Initial Study/Draft Mitigated Negative Declaration

Bay Area Rapid Transit
Fremont Line Operability Retrofit Project

May 2, 2012

INITIAL STUDY/DRAFT MITIGATED NEGATIVE DECLARATION

Date of Publication of Initial Study/Draft Mitigated Negative Declaration: May 2, 2012

Project Title: Bay Area Rapid Transit (BART) Fremont Line Operability Retrofit Project

Sponsor and Lead Agency: San Francisco BART District

Contact Person and Phone Number: Janie Layton, (510) 874-7423

Project Location: The following sites along the BART Fremont Line in Oakland and San Leandro, Alameda County:

- Segment A: Retrofit Activities from 18th Avenue to the BART Fruitvale Station (A-1 to P-88)
- Segment B: Retrofit Activities at Ashland Avenue (A-639, P-640, and A-641)
- Segment C: Retrofit Activities from the BART Fruitvale Station to the BART Coliseum Station (P-100 to B-239)
- Fruitvale, Coliseum, and Bay Fair BART Stations

Description of Proposed Project: To ensure public safety and protect the massive capital investment represented by the BART system, BART is upgrading the most heavily used and most vulnerable portions of the original system, which were constructed in 1972 using the latest seismic standards available at the time. The Fremont Line Operability Retrofit Project (proposed Project) would upgrade the Fremont Line, which is a heavily used portion of the BART system, to an "Operability" Level of retrofit. For this level of seismic upgrade, facilities would be retrofitted to a degree at which BART would be able to resume operations shortly after a major earthquake. Operability retrofits would involve construction activities that primarily consist of strengthening the existing columns and footings that support aerial structures and stations. Proposed seismic retrofit strategies and concepts for the aerial structures generally include:

- Additional Cast in Drilled Hole (CIDH) piles or other non-driven piles would be installed in the areas around the perimeter of the existing foundations.
- The existing foundations would be enlarged to approximately 3–8 feet wider on each side and approximately 1–3 feet thicker by adding concrete toppings; and top mats of rebar and new vertical and horizontal dowels would be placed into the existing foundations.
- The concrete columns would be jacketed (encased) with Fiberwrap or 3/8- to l-inch-thick steel casings or collars. Steel jacketing encircling a column would be round or elliptical in shape, depending on the original shape of the column, and filled with concrete or grout. Fiberwrap is a material made of a combination of specialized fabrics and resins to form a strong two-dimensional material that can be bonded (wrapped) onto concrete to enhance the structural performance of the column.

- Additional shear keys would be placed at the bent caps, where needed. A shear key is a structural element installed to prevent the relative movement between the guideway and supporting bent cap. A shear key retrofit consists of a concrete or steel structure connecting the girder to the bent cap.
- At some abutment or bent cap locations, concrete seat extenders may be added to increase the available seating area for the girders. These extenders, which typically consist of a concrete block, are added to a structure to increase the support for an aerial girder. Extenders are installed to reduce the possibility of the girder being shaken off its support during excessive earthquake movement.
- In addition to the seismic retrofits described above, some of the multi-column piers (piers with two columns instead of one) would require infill concrete walls between the columns. In areas where multiple piers are located within a sensitive view area, the steel casings or Fiberwrap would be installed to the same height on each pier for a consistent appearance.

Ground disturbance around each pier to be retrofitted would take place within a 10-foot radius of the pier; on-site construction equipment would be placed within a 20-foot radius of each pier.

This Proposed Project Would Not Have a Significant Effect on the Environment: This finding is based on the criteria listed in the State of California Environmental Quality Act (CEQA) Guidelines Sections 15064 (Determining the Significance of the Environmental Effects Caused by a Project), 15065 (Mandatory Findings of Significance), and 15070 (Decision to Prepare a Negative or Mitigated Negative Declaration), and the reasons documented in the Initial Study for the proposed Project. Mitigation measures are included in the proposed Project to avoid potentially significant effects. These mitigation measures are identified in the Initial Study and are summarized below.

Copies of the Initial Study/Mitigated Negative Declaration: Copies of the Initial Study/Mitigated Negative Declaration can be reviewed on the BART website at http://www.bart.gov/earthquakesafety. Copies are available for review at the following locations:

- BART offices at 300 Lakeside Drive, 17th Floor, Oakland
- Oakland Main Library at 125 14th Street, Oakland
- Metropolitan Transportation Commission (MTC)/Association of Bay Area Governments (ABAG) Library at the Joseph P. Bort Metro Center at 101 8th Street, Oakland
- Cesar Chavez Branch Library at 3301 East 12th Street, Suite 271, Oakland
- San Leandro Main Library at 300 Estudillo Avenue, San Leandro
- South Branch Library at 14799 East 14th Street, San Leandro

Copies of the document can also be obtained by calling the BART Fremont Line Operability Retrofit Project information line at the following number and leaving information on how you may be contacted: (510) 874-7425. A copy of the document will be mailed to you.

Public Meeting: BART will hold a public meeting to receive public comments on the Initial Study/Mitigated Negative Declaration. The meeting will be held at the following time and location:

May 17, 2012
6:00 p.m. to 7:30 p.m.
Fruitvale-San Antonio Senior Center
3301 East 12th Street, Suite 201
Oakland, California 94601

Comments on the Draft Initial Study/Mitigated Negative Declaration: A 30-day public and agency review period pursuant to Section 15073 of the State CEQA Guidelines is scheduled from May 2, 2012 to May 31, 2012. Comments may be made at the public meeting or submitted in writing or via email. Email comments should be sent to: jlayton@bart.gov. Written comments may be mailed to the following address:

San Francisco Bay Area Rapid Transit District, Fremont Line Operability Retrofit Project
Attention: Janie Layton, Environmental Administrator
P.O. Box 12688 (Mail Stop LKS - 18)
Oakland, CA 94604-2688

All questions regarding the BART Fremont Line Operability Retrofit Project, the Initial Study/Mitigated Negative Declaration, or how to comment on this document can be directed to the project information telephone line at (510) 874-7425. However, verbal comments will not be accepted by telephone. After close of the review period, the BART Board of Directors will consider public and agency comments prior to adoption of the final Mitigated Negative Declaration.

Mitigation Measures: The following mitigation measures are incorporated into the Fremont Line Operability Retrofit Project:

Mitigation Measure AES-1: Reduce Nighttime Construction Lighting

Construction lighting shall be adequately shielded to prevent unnecessary glare onto adjacent properties.

Mitigation Measure AQ-1: Reduce Temporary Construction Emissions of Reactive Organic Gases (ROG), Nitrogen Oxides (NO_X), and Fine Particulate Matter (PM_{10} and $PM_{2.5}$)

In accordance with Bay Area Air Quality Management District (BAAQMD) CEQA Air Quality Guidelines, the following fugitive dust control measures shall be implemented:

- All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered two times per day.
- All haul trucks transporting soil, sand, or other loose material off site shall be covered.
- All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited.
- All vehicle speeds on unpaved roads shall be limited to 15 miles per hour (mph).

- All roadways, driveways, and sidewalks to be paved shall be completed as soon as possible. Building pads shall be laid as soon as possible after grading, unless seeding or soil binders are used.
- Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to 5 minutes (as required by the California Airborne Toxics Control Measure Title 13, Section 2485 of California Code of Regulations). Clear signage shall be provided for construction workers at all access points.
- All construction equipment shall be maintained and properly tuned in accordance with manufacturer's specifications. All equipment shall be checked by a certified visible emissions evaluator.
- Post a publicly visible sign with the telephone number and person to contact at the lead agency regarding dust complaints. This person shall respond and take corrective action within 48 hours. BAAQMD's phone number shall also be visible to ensure compliance with applicable regulations.

Mitigation Measure BIO-1: Pre-Construction Surveys and Construction Period Parameters

If any seismic upgrade activities to BART platforms would occur during the active nesting period (February 1 through August 31), a pre-construction survey for nesting birds (e.g., swallows) shall be conducted by a qualified biologist. Nesting bird surveys should be conducted within 1 week before initiation of construction activities. If no active nests are found, no further activity is required.

If active nests are found in any areas that would be directly affected by construction activities, the California Department of Fish and Game (CDFG) shall be contacted to determine appropriate action. Appropriate actions include establishing a no-disturbance buffer (a minimum of 50 feet) around the site to avoid disturbance until a wildlife biologist determines that the young have fledged (usually late-June to mid-July) or destruction of an inactive nest site. The extent of these buffers beyond the 50-foot minimum would be determined by the biologist, depending on the level of noise or construction disturbance, line of sight between the nest and the disturbance, ambient levels of noise and other disturbances, and other topographical or artificial barriers.

Mitigation Measure HAZ-1: Implement Phase II Environmental Site Assessment (ESA)/Preliminary Site Investigation (PSI) Recommendations

As noted in the Preliminary Site Investigation (PSI), construction workers shall use personal protective equipment such as disposable gloves and coveralls. The Phase II report shall be provided to construction contractors so that the information can be incorporated in their employee health and safety, and hazards communications programs. In addition, BART shall implement dust control measures and monitoring, and security measures to prevent unauthorized entry to the construction area and to reduce hazards outside the construction area.

In the event that soil, groundwater, or other environmental medium with suspected contamination is encountered unexpectedly during construction activities, BART's contractor shall cease work near the suspect material, the area shall be secured as necessary, and the contractor shall take all appropriate measures to protect human health and the environment. Appropriate measures shall include

notification of the applicable regulatory agency(ies) as necessary, and investigation to identify the nature and extent of contamination. Work shall not resume in the area(s) affected until the measures have been implemented, as appropriate.

Excavated soils that require off-site disposal will require appropriate analysis for waste disposal purposes. Project specifications shall include procedures for management and disposal of excess soils in accordance with applicable laws and regulations. Testing for profiling purposes may also be required by the disposal facility, although the information in the additional investigation and the Phase II report may serve to fulfill some or all of these profiling requirements. If groundwater management is required for the proposed Project, any groundwater intended for discharge will be handled, monitored, and analyzed, as specified by local permit requirements.

Mitigation Measure NOI-1: Reduce Temporary Construction Noise

BART shall incorporate the following practices into the construction documents to be implemented by the proposed Project contractor. Such practices include, but are not limited to, the following measures:

- All construction equipment shall be properly maintained and equipped with all feasible noise control, such as mufflers, in accordance with manufacturers' specifications (10 dB insertion loss).
- Noise-reducing enclosures or shielding shall be used around stationary noise-generating equipment (e.g., compressors and generators) (minimum 15 dB insertion loss).
- To ensure minimal annoyance, sleep disturbance, and compliance with applicable BART Design Criteria, BART shall conduct retrofit construction activities during daytime hours (7:00 a.m. to 7:00 p.m.), except for the following four locations: directly adjacent to or including the Fruitvale, Coliseum, and Bay Fair Stations; and at one additional location north of the Fruitvale Station at 19th Avenue and 12th Street.
- Construction activities during nighttime hours at 19th Avenue and 12th Street, and the Fruitvale, Coliseum, and Bay Fair BART Stations (7:00 p.m. to 7:00 a.m.) shall implement the following noise abatement measures:
    - All nighttime construction noise sources shall use noise-attenuating buffers or shields such as structures, barriers, blankets, truck trailers, or soil piles between noise generation sources and sensitive receptors (10–25 dB insertion loss).
    - No nighttime construction shall be performed in locations closer than 100 feet from any residences or other sensitive land uses. Before construction activity begins within 100 to 150 feet of one or more residences or businesses, written notification shall be provided to the potentially affected residents or business owners, identifying the type, duration, and frequency of construction activities. Notification materials shall include a contact number and identify a mechanism for residents or business owners to register complaints if construction noise levels are overly intrusive. The distance of 150 feet is based on the approximate 65-dBA contour of the loudest anticipated construction activity.

    - The primary contractor shall prepare and implement a detailed noise control plan based on the proposed construction methods. This plan shall identify specific measures to ensure compliance with noise control measures and a minimum noise reduction of 20 dB from implemented control measures. The noise control plan shall be submitted to and approved by BART before any noise-generating construction activity begins.
- Construction equipment travel shall be arranged to minimize disturbance to occupied residences and shall remain in staging areas when not in use. Staging areas shall be located as far from residences as feasible. Equipment not in use shall not be left idling for more than 5 minutes (5 dB insertion loss over 1 hour).
- Installation of sheet piles for temporary shoring shall be restricted to daytime hours between 7:00 a.m. and 7:00 p.m.
- A disturbance coordinator shall be designated, and the person's telephone number shall be posted in a noticeable location around the proposed Project sites and supplied to nearby sensitive receptors. The disturbance coordinator shall receive all public complaints and be responsible for determining the cause of the complaint and implementing any feasible measures to alleviate the problem.

Mitigation Measure NOI-2: Reduce Temporary Construction Vibration

To prevent annoyance and structural damage from construction-related vibration:

- Heavy equipment shall not be operated within 50 feet of the nearest sensitive receptors to the proposed Project sites. Rubber tired equipment may be used within 50 feet of adjacent sensitive receptors.
- Impact pile driving shall not be operated within 160 feet of residences.
- Pile driving of sonic piles or pre-drilling shall be conducted at a distance of 65 feet or greater from residences.

