting to the East Bay Greenway and Oakland Subdivision corridor improvement concepts.

Develop Detailed Design Guidelines

This study presents a basic design framework that will need to be further developed in order for the project to move forward. In order for a true regional project to take shape, a set of uniform design standards covering pathway design, crossing design, wayfinding signage, site amenities, landscape design standards, and other pathway features is required. This is essential for trail identity and regional function and will effectively guide the work recommended in the actions above.

Develop Management Plan

A management and maintenance plan is critical for the success of a regional multi-use pathway. The County and cities along the corridor will be required to agree to a set of uniform management and maintenance standards. Agencies will also be required to decide whether to manage the corridor using their own public works and parks agencies or if they will partner with the East Bay Regional Park District (EBDRP) to manage this facility and part of the EBRPD Regional Trail system.

Mid-Term Actions

Design Development

The East Bay Greenway environmental documentation will necessarily provide traffic operations analysis and design refinements for key on-street segments and intersections outside of the Oakland Subdivision. The environmental documentation will need to identify a preferred alternative, provide necessary environmental context, and provide appropriate mitigations and design refinements to enable certification by ACTIA. The next logical step in design development will be to seek design and construction funding for the rail-to-trail segment from 98th Avenue south to Industrial Parkway. Design development for this rail-to-trail segment will need to focus on a host of specific rail-to-trail design issues, including but not limited to those topics presented in **Chapter 3** and summarized here:

- Site specific rail-to-trail or rail-with-trail pathway crossing design at minor and major roadways
- Separation and setback from rail activity for both open and constrained areas
- Relocation or removal of above ground and/or overhead utilities potential conflicting with public access
- Overcrossing and bridge design

Project-Specific Environmental Analysis

Program- and project-specific analysis for the recommended alignment segments not covered in the East Bay Greenway environmental documentation will require a primary emphasis on traffic

operations at roadway crossings, air and noise impacts primarily during the construction phase, public services capacity to provide emergency response and safety patrol, and hazardous materials.

First-Phase Construction

First phase construction of the recommended alignment should focus on the highest potential use segments of the proposed rail-to-trail segment from 98th Avenue south to Industrial Parkway. A first phase should be comprised of physical improvements that can be reasonably constructed under assembled competitive grant funding not exceeding approximately \$10 Million in construction budget. Peralta Avenue to Elgin Way in San Leandro is an approximately 3.8 mile segment with an estimated construction budget of \$5.4 Million that passes through downtown San Leandro, expanding Transit-Oriented Development around the San Leandro BART station, existing residential and mixed-use neighborhoods, and connects to the Bay Fair BART station. This segment would attract significant use, be highly visible, and would create significant momentum for the remainder of the corridor. On-street segments in Oakland, Hayward, and Union City could proceed concurrent with this major project.

Long-Term Actions

Second-Phase Construction

Future construction phases would proceed in appropriate-scale project increments in response to available funding. The corridor segment in South San Leandro through Central Hayward from Elgin way to Sycamore Avenue represents a next logical phase followed by the segment from Sycamore Avenue to Industrial Parkway.

Financial Needs

The recommended alignment presented in this study requires significant financial capital to complete. Acquisition of the Oakland Subdivision, environmental analysis, design development, and project specific environmental permitting and clearance costs are presented in **Table ES-8**. The financial needs outlined below estimate a 15 year funding horizon.

Table ES-8 shows how the \$102.5 Million in projected costs may be partially paid for by existing funding sources, in addition to estimating the funding shortfall.

Aside from the money potentially available through the Dumbarton Rail Project, where \$35 Million may be available for Oakland Subdivision acquisition to provide for passenger rail connection to Union City Intermodal Station, much of the funding is expected to come from regional and local sources depending on local agency priorities and ability to support local significant investment in what will become a local and regional facility.

A conservative approach is used in this table to project a reasonable and potentially feasible amount of these sources that could be used on East Bay Greenway/Oakland Subdivision Corridor improvements, since this regional corridor represents only one small part of the bicycle, pedestrian, and trail needs in any community. For example, five percent of the estimated \$80 Million available from Alameda County sales tax measures for local and countywide bicycle and pedestrian projects could be used on Oakland Subdivision corridor segments.

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Regional sources available for bicycle and pedestrian projects such as Safe Routes to Transit, Regional Bikeway Network Program, and other sources including the Climate Action Program, are projected to total \$200 Million over the next five years of which 3.75 percent could be used on the Oakland Subdivision corridor. Based on previous authorizations of these funding sources, it is difficult to determine projected funding levels beyond five years.