TABLE OF CONTENTS

Section **Page**

TABLE OF CONTENTS

Continued **Page**

Figures

Tables

Appendices

TABLE OF CONTENTS

Acronyms and Abbreviations

AB	Assembly Bill
ABAG	Association of Bay Area Governments
AC Transit	Alameda-Contra Costa Transit
ARB	Air Resources Board
AWSC	all-way stop controlled intersection
BAAQMD	Bay Area Air Quality Management District
BART	Bay Area Rapid Transit
BBN	Bolt, Beranek, and Newman, Inc.
BMPs	Best Management Practices
CAAA	federal Clean Air Act Amendments of 1990
Caltrans	California Department of Transportation
CBC	California Building Code
CCAA	California Clean Air Act
CDFG	California Department of Fish and Game
CE	Categorical Exclusion
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CGS	California Geological Survey
CIDH	Cast in Drilled Hole
CNEL	Community Noise Equivalent Level
CO	carbon monoxide
CO_2	carbon dioxide
dB	decibel
dBA	A-weighted decibel scale
EBMUD	East Bay Municipal Utility District
EIR	Environmental Impact Report
EPA	U.S. Environmental Protection Agency
ESA	Environmental Site Assessment
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
GHG	greenhouse gases
HCM	Highway Capacity Manual
HOV	high occupancy vehicle
I-880	Interstate 880
in/sec	inch per second
IS/MND	Initial Study and Draft Mitigated Negative Declaration
ISA	Initial Site Assessment
lb/day	pounds per day
L_{dn}	Day-Night Average Level
L_{eq}	equivalent energy noise level
L_{max}	maximum instantaneous noise level
L_{min}	minimum instantaneous noise level

TABLE OF CONTENTS

Acronyms and Abbreviations

LOS	level of service
MCE	Maximum Credible Earthquake
mph	miles per hour
MTC	Metropolitan Transportation Commission
MTS	Metropolitan Transportation System
N_2O	nitrous oxide
NEPA	National Environmental Policy Act
NOx	Nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
PAH	polynuclear aromatic hydrocarbon
PM_{10}	respirable particulate matter with an aerodynamic diameter of 10 micrometers or less
$PM_{2.5}$	fine particulate matter with an aerodynamic diameter of 2.5 micrometers or less
PPV	peak particle velocity
PSI	Preliminary Site Investigation
ROG	reactive organic gases
RWQCB	Regional Water Quality Control Board
SFBAAB	San Francisco Bay Area Air Basin
SWPPP	Storm Water Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TAC	toxic air contaminant
TEA-21	Transportation Equity Act for the 21st Century
TWSC	two-way stop controlled intersection
UPRR	Union Pacific Railroad
USGS	U.S. Geological Survey
V/C	volume to capacity ratio
VOC	volatile organic compound

INTRODUCTION

PURPOSE OF DOCUMENT

This Initial Study and Draft Mitigated Negative Declaration (IS/MND) has been prepared by the San Francisco Bay Area Rapid Transit (BART) District to evaluate the potential environmental effects of implementation of the Fremont Line Operability Retrofit Project (proposed Project). This document evaluates activities associated with implementation of the proposed Project.

This document was prepared in accordance with the California Environmental Quality Act (CEQA) (Public Resources Code Section 21000 et seq.) and the State CEQA Guidelines (California Code of Regulations Section 15000 et seq.). An IS is prepared by a lead agency to determine if a project may have a significant effect on the environment (State CEQA Guidelines Section 15063[a]), and thus to identify the appropriate environmental document. In accordance with State CEQA Guidelines Section 15070, a "public agency shall prepare…a proposed negative declaration or mitigated negative declaration…when: (a) The Initial Study shows that there is no substantial evidence…that the project may have a significant impact on the environment, or (b) The Initial Study identifies potentially significant effects but revisions to the project plans or proposal are agreed to by the applicant and such revisions would reduce potentially significant effects to a less-than-significant level." In this circumstance, the lead agency prepares a written statement describing its reasons for concluding that the proposed Project would not have a significant effect on the environment and, therefore, does not require the preparation of an Environmental Impact Report (EIR).

As described in this IS (see the *Environmental Checklist* section), the proposed Project would result in potentially significant environmental impacts, but those impacts would be reduced to a less-than-significant level by revisions to the proposed Project or how BART would implement the proposed Project (in the form of mitigation measures). Therefore, an IS/MND is the appropriate document for compliance with the requirements of CEQA. This IS/MND conforms to these requirements and to the content requirements of State CEQA Guidelines Section 15071.

PROPOSED PROJECT OBJECTIVES

The objective of the proposed Project is to upgrade the retrofit of the original BART system along sections of the Fremont Line from a Safety Level of retrofit to an Operability Level of retrofit. This will allow BART to resume operations shortly after a major earthquake.

LEAD AGENCY/PROJECT APPLICANT

The lead agency is the public agency with primary approval authority over the proposed Project. According to State CEQA Guidelines Section 15051(a), "If the project will be carried out by a public agency, that agency shall be the Lead Agency even if the project would be located within the jurisdiction of another public agency." The lead agency and applicant for the proposed Project is BART.

After comments are received from the public and reviewing agencies, BART may: (1) adopt the MND and approve the proposed Project; (2) revise the MND or undertake additional environmental studies;

or (3) abandon the proposed Project. If the proposed Project is approved, BART could implement all or part of the proposed Project.

SUMMARY OF FINDINGS

This document contains the analysis and discussion of potential environmental impacts of the proposed Project. It was determined that the proposed Project would have no impact related to the following issue areas:

- Agricultural and forestry resources, land use, mineral resources, population and housing, public services, and recreation.

Impacts of the proposed Project were determined to be less than significant for the following issue areas:

- Aesthetics, air quality, biological resources, cultural resources, geology and soils, greenhouse gases, hazardous materials, hydrology and water quality, noise, traffic and circulation, and utilities and service systems.

A Mitigation Monitoring and Reporting Plan will be prepared and will include the mitigation measures to reduce aesthetics, air quality, biological resources, hazardous materials, and noise impacts to less-than-significant levels. Impacts on the remaining resource areas listed above would be insignificant without mitigation.

DOCUMENT ORGANIZATION

This IS/MND includes the following sections:

- **Introduction.** This section provides an introduction and describes the purpose and organization of this document.
- **Proposed Project Description.** This section describes the purpose and need for the proposed Project, and provides a detailed description of the proposed Project.
- **Environmental Checklist.** This section presents an analysis of a range of environmental issues identified in the CEQA Guidelines Appendix G Environmental Checklist and determines if implementation of the proposed Project would result in no impact, a less-than-significant impact, a less-than-significant impact with mitigation incorporated, or a potentially significant impact. If any impacts were determined to be potentially significant, an EIR would be required. For this proposed Project, mitigation measures have been incorporated to reduce all potentially significant impacts to less-than-significant levels.
- **List of Preparers.** This section identifies report preparers.

ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED

Project impacts on each of the environmental factors listed below are evaluated in this Initial Study. None of the environmental factors listed below would result in any significant effects that cannot be mitigated to less-than-significant levels through Project-specific mitigation measures identified in this Initial Study.

☒	Aesthetics	☐	Agriculture and Forestry Resources	☒	Air Quality
☒	Biological Resources	☐	Cultural Resources	☐	Geology / Soils
☐	Greenhouse Gas Emissions				
☒	Hazards & Hazardous Materials	☐	Hydrology / Water Quality	☐	Land Use / Planning
☐	Mineral Resources	☒	Noise	☐	Population / Housing
☐	Public Services	☐	Recreation	☐	Transportation / Traffic
☐	Utilities / Service Systems	☐	Mandatory Findings of Significance		

DETERMINATION (To be completed by the Lead Agency)

On the basis of this initial evaluation:

I find that the proposed Project **COULD NOT** have a significant effect on the environment, and a **NEGATIVE DECLARATION** will be prepared. ☐

I find that although the proposed Project COULD have a significant effect on the environment, there WILL NOT be a significant effect in this case because revisions in the Project have been made by or agreed to by the Project proponent. A **MITIGATED NEGATIVE DECLARATION** will be prepared. ☒

I find that the proposed Project **MAY** have a significant effect on the environment, and an **ENVIRONMENTAL IMPACT REPORT** is required. ☐

I find that the proposed Project **MAY** have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An **ENVIRONMENTAL IMPACT REPORT** is required, but it must analyze only the effects that remain to be addressed. ☐

I find that although the proposed Project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier **EIR** or **NEGATIVE DECLARATION** pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier **EIR** or **NEGATIVE DECLARATION**, including revisions or mitigation measures that are imposed upon the proposed Project, nothing further is required. ☐

By Janie Layton

Signature

5/2/12

Date

Janie Layton

Printed Name

Environmental Administrator

Title

San Francisco Bay Area Rapid Transit District

Agency

PROPOSED PROJECT DESCRIPTION

PROPOSED PROJECT CONTEXT AND PURPOSE

The BART system is one of the San Francisco Bay Area's most vital transportation links, averaging about 300,000 riders every day. A BART system map is shown in **Figure 1**. Construction of the original BART system concluded in 1972 and consisted of the Concord, Daly City, Fremont, and Richmond Lines. Since then, new track and stations were added to the system, so that it now consists of 104 miles of track and 44 stations, connecting communities in Contra Costa, Alameda, San Francisco, and San Mateo counties. The system represents a public investment currently valued at nearly $15 billion, with immeasurable importance to the local and regional economy.

BART's success in maintaining continuous service immediately after the Loma Prieta earthquake of 1989 confirmed the system's importance as a transportation "lifeline." However, the Loma Prieta earthquake may not be the biggest test of BART's ability to withstand a seismic impact. A U.S. Geological Survey (USGS) statistical analysis predicts a high probability of one or more major earthquakes hitting the Bay Area within the next 30 years. To ensure public safety and protect the massive capital investment represented by the BART system, BART is upgrading the most heavily used and most vulnerable portions of the original system using the latest seismic standards. System extensions along various lines constructed after the 1989 Loma Prieta earthquake used more stringent and current seismic design criteria. BART is currently undertaking the Seismic Retrofit of Aerial Structures along the Concord, Richmond, Daly City, and Fremont lines, which are part of the original system. This retrofit Project is being implemented as part of BART's Earthquake Safety Program (Program). BART previously approved these segments and stations for a Life Safety or Operability Level of retrofit.[1] Work related to this Program has been running under budget because of additional design analysis resulting in decreased construction costs and a very competitive bidding climate. These cost savings now allow BART to upgrade portions of the aerial structures from a Safety Level of retrofit to an Operability Level of retrofit. This upgrade would occur along the Fremont Line, which is a heavily used portion of the BART system.

This retrofit Project was subject to the National Environmental Policy Act (NEPA) due to the use of federal funds for some components. The Federal Highway Administration (FHWA), as federal lead agency, determined that the Project qualified to proceed under a Categorical Exclusion (CE) from NEPA in August 2007 (revalidated in August 2010), supported by a series of environmental technical studies. The California Legislature enacted a statutory exemption from CEQA for the Program (Public Utility Code Section 29031.1). Pursuant to this exemption, on February 10, 2005, the BART Board of Directors adopted the Program for retrofitting of the aerial structures along the Concord, Richmond, Daly City, and Fremont lines.

[1] Per the operability retrofit, facilities would be retrofitted to a degree at which BART would be able to resume operations shortly after a major earthquake. The Life Safety Level retrofit entails retrofitting of aerial structures and stations to a degree at which passengers would be protected, but BART operations may be disrupted after a seismic event.

Figure 1: BART System Map

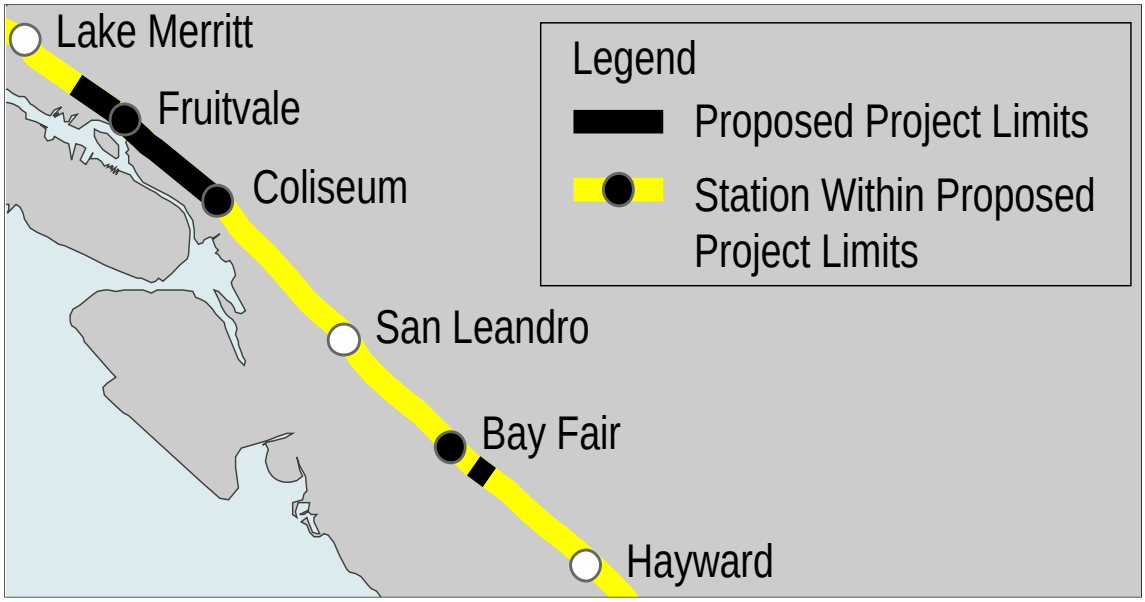
Source: BART 2011

No federal funding is associated with the Operability Level retrofit, and therefore no federal environmental review pursuant to NEPA is required. However, the CEQA statutory exemption for the Program expired in June 2010. As lead agency under CEQA, BART is required to assess the environmental effects of the Fremont Line Operability Retrofit Project (proposed Project).

The proposed Project would upgrade three segments of aerial structures and three station locations along the Fremont line. The segments and stations are shown in **Figure 2**, and include the following:

- **Segment A**: Retrofit Activities from 18th Avenue to the BART Fruitvale Station (A-1 to P-88)
- **Segment B**: Retrofit Activities at Ashland Avenue (A-639, P-640, and A-641)
- **Segment C**: Retrofit Activities from the BART Fruitvale Station to the BART Coliseum Station (P-100 to B-239)
- **BART Stations**: Fruitvale, Coliseum, and Bay Fair

Figure 2: Proposed Project Segments for the Fremont Line Earthquake Safety Program.



Source: BART 2011

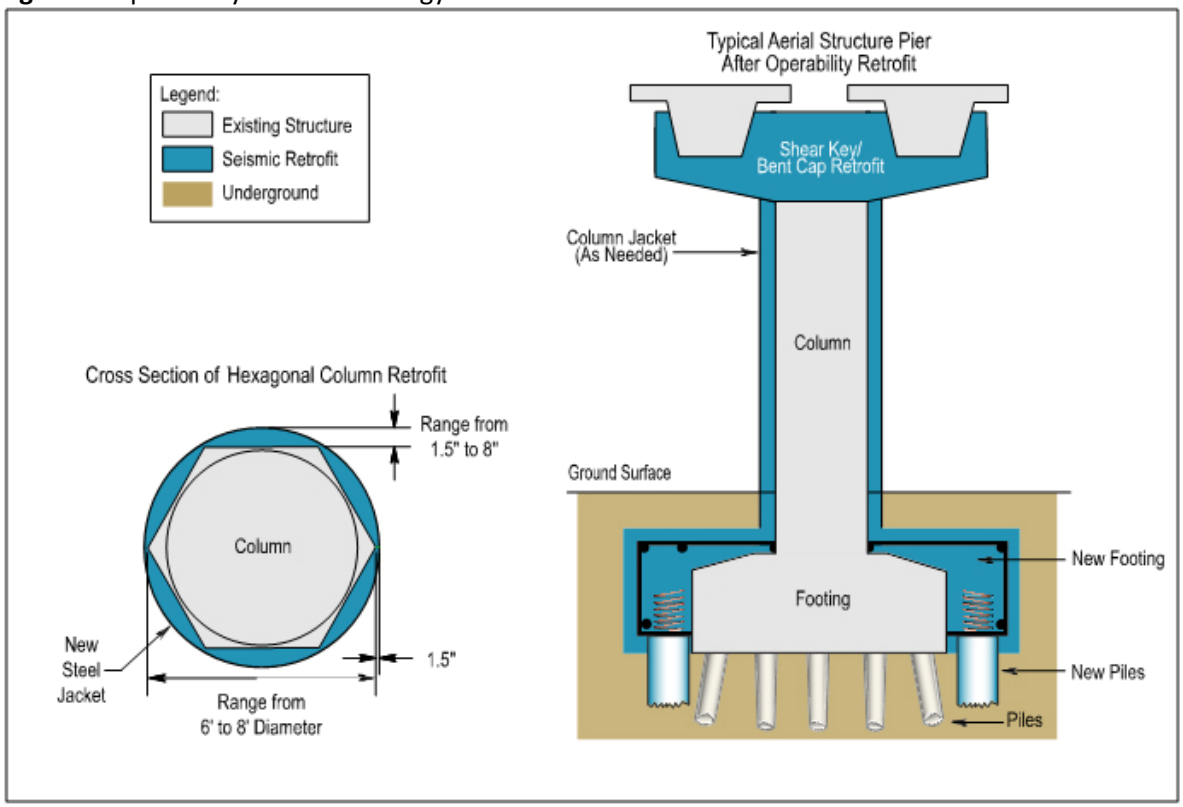
The proposed Project largely parallels East 12th Street and San Leandro Street in Oakland, and Ashland Avenue in unincorporated Alameda County. The section also parallels the Union Pacific Railroad (UPRR).The seismic upgrades would address operability issues, reducing the risk that BART facilities would undergo prolonged service interruptions because of an earthquake event in the San Francisco Bay Area.

This IS/MND document evaluates the potential environmental impacts associated with the retrofit upgrade to an Operability Level along the sections of the Fremont Line shown in **Figure 2**.

PROPOSED PROJECT CONSTRUCTION ACTIVITIES

Within the proposed Project area, the most common aerial structure in the BART system consists of a single-column reinforced concrete pier on pile-supported concrete footings. Existing columns are primarily hexagonal cross-sectional shapes. On top of the column are hammerhead-type pier caps and shear keys, which support the track. Seismic studies have determined that aerial structures may suffer damage from an earthquake, such as shear key failure, pier cap damage, column damage, and/or foundation damage. Structural damage from shear key failure would most likely allow trains to continue to traverse the location at slow speeds, and damage to the column or foundation could lead to loss of train service, as the columns and/or foundations may need major repairs. An example of the operability retrofit strategy for aerial structures is shown in **Figure 3**.

Figure 3: Operability Retrofit Strategy for Aerial Structures

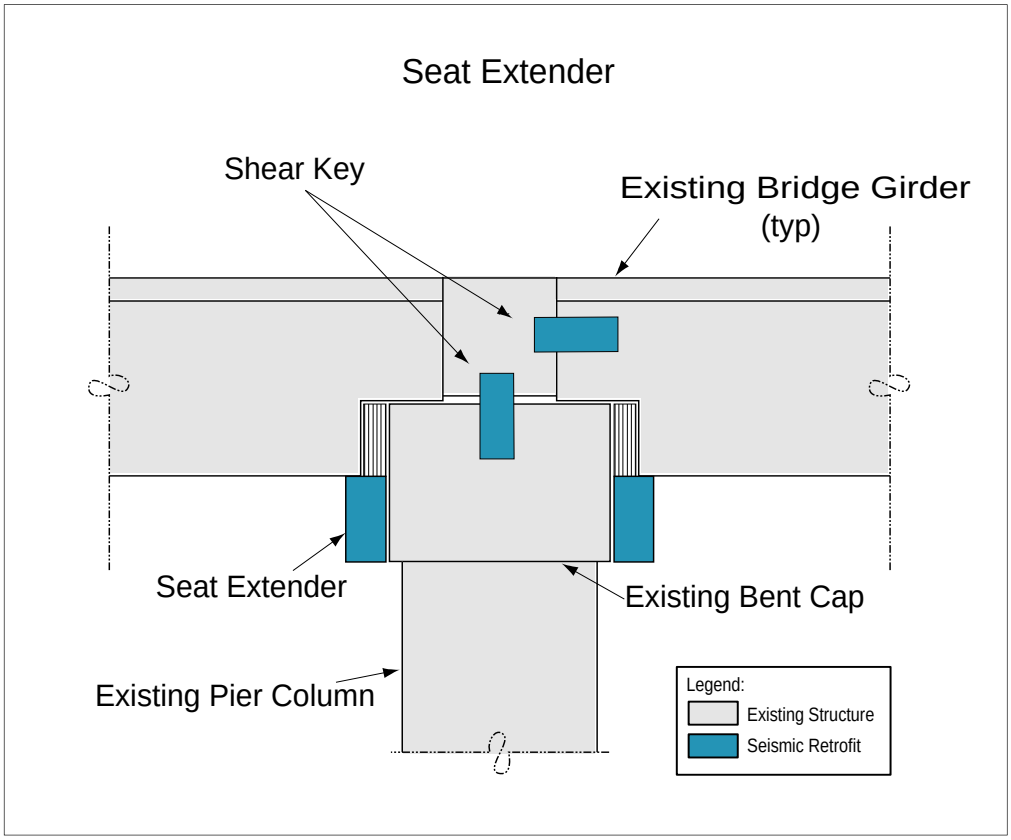


Source: BART 2011

Proposed seismic retrofit strategies and concepts for the aerial structures generally include:

- Additional Cast in Drilled Hole (CIDH) piles or other non-driven piles would be installed in the areas around the perimeter of the existing foundations.
- The existing foundations would be enlarged to approximately 3–8 feet wider on each side and approximately 1–3 feet thicker by adding concrete toppings; and top mats of rebar and new vertical and horizontal dowels would be placed into the existing foundations.
- The concrete columns would be jacketed (encased) with Fiberwrap or 3/8- to l-inch-thick steel casings or collars. Steel jacketing encircling a column would be round or elliptical in shape, depending on the original shape of the column, and filled with concrete or grout. Fiberwrap is a material made of a combination of specialized fabrics and resins to form a strong two-dimensional material that can be bonded (wrapped) onto concrete to enhance the structural performance of the column.
- Additional shear keys would be placed at the bent caps, where needed. A shear key is a structural element installed to prevent the relative movement between the guideway and supporting bent cap. A shear key retrofit consists of a concrete or steel structure connecting the girder to the bent cap (**Figure 4**).

Figure 4: Typical Seat Extender Retrofit



Source: BART 2011

- At some abutment or bent cap locations, concrete seat extenders may be added to increase the available seating area for the girders. These extenders, which typically consist of a concrete block, are added to a structure to increase the support for an aerial girder. Extenders are installed to reduce the possibility of the girder being shaken off its support during excessive earthquake movement. A diagram illustrating extenders is shown in **Figure 4**.
- In addition to the seismic retrofits described above, some of the multi-column piers (piers with two columns instead of one) would require infill concrete walls between the columns. In areas where multiple piers are located within a sensitive view area, the steel casings or Fiberwrap would be installed to the same height on each pier for a consistent appearance.

Ground disturbance around each pier to be retrofitted would take place within a 10-foot radius of the pier; on-site construction equipment would be placed within a 20-foot radius of each pier.

Proposed Project construction activities would primarily consist of strengthening the existing columns and footings that support aerial structures and stations. Construction activities would generally be confined to areas immediately surrounding aerial structures and at various elevated stations. Construction zones would typically be located within the edge of the existing BART aerial structures or BART right-of-way. Temporary easements may be required for construction equipment to access construction zones. Construction vehicles would use public roadways to access construction zones. Although a detailed construction plan has not yet been developed, multiple areas within the proposed

Project area would be under construction simultaneously. Construction contractors would define the sequence of construction activities, in consultation with BART prior to construction.

Construction activities would require the use of haul trucks, excavators, graders, cranes, drill equipment, watering trucks, generators, and other typical construction equipment, and pile-driving may be required along portions of the alignment. Pile-driving would be limited to the installation of temporary sheet piles for shoring where necessary. In areas where sensitive noise receptors are present and could be subject to pile-driving-related noise, contractors may use other types of shoring for temporary support of BART structures. BART and its contractors would employ noise reduction measures as necessary to minimize noise impacts, and would provide advanced public notice of construction activities.

Before beginning construction activities, the construction contractor would be required to prepare and implement a construction phasing plan and traffic management plan to manage and maintain traffic operations, parking, and pedestrian and bicycle safety throughout the duration of retrofit activities at any aerial guideway location or BART station, including any required utility relocation work. The plan would be coordinated with the participation of BART, the City of Oakland, the City of San Leandro, the County of Alameda, and Alameda-Contra Costa Transit (AC Transit).

Seismic retrofit activities would be conducted with minimal impact on BART service. During all seismic retrofit activities, construction contractors would use energy-efficient equipment, avoid unnecessary idling of construction equipment, maintain equipment in good working conditions, and encourage carpooling of construction workers. Construction equipment would not block BART trains or substantially interfere with BART employees or riders. In areas where operations could be affected, work would be done during non-operational hours (generally 12:30 a.m. to 4:00 a.m. on weekdays, but this varies by location, and non-operational hours are longer on weekends). BART operates from 4:00 a.m. to midnight on weekdays, 6:00 a.m. to midnight on Saturdays, and 8:00 a.m. to midnight on Sundays. BART will maintain regular service throughout construction.