State sources available for bicycle and pedestrian projects such as the Bicycle Transportation Account, Safe Routes to Schools, Office of Traffic Safety, and other sources is expected to total \$30 Million of which five percent could be used on the Oakland Subdivision corridor.

The 2010 federal surface transportation act will reauthorize and hopefully expand numerous sources, some of which could be used on the Oakland Subdivision corridor. For estimating purposes, the amounts assume two (2) authorizations over the next 15 years. The Oakland Subdivision corridor could potentially receive five percent of the Bay Area allocation for Transportation, Community, and System Preservation, five percent of the Recreational Trails allocation, five percent of the Congestion Mitigation and Air Quality program, five percent of the Safe Routes to School program, and five percent of the Transportation Enhancements program.

Based on these assumptions, there will be a shortfall of \$36.6 Million to complete the Oakland Subdivision corridor, averaging about \$2.44 Million per year. A dedicated source of funding on the state or regional level for the Oakland Subdivision corridor would be instrumental in ensuring that the system is completed in a 15-year timeframe.

Table ES-8: Oakland Subdivision Corridor Improvement Financial Needs

Projected Costs	
Total Acquisition ¹	\$65,000,000
Total Project Cost ²	\$37,536,000
Total Financial Need	\$102,536,000
Potential Funding Sources	
Active Transportation ³	\$12,500,000
Dumbarton Rail Project ⁴	\$35,000,000
Local Sources	
Sales Tax ⁵	\$4,000,000
Regional Sources ⁶	\$7,500,000
EBRPD Measure WW ⁷	\$400,000
State Sources ⁸	\$1,500,000
Federal Sources ⁹	
TCSP ¹⁰	\$700,000
Recreational Trails ¹¹	\$250,000
CMAQ ¹²	\$1,100,000
Safe Routes to School ¹³	\$800,000
Transportation Enhancements ¹⁴	\$2,200,000
Total Potential Funding	\$65,950,000
Surplus/(Shortfall)	(\$36,586,000)

1 Acquisition cost is based on Regional Rail Plan documentation prepared in 2007 assuming \$60 Million for the Oakland Subdivision from Port of Oakland to Niles Junction. This number was increased based on 2.85% rate of inflation for 2007 and 3.85% rate of inflation for 2008. This acquisition cost could be substantially reduced if Alameda County and the UPRR negotiate a land swap such as currently being explored.

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- 2 Total construction includes construction cost, design (20% of construction cost), environmental permitting and clearance (15% of construction cost), and planning level contingency (30% of construction cost).
- 3 The Alameda County Transportation Improvement (ACTIA) legislative campaign for Active Transportation funding through the federal transportation bill reauthorization could generate up to \$50 Million for Alameda County that would be combined with existing sales tax and other anticipated funding (already accounted for in this table) for a total \$135 Million investment in Active Transportation including transit access, regional greenways, and programs/education. The estimated total financial need for urban greenways is \$57 Million including the East Bay Greenway, Iron Horse Trail and Bay Trail. 25% of the \$50 Million request is assumed.
- 4 \$35 Million is the remaining Regional Measure 2 funds in the Dumbarton Rail Project currently allocated for securing and purchase of the needed rail rights of way (ROW) along UPRR's Oakland Subdivision for the operation of the Dumbarton trains from Industrial Parkway in Hayward to the Shinn Yard in Fremont. This funding may not be available if moved by MTC to other projects from the Dumbarton Rail Project.
- 5 Assumes 5% of Alameda County sales tax measure moneys for bikeways/trails (estimated at \$80 Million) including both non-competitive and competitive shares, subject to variation based on available sales tax revenue, a competitive grant process, and regional and local priorities.
- 6 Assumes 3.75% of regional funding sources including Safe Routes to Transit, Regional Bikeway Network Program, Climate Action Program (estimated at \$200 Million for the Bay Area over the next five years).
- 7 East Bay Regional Park District Measure WW includes \$400,000 specifically to assist local jurisdictions with acquisition of the UPRR Oakland Subdivision for the East Bay Greenway.
- 8 Assumes 5% of state funding in Bay Area from Bicycle Transportation Account, Safe Routes to School, Office of Traffic Safety and other sources.
- 9 Federal funding from the federal surface transportation act is estimated based on state and Bay Area share; assumes two authorizations over the next 15 years.
- 10 Transportation, Community and System Preservation Program, 5% of Bay Area share.
- 11 Recreational Trails program, 5% of Bay Area share.
- 12 Congestion and Mitigation and Air Quality Program, 5% of Bay Area share.
- 13 Safe Routes to School Program, 5% Bay Area share.
- 14 Transportation Enhancements, 5% Bay Area share

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