Construction activities around aerial structures would in some cases displace automobile parking spaces. Parking space displacement would occur around support columns and may occur in areas needed for construction equipment access and staging, as well as for construction materials storage. In some areas, sidewalks would be temporarily removed during construction and rebuilt at the conclusion of retrofitting activities. Some bus stops adjacent to BART stations would be temporarily realigned or moved to nearby locations while retrofitting work occurs. Traffic would also be rerouted where necessary to facilitate access to columns, but every effort would be made to minimize or avoid rerouting via the implementation of construction phasing and traffic management plans. Construction activities would be coordinated through BART's Government and Community Relations Department for notifications to surrounding neighborhoods and businesses, including a hotline for construction complaints.

The proposed Project would not permanently alter any transportation facilities/operations. All conditions that could affect traffic would be restored to pre-project conditions at the conclusion of construction activities.

It is estimated that the duration of construction activity at each aerial structure would take approximately 6–8 weeks, with an additional 3–4 weeks where shear key construction is required. At

most locations, a series of columns would be worked on simultaneously. It is estimated that the proposed Project implementation activities for the Fremont Line retrofitting process would occur over a period of approximately 4 years.

REFERENCES

Bay Area Rapid Transit District (BART). 2011. Email from Janie Layton, Environmental Administrator, System Safety transmitting figures for CEQA Support to Vick Germany and Rudy Calderon. June 20.

ENVIRONMENTAL CHECKLIST

The following sections contain the environmental checklist from Appendix G of the CEQA Guidelines. The checklist form is used to identify impacts resulting from implementation of the proposed Project. A discussion follows each environmental issue in the checklist to explain the rationale for determining whether significant impacts would result. Included in each discussion are proposed Project-specific mitigation measures, where appropriate, to reduce potentially significant impacts to less-than-significant levels.

For this checklist, the following designations are used:

- **Potentially Significant Impact:** An impact that could be significant, and for which mitigation must be identified. If potentially significant impacts are identified for which mitigation is not possible, an EIR must be prepared.
- **Less-than-Significant Impact with Mitigation Incorporated:** An impact that requires mitigation to reduce the impact to a level of less than significant.
- **Less-than-Significant Impact:** Any impact that would not be considered significant under CEQA based on established significance thresholds.
- **No Impact:** The proposed Project results in no impact.

AESTHETICS

ENVIRONMENTAL ISSUES	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
1. Aesthetics				
Would the project:				
a) Have a substantial adverse effect on a scenic vista?	☐	☐	☐	☒
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	☐	☐	☐	☒
c) Substantially degrade the existing visual character or quality of the site and its surroundings?	☐	☐	☒	☐
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	☐	☒	☐	☐

ENVIRONMENTAL SETTING

The Fremont Line generally parallels the Interstate 880 (I-880) corridor along the UPRR tracks.

18th Avenue to the BART Fruitvale Station, including Fruitvale Station

The BART corridor segment in this area passes through a visually eclectic portion of south Oakland. The segment is in an area characterized by dense, urbanized development, containing single- and multi-family family residential structures, light industrial buildings, and commercial structures dating from the late 19th to early 20th century, to structures built more recently. Relatively small pockets of open space are also located in the immediate area.

Views of BART's right-of-way are available from multiple vantage points along this segment, especially in the northern part of the segment, where the BART guideway closely parallels I-880 and is visible to travelers along the highway. Views of the guideway are also available from various nearby commercial, residential, and recreational areas. The guideway is not always visible to viewers unless they are relatively close to the tracks. The area's densely developed nature results in the presence of many intervening structures that block views of the BART facilities. The Fruitvale Station, at the southern terminus of this segment, is a large multi-story structure built primarily of concrete and glass in a streamlined and unadorned style. The station is a visually dominant element at its location and is prominent in views from the surrounding area.

Fruitvale Station to the Coliseum Station, Including Coliseum Station

The BART corridor segment in this area passes through an area of Oakland visually similar to that of the segment described above, although this area is relatively more populated by light industrial buildings, expansive surface parking lots, and vacant lots, and slightly less so by residential structures.

Due to the prevalence of large surface parking lots and vacant lots, and because San Leandro Street closely parallels BART's right-of-way for most of this segment, BART's aerial guideway is more consistently prominent in views from locations in the immediate vicinity. This includes views from vehicles traveling through the area as well as views from industrial, commercial, and residential locations.

The Coliseum Station, at the southern terminus of this segment, is a large multi-story structure built primarily of concrete and glass in a streamlined and unadorned style. The station is a visually dominant element and is prominent in views from the surrounding area.

Bay Fair Station (San Leandro) and Ashland Avenue (Alameda County)

The Bay Fair Station is located in the City of San Leandro. Similar to the Fruitvale and Coliseum stations, it is a large multi-story structure built primarily of concrete and glass in a streamlined and unadorned style. It is a visually dominant element and is prominent in views from the surrounding area. The station is surrounded by a large surface parking lot, which is dominated by the frequent presence of hundreds of parked vehicles, punctuated by ornamental landscaping. The area beyond the parking lot consists primarily of densely developed suburban single-family residential structures dating mostly from the early to middle part of the 20th century to more recent tract home developments. The area immediately north of the station is an exception to this development pattern. It is the site of Bay Fair Mall, a large suburban shopping center with a central core of buildings surrounded by expansive surface parking lots.

BART's aerial guideway passes over Ashland Avenue in unincorporated Alameda County. The area is characterized by middle to late 20th century suburban single-family residential structures, as well as a few small-scale commercial buildings. The elevated guideway at this location is a visually dominant element and is prominent in views from the surrounding area.

DISCUSSION

a), b) Scenic Vistas and Scenic Resources

No Impact. No scenic vistas near the proposed Project segments are visible from existing publicly accessible areas. The proposed Project segments are in relatively flat urbanized areas surrounded by mixed-use developments of varying heights. Some background views of the East Bay Hills are visible in the distance looking north from some locations along the proposed Project segments, but are otherwise obscured due to existing development. Southerly vistas of the Oakland Estuary or the San Francisco Bay beyond are not visible from the proposed Project site due to intervening development. As there are no scenic vistas near the proposed Project sites visible from publicly accessible areas, the proposed Project would have no impact on scenic vistas.

There are no scenic resources on or immediately adjacent to the proposed Project segments. The proposed Project would have no impact on trees, rock outcroppings, or historic resources located within a designated scenic highway because the proposed Project segments are not located near a designated scenic highway.

c) Visual Character and Quality

Less-than-Significant Impact. Proposed Project implementation would result in relatively minor changes to the visual character of the proposed Project segments and their immediate vicinities. Proposed seismic upgrading work would result in minor physical changes to BART stations and aerial guideways, but these modifications would not result in structures that are substantially different in character than under existing conditions.

Proposed Project construction activity would result in the presence of construction vehicles and equipment as well as construction staging areas, which would temporarily alter the visual character and quality of the proposed Project areas. However, the proposed Project construction period would be temporary, and construction visual effects of the proposed Project during this period would not be significant. The proposed Project would have a less-than-significant impact on visual character and quality.

d) Light and Glare

Less-than-Significant with Mitigation Incorporated. Seismic upgrading activities would not require the introduction of any permanent new sources of substantial light and glare. During the proposed Project construction period, nighttime security lighting may be used at construction staging areas. The amount of light emanating from this equipment would be relatively minor, and light fixtures would cast light downward. In addition, this equipment would be used temporarily, only during the proposed Project construction period.

Four areas have been identified where BART operations could be affected by retrofit activities; work in these areas must be done during non-operational hours (generally, 12:30 a.m. to 4:00 a.m., on weekdays), resulting in nighttime light and glare that could affect adjacent properties. Those locations are directly adjacent to or include the Fruitvale, Coliseum, and Bay Fair Stations. One additional location is north of the Fruitvale Station at 19th Avenue and 12th Street. Nighttime construction would only occur for 5 days per pier/bent, but light and glare impacts at these locations would be potentially significant. Implementation of the following mitigation measure will reduce the impact to less than significant.

Mitigation Measure AES-1: Reduce Nighttime Construction Lighting

Construction lighting shall be adequately shielded to prevent unnecessary glare onto adjacent properties.

AGRICULTURAL AND FORESTRY RESOURCES

ENVIRONMENTAL ISSUES	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
2. Agricultural and Forestry Resources				
Would the project:				
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	☐	☐	☐	☒
b) Conflict with existing zoning for agricultural use or a Williamson Act contract?	☐	☐	☐	☒
c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?	☐	☐	☐	☒
d) Result in the loss of forest land or conversion of forest land to non-forest use?	☐	☐	☐	☒
e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?	☐	☐	☐	☒

ENVIRONMENTAL SETTING

The proposed Project segments are located in an urban area with a mix of commercial, residential, and industrial uses. No agricultural uses are near the proposed Project sites.

DISCUSSION

a) Farmland Conversion

No Impact. The proposed Project sites are within an urban area designated by the Alameda County Important Farmland Map as Urban and Built-Up Land (California Department of Conservation 2011). The proposed Project would not convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance to non-agricultural use. The proposed Project would have no impact.

b) Zoning for Agricultural Uses or Williamson Act Contracts

No Impact. The proposed Project would not conflict with zoning for agricultural use or a Williamson Act Contract. The proposed Project would have no impact.

c) Conflict with Existing Zoning for, or Cause Rezoning of, Forest Land or Timberland

No Impact. The proposed Project sites are not forest or timberlands. The Project would not conflict with existing zoning for, or cause rezoning of, forest land or timberland. The proposed Project would have no impact.

d) Loss or Conversion of Forest Land to Non-Forest Use

No Impact. The proposed Project sites are not occupied by forest land. The Project would not convert forest land to non-forest use. The proposed Project would have no impact.

e) Other Environmental Changes Resulting in Farmland or Forest Land Conversion to Other Uses

No Impact. Given that the proposed Project is not located on farmland or forest land, proposed Project implementation would not result in environmental changes that would convert farmland or forest land to other uses. The proposed Project would have no impact.

REFERENCES

California Department of Conservation. 2011. The Farmland Mapping and Monitoring Program, *Alameda County Farmland Map*. Available: ftp://ftp.consrv.ca.gov/pub/dlrp/FMMP/pdf/2010/ala10.pdf. Accessed October 4, 2011.

AIR QUALITY

ENVIRONMENTAL ISSUES	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less-than-Significant Impact	No Impact
3. Air Quality				
Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied on to make the following determinations.				
Would the project:				
a) Conflict with or obstruct implementation of the applicable air quality plan?	☐	☒	☐	☐
b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?	☐	☒	☐	☐
c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?	☐	☒	☐	☐
d) Expose sensitive receptors to substantial pollutant concentrations?	☐	☐	☒	☐
e) Create objectionable odors affecting a substantial number of people?	☐	☐	☒	☐

ENVIRONMENTAL SETTING

The proposed Project is in Alameda County, which is in the San Francisco Bay Area Air Basin (SFBAAB) and is under the jurisdiction of the Bay Area Air Quality Management District (BAAQMD). Concentrations of the following air pollutants—ozone, carbon monoxide (CO), nitrogen dioxide, sulfur dioxide, respirable and fine particulate matter (PM_{10} and $PM_{2.5}$), and lead—are used as indicators of ambient air quality conditions. These pollutants are commonly referred to as "criteria air pollutants" because they are the most prevalent pollutants known to be deleterious to human health; there is extensive documentation available on health-effects criteria for these pollutants. Nitrogen oxides (NO_X) and reactive organic gases (ROG), which are precursors to ozone formation, are also regulated air pollutants. In addition, exposure to toxic air contaminants (TAC), a diverse group of air pollutants for which ambient air quality standards have not been established, is associated with cancer and other health risks.

Concentrations of criteria air pollutant are measured at seven sites in Alameda County. The Oakland International Boulevard Station is the closest station to the proposed Project area with recent data for ozone and $PM_{2.5}$. PM_{10} is not measured in the proposed Project vicinity by the California Air Resources Board (ARB). In general, the ambient air quality measurements from this station are representative of

the air quality near the proposed Project area. With respect to ozone, the SFBAAB is currently designated as a nonattainment area for the state 1-hour standard and the national 8-hour standard. The SFBAAB is also designated as a nonattainment area with respect to the national and state $PM_{2.5}$ standards and the state PM_{10} standard. However, the area is currently designated as an "unclassified" area for the national PM_{10} ambient air quality standard. The SFBAAB is in attainment or unclassified for all other criteria air pollutants (ARB 2011a).[2]

The largest sources of pollutants in the proposed Project vicinity include the large transportation corridors (e.g., I-880, railroads, Oakland International Airport) within 10 miles of the proposed Project alignment. Several BAAQMD-permitted stationary sources are adjacent to the proposed Project area, located in the industrial areas surrounding the BART tracks (ARB 2011b). The nearest sensitive receptors to the proposed Project area would be residences adjacent to the BART route between 30th Avenue and Fruitvale Avenue and between 39th and 41st avenues in Oakland.

Air quality in Alameda County is regulated by the U.S. Environmental Protection Agency (EPA) and ARB at the federal and state levels, respectively, and locally by the BAAQMD. The BAAQMD seeks to improve air quality conditions in Alameda County through a comprehensive program of planning, regulation, enforcement, technical innovation, and promotion of the understanding of air quality issues. The clean air strategy of the BAAQMD includes the development of programs for the attainment of ambient air quality standards, adoption and enforcement of rules and regulations, and issuance of permits for stationary sources. The BAAQMD also inspects stationary sources, responds to citizen complaints, monitors ambient air quality and meteorological conditions, and implements other programs and regulations required by the federal Clean Air Act, federal Clean Air Act Amendments of 1990 (CAAA), and the California Clean Air Act (CCAA). As stated in Appendix G of the State CEQA Guidelines, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the checklist determinations.

BAAQMD identified such significance criteria in CEQA Air Quality Guidelines adopted in 2010, amended 2011 (BAAQMD 2011). The BAAQMD guidelines were set aside by court order on March 5, 2012, until BAAQMD complies with CEQA by conducting an analysis of potential impacts by discouraging smart growth and encouraging sprawl. In this situation, other agencies have discretion under State CEQA Guidelines section 15064.7 to select significance thresholds that are supported by substantial evidence. In developing its criteria, BAAQMD conducted extensive analysis; see BAAQMD 2011 and the administrative record for the 2010 guidelines adoption. In addition, the proposed Project consists of seismic retrofits to existing transit infrastructure that would not have adverse growth-inducing effects as a result of relying on BAAQMD's significance criteria.

[2] When data are incomplete and do not support a designation of attainment or nonattainment, an area is designated as unclassified. Areas that are currently designated as unclassified may be redesignated as attainment/nonattainment once additional data have been collected.

Accordingly, BART has determined to exercise its discretion in this instance by utilizing the BAAQMD criteria, which provide that implementation of the proposed Project would result in significant air quality effects associated with construction if:

- Construction-generated exhaust emissions of ROG, NO_X, or $PM_{2.5}$ exceed the BAAQMD-recommended mass emissions threshold of 54 pounds per day (lb/day), or exhaust emissions of PM_{10} exceed 82 lbs/day.
- Best Management Practices (BMPs) for fugitive dust control are not implemented during construction.
- Sensitive receptors are exposed to substantial pollutant concentrations (i.e., a TAC, as identified by ARB and/or EPA, at a level for which the risk of contracting cancer exceeds 10 in 1 million or the noncancer-risk hazard index exceeds 1 for the maximally exposed individual).
- Objectionable odors are created that affect a substantial number of people in the short or long term (defined as five confirmed complaints in 1 year).

The proposed Project consists only of the construction of seismic retrofit components modifying existing structures, as described above in the *Proposed Project Description*. As such, the proposed Project would have no long-term operational emissions. Accordingly, BAAQMD's additional significance criteria for operational air pollutant emissions do not apply and are not included in this Initial Study.

DISCUSSION

a), b), c) Conflict with Air Quality Plan, Violation of Air Quality Standards, Criteria Pollutants

Less than Significant with Mitigation Incorporated. Construction emissions are short term or temporary in duration, but still may have the potential to represent a significant impact with respect to air quality, especially fugitive dust emissions (PM_{10} and $PM_{2.5}$). Fugitive dust emissions are associated primarily with heavy site preparation activities and vary as a function of such parameters as soil silt content, soil moisture, wind speed, acreage of disturbance area, and miles traveled by construction vehicles on and off site. ROG and NO_X emissions are associated primarily with gas and diesel equipment exhaust. For the proposed Project, retrofit installation would result in the temporary generation of ROG, NO_X, PM_{10}, and $PM_{2.5}$ emissions from site preparation (e.g., clearing and grading), retrofit feature installation, and other miscellaneous activities. At the peak of construction, there would be drill equipment, cranes, excavators, graders, haul trucks, watering trucks, generators, and other typical construction equipment on site.

Short-term construction-generated emissions of ROG, NO_X, PM_{10}, and $PM_{2.5}$ were modeled using the BAAQMD-recommended URBEMIS 2007, Version 9.2.4, computer program (Rimpo and Associates 2008). Input parameters were based on default model settings and proposed Project-specific information, where available (e.g., number and type of equipment, amount of material transport). The modeled maximum daily construction emissions are summarized in Table AQ-1 and are described in more detail below and in Appendix A.

Table AQ-1: Summary of Modeled Maximum Short-Term Construction-Generated Emissions				
Source	ROG (lb/day)	NO_X (lb/day)	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)
Construction Activities (2012)				
Mobile Equipment Exhaust [1]	4.2	43.7	1.6	1.5
Fugitive Dust	-	-	5.0	1.1
Construction Activities (2013)				
Mobile Equipment Exhaust [1]	3.9	40.5	1.5	1.4
Fugitive Dust	-	-	5.0	1.1
Construction Activities (2014)				
Mobile Equipment Exhaust [1]	3.7	36.9	1.3	1.2
Fugitive Dust	-	-	5.0	1.1
Total Maximum Daily Unmitigated	**4.2**	**43.7**	**6.6**	**2.6**
Maximum Tons per Year	**0.6**	**5.7**	**0.9**	**0.3**

Notes: lb/day = pounds per day, ROG = reactive organic gases; NO_X = oxides of nitrogen; PM_{10} = respirable particulate matter with an aerodynamic diameter of 10 micrometers or less; $PM_{2.5}$ = fine particulate matter with an aerodynamic diameter of 2.5 micrometers or less.

[1] Accounts for employee commute trips, on-site heavy-duty construction equipment operations, and material transport.

See Appendix A for modeling results and assumptions.

Source: Data modeled by AECOM in 2011.

The proposed Project construction would result in worst-case maximum unmitigated daily emissions of approximately 4.2 lb/day of ROG, 43.7 lb/day of NO_X, 6.6 lb/day of PM_{10}, and 2.6 lb/day of $PM_{2.5}$. Based on these results, daily unmitigated construction-generated emissions would not exceed BAAQMD's significance threshold of 54 lb/day for ROG, NO_X, and $PM_{2.5}$, and 82 lb/day for PM_{10}, respectively.

Regardless of whether the thresholds established in BAAQMD's 2011 CEQA Guidelines are exceeded, BAAQMD recommends the implementation of its *Basic Construction Mitigation Measures* for all projects proposed within its jurisdiction. These measures are not presented here as mitigation for exceedance of significance thresholds for any air pollutants, because the analysis demonstrates that there will be no exceedance. Nevertheless, implementation of the *Basic Control Mitigation Measures* outlined under Mitigation Measure AQ-1 would ensure that the proposed Project is consistent with BAAQMD recommendations as outlined in the BAAQMD CEQA Air Quality Guidelines and that impacts would be less than significant.

Mitigation Measure AQ-1: Reduce Temporary Construction Emissions of ROG, NO_X, PM_{10}, and $PM_{2.5}$

In accordance with BAAQMD CEQA Air Quality Guidelines, the following fugitive dust control measures shall be implemented:

- All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered two times per day.
- All haul trucks transporting soil, sand, or other loose material off site shall be covered.
- All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited.
- All vehicle speeds on unpaved roads shall be limited to 15 mph.
- All roadways, driveways, and sidewalks to be paved shall be completed as soon as possible. Building pads shall be laid as soon as possible after grading, unless seeding or soil binders are used.
- Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to 5 minutes (as required by the California Airborne Toxics Control Measure Title 13, Section 2485 of California Code of Regulations). Clear signage shall be provided for construction workers at all access points.
- All construction equipment shall be maintained and properly tuned in accordance with manufacturers' specifications. All equipment shall be checked by a certified visible emissions evaluator.
- Post a publicly visible sign with the telephone number and person to contact at the lead agency regarding dust complaints. This person shall respond and take corrective action within 48 hours. BAAQMD's phone number shall also be visible to ensure compliance with applicable regulations.

d) Sensitive Receptors Exposure

Less-than-Significant Impact. Proposed Project construction would result in the short-term generation of diesel exhaust emissions from the use of off-road diesel equipment required for site grading and other construction activities. Particulate exhaust emissions from diesel-fueled engines (diesel PM) were identified as a TAC by ARB in 1998. The potential cancer risk from the inhalation of diesel PM outweighs the potential for all other health impacts. The dose to which the receptors are exposed (a function of concentration and duration of exposure) is the primary factor used to determine health risk (i.e., potential exposure to TAC emission levels that exceed applicable standards). According to the Office of Environmental Health Hazard Assessment, health risk assessments—which determine the exposure of sensitive receptors to TAC emissions—should be based on a 70-year lifetime exposure period for long-term exposures; however, such assessments should be limited to the period/duration of activities associated with a particular project (Salinas 2004).

The possible sensitive receptor exposure period for the proposed Project is short (approximately 6–8 weeks, with an additional 3–4 weeks where shear keys are required). In addition, diesel PM is highly dispersive and studies have shown that measured concentrations of vehicle-related pollutants, including ultra-fine particles, decrease dramatically within approximately 300 feet of the source (Zhu et

al. 2002). Because the use of mobilized equipment would be temporary, in combination with the dispersive properties of diesel PM, and because primary construction activities would not be active within 300 feet of any sensitive receptors for any substantial length of time (approximately 6–8 weeks, with an additional 3–4 weeks where shear keys are required), construction-related TAC emissions would not be anticipated to expose sensitive receptors to substantial pollutant concentrations. Therefore, this impact would be less than significant.

e) Objectionable Odors

Less-than-Significant Impact. The occurrence and severity of odor impacts depend on numerous factors, including the nature, frequency, and intensity of the source; wind speed and direction; and the presence of sensitive receptors. While offensive odors rarely cause any physical harm, they can be unpleasant, leading to considerable distress and often generating citizen complaints to local governments and regulatory agencies.

Construction of the proposed Project would result in diesel exhaust emissions from on-site construction equipment. The diesel exhaust emissions would be intermittent and temporary (approximately 6–8 weeks, with an additional 3–4 weeks where shear keys are required) and would dissipate rapidly from the source with an increase in distance. No long-term odor sources would be created by the proposed Project. Thus, the proposed Project would not create substantial objectionable odors. This impact would be less than significant.

REFERENCES

Bay Area Air Quality Management District (BAAQMD). 2011 (May). CEQA Air Quality Guidelines. Available at: http://www.baaqmd.gov/~/media/Files/Planning%20and%20Research/CEQA/BAAQMD%20CEQA%20Guidelines_May%202011_5_3_11.ashx. Accessed September 19, 2011.

California Air Resources Board (ARB). 2011a. *Ambient Air Quality Standards and Area Designation Maps - State and National*. Available: http://www.arb.ca.gov/desig/adm/adm.htm#state. Last updated 2011. Accessed September 19, 2011.

California Air Resources Board (ARB). 2011b. *Community Health Air Pollution Information System*. Available: http://www.arb.ca.gov/gismo2/chapis_v01_6_1_04/. Last updated 2011. Accessed September 19, 2011.

Rimpo and Associates. 2008. URBEMIS 2007 v.9.2.4. Urban Emissions Model. Available: http://www.urbemis.com.

Salinas, Julio. Staff Toxicologist. Office of Health Hazard Assessment, Sacramento, CA. August 3, 2004—telephone conversation with Kurt Legleiter of EDAW regarding exposure period for determining heath risk.

Zhu, Y., W.C. Hinds, S. Kim, and S. Shen. 2002. Study of Ultrafine Particles Near a Major Highway with Heavy-duty Diesel Traffic. In *Atmospheric Environment* 36:4323–4335.

BIOLOGICAL RESOURCES

ENVIRONMENTAL ISSUES	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
4. Biological Resources				
Would the project:				
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or the U.S. Fish and Wildlife Service?	☐	☐	☐	☒
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations or by the California Department of Fish and Game or the U.S. Fish and Wildlife Service?	☐	☐	☐	☒
c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	☐	☐	☐	☒
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	☐	☒	☐	☐
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☐	☐	☒	☐
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	☐	☐	☐	☒

ENVIRONMENTAL SETTING

The proposed Project segments are located in a densely populated urban environment, surrounded largely by impervious surfaces composed primarily of street paving and rooftops. A Natural Environment Study was prepared in 2007 for the proposed Seismic Retrofit of BART Aerial Structures and Stations along the Richmond, Daly City, and Fremont Lines Project (BART 2007). The study concluded that the proposed Project would have no effect on state or federally listed species or designated critical habitat. No changes to conditions in the proposed Project area have occurred since 2007 that would lead to the return of wildlife species to the vicinity.

DISCUSSION

a) Candidate, Sensitive, or Special-Status Species

No Impact. The proposed Project would be constructed within the existing BART right-of-way, in a highly developed urban area. Suitable habitat to support candidate, sensitive, or special-status species no longer exists within the proposed Project locale or surrounding area. Urban development has caused sensitive species to be replaced by disturbance-tolerant wildlife and ornamental, non-native landscaping, making it unlikely that the proposed Project would cause direct or indirect adverse impacts on special-status species. The proposed Project would have no impact.

b) Riparian Habitats and Sensitive Natural Communities

No Impact. Within the proposed Project segments, there are no creeks, streams, or other waterways. The waterways closest to proposed Project segments include the Oakland Estuary, about 1,500 feet southwest of the Fruitvale Station; Damon Slough, about 400 feet west of the Oakland Coliseum Station; and Estudillo Canal, about 150 feet north of the Bay Fair Station platform. None of these waterways contain riparian habitat or sensitive communities. The proposed Project would have no impact.

c) Federally Protected Wetlands

No Impact. The existing BART right-of-way in the proposed Project area provides no opportunity for wetland hydrology, soils, or plants. No state or federally protected wetlands occur within these areas or would be affected by the proposed activity. The proposed Project would have no impact.

d) Native Resident or Migratory Wildlife Corridors and Nursery Sites

Less than Significant with Mitigation Incorporated. The highly urbanized proposed Project segments and surrounding areas, accompanied by high levels of human activity, act as barriers for terrestrial wildlife movement, and the proposed Project vicinity lacks natural habitat that could be used as wildlife corridors. However, proposed seismic upgrading work on the various BART station platforms could potentially disturb birds (e.g., swallows) that use the platforms as nesting sites. Disturbance of potential nesting sites is considered a significant impact.

Under Section 3503 of the California Fish and Game Code, it is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird. Section 3503.3 of the California Fish and Game Code prohibits take, possession, or destruction of any birds in the orders Falconiformes (hawks) or Strigiformes (owls), or of their nests and eggs. In addition, the federal Migratory Bird Treaty Act states that without a permit issued by the U.S. Department of the Interior, it is unlawful to pursue, hunt, take, capture, or kill any migratory bird. To protect nesting birds, the proposed Project shall implement the following mitigation measure:

Mitigation Measure BIO-1: Pre-Construction Surveys and Construction Period Parameters

If any seismic upgrade activities to BART platforms would occur during the active nesting period (February 1 through August 31), a pre-construction survey for nesting birds (e.g., swallows) shall be

conducted by a qualified biologist. Nesting bird surveys should be conducted within 1 week before initiation of construction activities. If no active nests are found, no further activity is required.

If active nests are found in any areas that would be directly affected by construction activities, the California Department of Fish and Game (CDFG) shall be contacted to determine appropriate action. Appropriate actions include establishing a no-disturbance buffer (a minimum of 50 feet) around the site to avoid disturbance until a wildlife biologist determines that the young have fledged (usually late-June to mid-July) or destruction of an inactive nest site. The extent of the buffers would depend on the level of noise or construction disturbance, line of sight between the nest and the disturbance, ambient levels of noise and other disturbances, and other topographical or artificial barriers.

e) Biological Resources Protection Policies

Less-than-Significant Impact. While the proposed Project could involve the removal and replacement of some existing vegetation, the proposed Project segments are located in highly urbanized areas with relatively little natural vegetation. Therefore, it is unlikely that any biological resources protected by local policies or ordinances would be affected. Moreover, pursuant to Government Code Section 53090, BART is exempt from local land use policies and ordinances, including tree protection ordinances. Although BART is not legally required to comply with local ordinances, BART generally has considered removal of trees identified as protected by local ordinances to be a significant impact under CEQA. Accordingly, if any trees are encountered during proposed Project activities that are identified as protected by local ordinances, BART will replace such trees at a 1:1 ratio with native species, in locations suitable for the replacement species. As a result, impacts to locally protected biological resources would be less than significant.

f) Habitat Conservation Plans

No Impact. No Habitat Conservation Plans or Natural Community Conservation Plans apply to the proposed Project area. The proposed Project would have no impact.

REFERENCES

Bay Area Rapid Transit District (BART). 2007. Natural Environment Study, Seismic Retrofit of BART Aerial Structures and Stations along the Richmond, Daly City, and Fremont Lines.

CULTURAL RESOURCES

ENVIRONMENTAL ISSUES	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
5. Cultural Resources				
Would the project:				
a) Cause a substantial adverse change in the significance of a historical resource as defined in Section 15064.5?	☐	☐	☒	☐
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5?	☐	☐	☒	☐
c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☐	☐	☐	☒
d) Disturb any human remains, including those interred outside of formal cemeteries?	☐	☐	☒	☐

ENVIRONMENTAL SETTING

The proposed Project area is located within the Rancho San Antonio land grant that was deeded to Luis Maria Peralta on August 3, 1820 for his service to the Spanish government. The 43,000-acre rancho included much of the present-day cities of Oakland, Berkeley, Alameda, and parts of San Leandro and Piedmont. The proposed Project area was also home to Native Americans for more than 3,000 years before the first European settlers arrived (City of San Leandro 2002). Very few traces of the native inhabitants remain today, but evidence from nearby sites and early records provides a picture of what life was like in the area prior to the arrival of Spanish explorers and missionaries.

Today, most of the proposed Project area is occupied by urban development. The existing Fremont Line and stations were largely constructed over existing roads and former rail corridors (Baseline 2006). As a result, much of the proposed Project area has been disturbed and evaluated previously. To assess the potential impacts of the proposed Project, the segments and stations were evaluated for potential archaeological sites by Heather Price, PhD., of William Self Associates (Baseline 2006). A search of the California Historic Resource Information System, Northwest Information Center was conducted, as well as additional research of the National Register of Historic Places and Updates, the California Inventory of Historic Places, the California Historic Bridge Inventory, and California Historic Landmarks. Additionally, historic aerial photography and topographic maps were evaluated to determine historic land use information near the proposed Project.

Based on the research, which included approximately 100 cultural resource studies along the Fremont Line, no known archaeological resources exist within the potential area of disturbance associated with the proposed Project segments. One cultural resource study was performed in the vicinity of the Fruitvale Station, but the results of this study are not considered indicative of conditions at the station, as the study was performed after disturbance associated with the development of the Fruitvale Station

was completed (Baseline 2006). As a result, the potential for archaeological resources at the Fruitvale Station and the remainder of the proposed Project area is considered limited.

DISCUSSION

a) Historical Resources

Less-than-Significant Impact. Proposed Project activities would take place within the existing BART rights-of-way, and based on the initial evaluations of the proposed Project conducted by Baseline Environmental and Dr. Price, the potential for impacts on historic resources because of proposed Project implementation is considered low. Therefore, the proposed Project is not anticipated to affect historic resources and would result in a less-than-significant impact.

b) Archaeological Resources

Less-than-Significant Impact. Proposed Project implementation would take place within the existing BART right-of-way, and based on the initial evaluations of the proposed Project conducted by Baseline Environmental and Dr. Price, there are no known archaeological resources located within 0.25 mile of the proposed Project segments. Furthermore, the proposed Project area was subject to previous disturbance during construction of the Fremont Line and associated stations, so that the potential for Project-related impacts on archaeological resources is considered low. Therefore, the proposed Project would not be anticipated to affect an archaeological resource, and impacts would be less than significant.

c) Paleontological Resources and Unique Geologic Features

No Impact. Paleontological resources are non-renewable fossilized evidence of previous animal and plant life found in the geologic record. Proposed Project implementation would take place within the existing BART right-of-way, and there are no known paleontological resources or unique geologic features within this area. All segments of the proposed Project are in areas that were previously disturbed when the Fremont Line was constructed. Therefore, the proposed Project would not be anticipated to affect these resources and no impact would occur.

d) Disturbance of Human Remains

Less-than-Significant Impact. Proposed Project activities would take place within the existing BART right-of-way. All segments of the proposed Project are in areas that were previously disturbed, and the potential for human remains to exist in areas that have been previously excavated because of urban development is considered low. Therefore, the proposed Project would not be anticipated to affect previously undiscovered human remains, and impacts would be less than significant.

REFERENCES

Baseline Environmental Consulting (Baseline). 2006. Initial Site Assessment: Seismic Retrofit of BART Aerial Stations and Structures along the Concord, Richmond, Daly City, and Fremont Lines. Prepared for the San Francisco Bay Area Rapid Transit District.

City of San Leandro. 2002. *City of San Leandro General Plan Historic Preservation and Community Design Element*. Available: http://www.sanleandro.org/depts/cd/plan/genplan/doc2002.asp. Accessed October 4, 2011.

GEOLOGY AND SOILS

ENVIRONMENTAL ISSUES	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
6. Geology and Soils				
Would the project:				
a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:				
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? (Refer to California Geological Survey Special Publication 42.)	☐	☐	☐	☒
ii) Strong seismic ground shaking?	☐	☐	☒	☐
iii) Seismic-related ground failure, including liquefaction?	☐	☐	☒	☐
iv) Landslides?	☐	☐	☐	☒
b) Result in substantial soil erosion or the loss of topsoil?	☐	☐	☒	☐
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse?	☐	☐	☒	☐
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994, as updated), creating substantial risks to life or property?	☐	☐	☒	☐
e) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?	☐	☐	☐	☒

ENVIRONMENTAL SETTING

The area of the proposed Project along the Fremont Line ranges in elevation from five to 100 hundred feet above mean sea level (BART 2007). Soils consist predominantly of clayey sands and sandy clays with interbedded sand and gravel layers to 20 feet below ground surface. Depth to groundwater ranges from 4.4 feet to greater than 20 feet. Based on a review of sites near the Fremont Line corridor, groundwater flow is generally to the west, toward San Francisco Bay, with local variability to the northwest and southwest.

DISCUSSION

a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:

i) Earthquake Fault Rupture

No Impact. The California Geological Survey (CGS) publishes maps of the active faults in the Bay Area that reach the surface as part of its work to implement the requirements of the Alquist-Priolo Earthquake Fault Zone Act[3] (CGS 2001). These maps show not only the most comprehensive depiction of fault traces that can rupture the surface, but also the zones in which cities and counties must require special geologic studies to prevent the building of structures intended for human occupancy. The proposed Project segments are not located within a delineated earthquake fault zone. No impact from ground rupture would result from proposed Project implementation.

ii) Strong Seismic Ground Shaking

Less-than-Significant Impact. The Hayward Fault lies to the east and roughly parallels the BART track alignment in the proposed Project area. Distance from proposed Project segments to the fault ranges from 0.75 mile (Ashland Avenue) to 2.3 miles (Fruitvale Station). Studies by the USGS and other agencies indicate that there is a 63 percent probability that there will be a magnitude 6.7 or greater earthquake in the Greater Bay Area within the next 30 years (USGS 2008). In particular, the probability for a major earthquake in the Bay Area is highest on the Hayward Fault, which has a 31 percent probability of producing a major earthquake (USGS 2008).

Although there is the potential for strong seismic groundshaking to occur at the proposed Project site, the risk of excessive permanent damage would be reduced because the proposed Project involves retrofitting existing BART facilities to meet heightened seismic design standards per BART Facilities Standards. The general design policy of BART Facilities Standards Structural Criteria for Seismic Design incorporates the relevant seismic safety provisions of the California Building Code (CBC) and the California Department of Transportation (Caltrans) Bridge Design Specifications, along with other professional industry standards. BART Design Criteria require that all operating facilities be designed to withstand the effects of the Maximum Credible Earthquake (MCE) without significant degradation of structural integrity.

While the proposed Project sites would be potentially subject to strong seismic groundshaking, the proposed retrofits and standard engineering design and adherence to BART and industry standards (e.g., CBC) would ensure that this impact would be less than significant.

[3] The main purpose of the Alquist-Priolo Earthquake Fault Zone Act is to prevent the construction of buildings used for human occupancy on the surface trace of active faults. The Act only addresses the hazard of surface fault rupture and is not directed toward other earthquake hazards.

iii) Seismic-Related Ground Failure

Less-than-Significant Impact. The proposed Project site is in a seismically active region with potential for strong shaking that could cause liquefaction (CGS 2011a). Liquefaction occurs when loosely packed sandy or silty materials saturated with water are shaken hard enough to lose strength and stiffness. Liquefied soils behave like a liquid and are responsible for tremendous damage in an earthquake, causing pipes to leak, roads and airport runways to buckle, and damage to building foundations.

Please see the discussion related to strong seismic ground-shaking in item ii above. While the proposed Project sites would be potentially subject to seismic-related ground failure and liquefaction, the proposed retrofits and standard engineering design and adherence to BART and industry standards (e.g., CBC) would ensure that the impact of seismic-related ground failure would be less than significant.

iv) Landslides

No Impact. The proposed Project segments are located on flat terrain and would not be susceptible to landslides (CGS 2011b). The proposed Project would have no impact.

b) Soil Erosion and Topsoil Loss

Less-than-Significant Impact. Proposed Project activities would occur predominately in areas of previously developed flat terrain that is not susceptible to erosion or topsoil loss. However, temporary soil disturbance would occur and would be subject to wind or water erosion. BART's Standard Specifications (Section 01-57-00, Temporary Controls) Section 1.08 (Erosion and Sediment Control) identifies specific practices to prevent erosion within the construction zone. To minimize erosion potential and to protect construction workers from potential excavation hazards, Section 31-50-00 (Excavation Support and Protection) requires that excavated areas be shored. Any salvaged topsoil from excavated areas would be stockpiled at appropriate locations on site and would be secured to prevent contamination by other materials per Section 31-00-00 (Earthwork). Stockpiled topsoil would be used for any landscaping needs on site. Implementation of these practices would ensure that impacts related to soil erosion or loss of topsoil would be less than significant.

c) Unstable Geologic Unit

Less-than-Significant Impact. Please see the discussion related to strong seismic ground-shaking in item ii above. While the proposed Project sites would be potentially subject to seismic-related ground failure and liquefaction, the proposed retrofits and standard engineering design and adherence to BART and industry standards (e.g., CBC) would ensure that impacts related to unstable geologic units would be less than significant.

d) Expansive Soils

Less-than-Significant Impact. The proposed Project sites are not located on expansive soils, as identified by the Uniform Building Code. In addition, compliance with the BART Facilities Standards (BART 2004) would ensure that appropriate measures be taken to ensure that any risks associated with expansive soils would be minimized. This impact would be less than significant.

e) Waste Water Disposal Systems

No Impact. The proposed Project does not include the use of septic tanks or alternative wastewater disposal systems. There would be no impact.

REFERENCES

Bay Area Rapid Transit (BART). 2004. Facilities Standards, Standard Specifications, Division 1 Spec 01 57 00 Temporary Controls.

Bay Area Rapid Transit (BART). 2007. *Preliminary Site Investigation: Seismic Retrofit of BART Aerial Structures and Stations along the Concord, Richmond, Daly City, and Fremont Lines*.

California Geological Survey (CGS). 2001. Alquist-Priolo Earthquake Fault Zone Map. Available: http://quake.abag.ca.gov/faults/. Accessed September 27, 2011.

California Geological Survey. 2011a. Seismic Hazards Zonation Program, Official California Seismic Hazards Zone Map. Available: http://quake.abag.ca.gov/liquefaction/. Accessed September 27, 2011.

California Geological Survey. 2011b. Earthquake and Rainfall Induced Landslides Maps. Available: http://quake.abag.ca.gov/landslides/. Accessed September 27, 2011.

Unites States Geological Survey (USGS). 2008. 2008 Bay Area Earthquake Probabilities. Available http://earthquake.usgs.gov/regional/nca/ucerf/. Accessed on November 17, 2011.

GREENHOUSE GAS EMISSIONS

ENVIRONMENTAL ISSUES	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
7. Greenhouse Gas Emissions				
Would the project:				
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	☐	☐	☒	☐
b) Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	☐	☐	☒	☐

ENVIRONMENTAL SETTING

Constituent gases of the Earth's atmosphere, called atmospheric greenhouse gases (GHGs), play a critical role in the Earth's radiation budget by trapping infrared radiation emitted from the Earth's surface that would have otherwise escaped to space. This phenomenon, known as the greenhouse effect, is responsible for maintaining a habitable climate. Prominent GHGs contributing to this process include carbon dioxide (CO_2), methane, ozone, water vapor, nitrous oxide (N_2O), and chlorofluorocarbons. Anthropogenic emissions of these GHGs in excess of natural ambient concentrations are responsible for the enhancement of the greenhouse effect and have led to a trend of unnatural warming of the Earth's natural climate, known as global warming or climate change. Global warming—inducing emissions of these gases—is attributable to human activities associated with industrial/manufacturing, utilities, transportation, residential, and agricultural sectors (CEC 2006a).

Transportation is responsible for 41 percent of the state's GHG emissions, followed by electricity generation (CEC 2006a). Emissions of CO_2 and oxides of nitrogen are byproducts of fossil fuel combustion. Methane, a highly potent GHG, results from off-gassing associated with agricultural practices and landfills. Sinks of CO_2 include uptake by vegetation and dissolution into the ocean.

Global warming is a global problem, and GHGs are global pollutants (unlike criteria air pollutants and TACs, which are pollutants of regional and local concern). Worldwide, California is the 12th–16th largest emitter of CO_2 and is responsible for approximately 2 percent of the world's CO_2 emissions (CEC 2006a, 2006b). In 2004, California produced 492 million gross metric tons of carbon dioxide-equivalent (CEC 2006a).

In September 2006, California Governor Arnold Schwarzenegger signed Assembly Bill (AB) 32, the California Global Warming Solutions Act of 2006. AB 32 establishes regulatory, reporting, and market mechanisms to achieve quantifiable reductions in GHG emissions and a cap on statewide GHG emissions, and is the first of its kind worldwide. It requires that statewide GHG emissions be reduced to 1990 levels by 2020. To meet the goals of AB 32, California would need to generate fewer GHG emissions than current levels, an approximate 28 percent reduction from "business as usual" emissions

levels in 2020 (ARB 2008). AB 32 applies to major stationary sources of emissions only, but acknowledges the urgency of this potential threat to the environment. In addition, Senate Bill 97 directed the Office of Planning and Research to adopt additional guidelines for assessing environmental impacts under CEQA.

Additionally, local air districts have begun to prepare area-specific thresholds and target reductions to reduce GHG emissions in accordance with state requirements. BAAQMD, in its 2010 CEQA Guidelines, established specific targets for projects, including a per-service-population target for projects other than industrial stationary sources. However, it should be noted that BAAQMD has not formally adopted GHG emissions thresholds for construction, but recommends that all projects disclose GHG emissions and incorporate BMPs, as feasible (BAAQMD 2011).

DISCUSSION

a) Generation of Greenhouse Gas Emissions

Less-than-Significant Impact. GHG emissions from the proposed Project would predominantly be in the form of CO_2 from heavy equipment related to construction. Although emissions of other GHGs—such as methane and N_2O—are important with respect to global climate change, the emission levels of these GHGs are relatively small compared with CO_2 emissions, even considering their higher global warming potential. Therefore, all GHG emissions for construction and operation are reported as CO_2. The construction-related GHG emissions associated with BART retrofit activities were calculated using URBEMIS 2007 Version 9.2.4. The proposed Project would not generate any new mobile, area, or stationary sources of GHGs; therefore, only construction GHG emissions are considered.

Table GHG-1 shows the annual GHG emissions associated with construction of the proposed Project. Detailed calculations and related assumptions are presented in Appendix A.

Table GHG-1:
Summary of Modeled Construction-Generated Emissions of Greenhouse Gases

Source	Total Mass CO_2 Emissions (metric tons)
Construction Emissions	
Year 1	645[1]
Year 2	645
Year 3	645
Year 4	645
Total Construction Emissions	2,580

Note: See Appendix A for detailed model input, assumptions, and threshold calculations.
[1] URBEMIS outputs CO_2 emissions in short tons; conversion to metric tonnes is derived using a 0.907:1 metric tonnes to short tons ratio.
Source: Modeling conducted by AECOM in 2011

Construction activities associated with construction of the proposed Project would occur over a 4-year period. The construction would occur in separate phases along the length of the line, with each section taking approximately 6–8 weeks, with an additional 3–4 weeks where shear keys are required. During this time, a net increase in GHG emissions would result from the various construction activities. Construction-related GHG emissions would be associated with engine exhaust from heavy duty construction equipment, material (e.g., building materials, soil) transport trucks, and worker commute trips. Although any increase in GHG emissions would add to the quantity of emissions that contribute to global climate change, emissions associated with construction of the proposed Project would occur over a finite period. Following completion of the proposed Project, all construction emissions would cease. Despite the intensity and duration of construction activities and the lack of available mitigation measures to abate GHG emissions from heavy-duty construction equipment, the incremental contribution to climate change by the proposed Project's construction emissions would be minimal and would not be a considerable contribution to the cumulative global impact.

As shown in Table GHG-1, estimated GHG emissions associated with construction of the entire proposed Project would be a maximum of approximately 645 metric tons of CO_2 for each phase, totaling 2,580 metric tons over the estimated 4-year construction schedule. The BAAQMD has not established a CEQA significance threshold for GHG emissions from construction. However, for GHG emissions from operation of industrial stationary sources, BAAQMD has established a significance threshold of 10,000 metric tons of CO_2 per year (BAAQMD 2011). For each year of construction, the proposed Project would generate substantially fewer emissions than the BAAQMD threshold of 10,000 metric tons CO_2 per year for industrial sources. Because construction-related emissions would be temporary and finite in nature and would be below the BAAQMD standard for ongoing GHG emissions from industrial facilities, the proposed Project's GHG emissions would not be a considerable contribution to the cumulative global impact and therefore would be less than significant. In addition, implementation of Mitigation Measure AQ-1 (described in *Air Quality*) would further reduce GHG emissions related to the proposed Project by limiting vehicle idling times and requiring regular maintenance of construction equipment, consistent with BAAQMD's recommendation to use BMPs to reduce GHG emissions.

b) Conflict with Applicable Plans, Policies, or Regulations

Less-than-Significant Impact. The proposed Project would not generate any long-term sources of GHG, and short-term construction-generated GHG emissions would be finite in nature. Moreover, as noted above, the proposed Project would generate approximately 2,580 metric tons of CO_2 over 4 years, which is substantially lower than the BAAQMD threshold of 10,000 metric tons CO_2 per year for operational emissions from industrial sources. In establishing its GHG significance thresholds, BAAQMD identified the emissions level that would not be expected to substantially conflict with AB 32 GHG reductions or to contribute substantially to a cumulative impact (BAAQMD 2011). As such, the proposed Project would not conflict with the successful implementation of AB32. Similarly, the proposed Project would not conflict with any other applicable plan, policy, or regulation adopted for reducing GHG emissions. Because the Project would not conflict with any applicable plan, policy, or regulation for GHG reduction or managing global climate change, this impact would be less than significant.

REFERENCES

Bay Area Air Quality Management District (BAAQMD). 2011 (May). CEQA Air Quality Guidelines. Available at: http://www.baaqmd.gov/~/media/Files/Planning%20and%20Research/CEQA/BAAQMD%20CEQA%20Guidelines_May%202011_5_3_11.ashx. Accessed September 19, 2011.

California Air Resources Board. 2008 (December). *AB32 Climate Change Scoping Plan*. Sacramento, CA. Available: <http://www.arb.ca.gov/cc/scopingplan/document/scopingplandocument.htm>. Last updated August 2011. Accessed March 29, 2012.

California Energy Commission (CEC). 2006a. *Inventory of California Greenhouse Gas Emissions and Sinks:1990 to 2004.* (Staff Final Report). Publication CEC-600-2006-013-SF. Available: <http://www.climatechange.ca.gov/inventory/index.html>. Last updated July 31, 2008. Accessed September 19, 2011.

California Energy Commission (CEC). 2006b (July). *Our Changing Climate: Assessing the Risks to California*. Publication CEC-500-2006-077. Available: <http://www.energy.ca.gov/2006publications/CEC-500-2006-077/CEC-500-2006-077.PDF>. Last updated July, 2006. Accessed September 19, 2011.

HAZARDS AND HAZARDOUS MATERIALS

ENVIRONMENTAL ISSUES	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
8. Hazards and Hazardous Materials				
Would the project:				
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	☐	☐	☒	☐
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and/or accident conditions involving the release of hazardous materials into the environment?	☐	☒	☐	☐
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☐	☐	☒	☐
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	☐	☒	☐	☐
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☒
f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☒
g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☐	☒	☐
h) Expose people or structures to a significant risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?	☐	☐	☐	☒

ENVIRONMENTAL SETTING

The Fremont Line was constructed over existing roads and former rail corridors. Because of the proximity to I-880, aerially deposited lead from vehicle exhausts may be present in shallow soils in portions of this corridor. Petroleum compounds, metals, and polynuclear aromatic hydrocarbons (PAHs) could have affected segments constructed within rail corridors. Based on a review of geologic records, shallow groundwater may be encountered during seismic retrofit activities along the Fremont Line. Commercial and industrial uses are found along the Fremont Line from 16th Avenue to the San Leandro Station, where land uses are primarily residential with some commercial and industrials uses.

A Phase I Environmental Review (Phase 1) (Geomatrix 2005a, cited in BART 2006) was prepared to identify current and historical conditions at and near the proposed Project corridor with the potential to result in contamination of soils and groundwater that may be encountered during seismic retrofit activities. The Phase I included a review of available geologic maps, a site reconnaissance, a review of available historic Sanborn Fire Insurance Maps and historical aerial photographs, and a review of regulatory databases of hazardous materials use, storage, disposal, and releases. An Initial Site Assessment (ISA) (BART 2006) was prepared based on the Phase I results.

A Phase II Investigation Work Plan (Phase II) (Geomatrix 2005b, cited in BART 2006) was designed to investigate areas of potential soil and groundwater contamination identified during the Phase I. Phase II identified 124 sampling locations along the Fremont Line. The findings of the Phase II are documented in the Preliminary Site Investigation (PSI) (BART 2007).

The PSI provided recommendations for soil and groundwater management and construction worker health and safety provisions that may be required for the proposed Project. Analytical results above naturally occurring concentrations, for metals in soils, and all analytic results, for organic compounds, were compared to construction worker direct contact Environmental Screening Levels.

A search of the California Environmental Protection Agency's Cortese List identified 90 sites within 0.25 mile of the proposed Project segments as properties with known hazardous substances, contamination, or leaking underground storage tanks. A complete list of these sites can be found in Appendix B. Appendix B includes the sites listed in the ISA as "priority" sites (BART 2006). While a number of the Cortese List sites are in proximity to the proposed Project segments, the proposed Project segments are not located on any properties identified on the Cortese List.

DISCUSSION

a) Routine Transport, Use, or Disposal of Hazardous Materials

Less-than-Significant Impact. Proposed Project construction activities could involve the use of heavy equipment and vehicles containing fuel, oil, and grease, as well as materials such as concrete, asphalt, paints, and solvents. Fluids such as oil or grease could leak from construction vehicles or be inadvertently released in the event of an accident. Such accidental spills could adversely affect the health and safety of individuals working at or utilizing the facility and individuals at adjacent land uses. In the event of an accidental release or spill, BART would adhere to and comply with the Health and Safety Plan prepared for the proposed Project. The plan was prepared in compliance with California

Health and Safety Code Section 25503.5, and includes an inventory statement, a site map showing the location of hazardous materials, an emergency response and contingency plan, an employee training plan, and general facility information.

In addition, BART would follow the Spill Prevention and Emergency Response Plan prepared for the proposed Project. The plan identifies emergency procedures in the event of a hazardous materials spill, and ways to contain any potential contamination. Specifically, the plan calls for protecting all storm drain and sewer inlets in and near the release site using plugs or spill boom; isolating the spill by placing booms or absorbent materials around the edges of the spill to prevent further spread; stopping the source of the release by plugging the leak; placing the leaking container on or in secondary containment or transferring the material to a new container; absorbing the released material using spill booms or diatomaceous earth; and containing the spill clean-up waste in appropriate containers for disposal.

Following proposed Project construction activities, BART operations at the proposed Project segments would remain the same as under existing conditions and would not involve the routine transport of hazardous materials. Disposal of chemicals and any hazardous materials used in construction would adhere to federal, state, and local regulations. Therefore, this impact would be less than significant.

b) Upset and/or Accident Conditions

Less than Significant with Mitigation Incorporated. The Phase I identified numerous commercial, industrial, and agricultural land uses associated with hazardous materials during a site reconnaissance survey of the proposed Project corridor, and review of historical land use resources. The Phase I indicated that historical land use in some areas—particularly in the East Oakland/San Leandro area and along former railroad right-of-ways—may have resulted in hazardous material releases that could affect soils and groundwater that would be encountered during seismic retrofit activities. Each BART line segment reviewed for the Phase I was reported to have nearby businesses, such as gas stations, vehicle maintenance facilities, or dry cleaners, that use and store hazardous materials. These facilities have the potential to have affected the quality of groundwater in the area of proposed Project segments, if releases of hazardous materials have occurred.

Geologic information indicated that the depth to groundwater along the Fremont Line is shallow enough that groundwater may be encountered during seismic retrofit work. The Phase I also noted a potential area of aerially deposited lead in the shallow soils along portions of the proposed Project segments adjacent to I-880. Contaminants associated with current and historical land uses include petroleum products, aerially deposited lead and other metals, polychlorinated biphenyls, PAHs, pesticides, and volatile organic compounds (VOCs) associated with gasoline and chlorinated solvents. Exposure to these materials during proposed Project construction activities would be a potentially significant impact.

The PSI reported on the analysis of soil and groundwater samples in locations that would be affected by the proposed Project, based on sampling locations from the Phase I as reported in the ISA (BART 2007). The Phase II data indicated that soils likely encountered during proposed Project construction may contain arsenic, cobalt, and/or lead (Geomatrix, in prep., cited in BART 2007). Based on the Phase II data, the PSI statistical analysis concluded that soils likely to be encountered by construction workers may contain cobalt in concentrations above direct contact Environmental Screening Levels, which will

require health and safety measures during construction. No other metals or organic compounds were identified above health and safety thresholds. However, elevated concentrations of lead and other metals in soil will require analysis to determine whether soil excavated for off-site disposal must be managed as hazardous waste. In addition, any dewatered groundwater will require management and disposal in accordance with permit requirements.

Mitigation Measure HAZ-1: Implement Phase II/PSI Recommendations

As noted in the PSI, construction workers shall use personal protective equipment such as disposable gloves and coveralls. The Phase II report shall be provided to construction contractors so that the information can be incorporated in their employee health and safety, and hazards communications programs. In addition, BART and/or its construction contractors shall implement dust control measures and monitoring, and security measures to prevent unauthorized entry to the construction area and to reduce hazards outside the construction area.

In the event that soil, groundwater, or other environmental medium with suspected contamination is encountered unexpectedly during construction activities, BART's contractor shall cease work near the suspect material, the area shall be secured as necessary, and the contractor shall take all appropriate measures to protect human health and the environment. Appropriate measures shall include notification of the applicable regulatory agency(ies) as necessary and investigation to identify the nature and extent of contamination. Work shall not resume in the area(s) affected until the measures have been implemented, as appropriate.

Excavated soils that require off-site disposal will require appropriate analysis for waste disposal purposes. Project specifications shall include procedures for management and disposal of excess soils in accordance with applicable laws and regulations. Testing for profiling purposes may also be required by the disposal facility, although the information in the additional investigation and the Phase II report may serve to fulfill some or all of these profiling requirements. If groundwater management is required for the proposed Project, any groundwater intended for discharge will be handled, monitored, and analyzed, as specified by local permit requirements.

c) Hazardous Emissions and Materials near Schools

Less-than-Significant Impact. Thirteen schools are located within 0.25 mile of the proposed Project area:

- Garfield Elementary School, 1640 22nd Avenue, Oakland (0.25 mile northwest of the northern terminus of the proposed Project alignment).
- International Community Elementary School, 2825 International Boulevard, Oakland (adjacent to the proposed Project alignment northwest of the Fruitvale Station).
- Think College Now Elementary School, 2825 International Boulevard, Oakland (adjacent to the proposed Project alignment northwest of the Fruitvale Station).
- Lazear Elementary School, 824 29th Avenue, Oakland (0.1 mile southwest of the proposed Project alignment northwest of the Fruitvale Station).

- St. Elizabeth Elementary School, 1516 33rd Avenue, Oakland (0.2 mile north of the Fruitvale Station).
- St. Elizabeth High School, 1530 34th Avenue, Oakland (0.25 mile north of the Fruitvale Station).
- Ascend Elementary School, 3709 East 12th Street, Oakland (adjacent to the northeast alignment approximately 0.1 mile southeast of the Fruitvale Station).
- Bridges Academy, 1325 53rd Avenue, Oakland (0.2 mile northeast of the rail alignment midway between Fruitvale Station and Coliseum Station).
- Melrose Leadership Academy, 5328 Brann Street, Oakland (0.25 mile northeast of the rail alignment midway between Fruitvale Station and Coliseum Station).
- Hesperian Elementary School, 620 Drew Street, San Lorenzo (0.2 mile south of the Bay Fair Station and 0.25 mile west of the Ashland Avenue site).
- Edendale Middle School, 16160 Ashland Avenue, San Lorenzo (0.4 mile north of the Ashland Avenue site).
- San Lorenzo High School, 50 East Lewelling Boulevard, San Lorenzo (0.2 mile south of the Ashland Avenue site).
- St. John's School, 270 E. Lewelling Boulevard, San Lorenzo (0.2 mile south of the Ashland Avenue site).

Proposed Project construction activities could involve the use of heavy equipment and vehicles containing fuel, oil, and grease, as well as materials such as concrete, asphalt, paints, and solvents. Fluids such as oil or grease could leak from construction vehicles or be inadvertently released in the event of an accident. Such accidental spills could adversely affect the health and safety of students and staff at nearby schools. However, as discussed in item a), adherence with applicable federal, state, and local regulations as well as BART's Health and Safety Plan would minimize potential impacts. Operation of the proposed Project would not involve the routine transport of hazardous materials. Disposal of chemicals and hazardous materials used in construction would adhere to federal, state, and local regulations. Therefore, this impact would be less than significant.

d) Hazardous Materials Sites

Less than Significant with Mitigation Incorporated. Please see the *Environmental Setting* discussion, as well as information in item b). The proposed Project segments are not located on any property identified on the Cortese List, and so would not create a significant hazard to the public or the environment. In addition, implementation of Mitigation Measure HAZ-1 would ensure that potential impacts associated with nearby Cortese List sites would remain less than significant.

e) Airport Land Use Plans

No Impact. The nearest airport is Oakland International Airport, which is more than 2 miles to the west. Proposed Project activities on existing guideways and stations would have no impact related to safety hazards for people residing or working in the proposed Project area.

f) Private Airstrips

No Impact. The proposed Project is not located within the vicinity of a private airstrip and, therefore, would have no impact related to safety hazards for people residing or working in the proposed Project area.

g) Emergency Response Plans

Less-than-Significant Impact. The proposed Project's seismic upgrading activities would not impair implementation of or physically interfere with an adopted emergency response plan. During construction activities, temporary traffic control would be necessary and would temporarily alter traffic patterns near the proposed Project site. However, emergency access would be maintained at all times and would be coordinated with emergency agencies including fire and police, as needed. Therefore, impacts related to emergency access and response would be less than significant.

h) Wildland Fires

No Impact. The proposed Project segments are located within densely developed urban areas, and there are no wildland areas within the general vicinity of these locations. Therefore, proposed Project implementation would not expose people or structures to a significant risk of loss, injury, or death involving wildland fires, and there would be no impact.

REFERENCES

Bay Area Rapid Transit District (BART). 2006. *Initial Site Assessment: Seismic Retrofit of BART Aerial Stations and Structures along the Concord, Richmond, Daly City and Fremont Lines*. Prepared by Baseline Environmental Consulting.

Bay Area Transit District (BART). 2007. *Preliminary Site Investigation: Seismic Retrofit of BART Aerial Structures and Stations along the Concord, Richmond, Daly City and Fremont Lines*.

Geomatrix. 2005a. Phase I Environmental Review, BART Earthquake Safety Program, M-, R-, C-, and A-Line s, August 23. Cited in BART 2006.

Geomatrix. 2005b. Phase II Investigation Work Plan, BART Earthquake Safety Program, M-, R-, C-, and A-Lines, August. Cited in BART 2006.

Geomatrix. In preparation. Phase II Environmental Review, BART Earthquake Safety Program, M-, R-, C- and A-Lines. Cited in BART 2007.

HYDROLOGY AND WATER QUALITY

ENVIRONMENTAL ISSUES	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less-than-Significant Impact	No Impact
9. Hydrology and Water Quality				
Would the project:				
a) Violate any water quality standards or waste discharge requirements or expose people to water quality that violates water quality standards?	☐	☐	☒	☐
b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level that would not support existing land uses or planned uses for which permits have been granted)?	☐	☐	☒	☐
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial on- or offsite erosion or siltation?	☐	☐	☒	☐
d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in on- or offsite flooding?	☐	☐	☐	☒
e) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?	☐	☐	☒	☐
f) Otherwise substantially degrade water quality?	☐	☐	☐	☒
g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?	☐	☐	☐	☒
h) Place within a 100-year flood hazard area structures that would impede or redirect flood flows?	☐	☐	☒	☐
i) Expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam?	☐	☐	☐	☒
j) Result in inundation by seiche, tsunami, or mudflow?	☐	☐	☐	☒

ENVIRONMENTAL SETTING

The proposed Project segments are located in urbanized areas with existing water management infrastructure The proposed Project is located within the San Francisco Bay watershed. Average annual rainfall in the area is about 22.9 inches (City of Oakland 2011). However, rainfall is highly variable and confined almost exclusively to the "rainy" period from early November to mid-April. Because much of the area's rainfall comes from the fringes of mid-latitude storms, a shift in the annual storm track of a few hundred miles can mean the difference between a very wet year and near-drought conditions. Most locations along the proposed Project segments are developed, have no natural surface drainage features, and rely on storm drainage infrastructure to direct water flows. There would be no direct flow to wetlands, streams, or creeks due to the urbanized character of the proposed Project area.

The Federal Emergency Management Agency (FEMA) is responsible for determining flood elevations and floodplain boundaries (BART 2006). FEMA maps identify the locations of special flood hazard areas, including the 100-year floodplain. The proposed Project segments between the Fruitvale and Coliseum stations—including the stations themselves—are located within an existing floodplain, in an area in which 181 aerial pier structures are sited. The Bay Fair Station is also located within an existing floodplain.

The San Francisco Bay Regional Water Quality Control Board (RWQCB) is the state agency with primary responsibility for designating the beneficial uses of the San Francisco Bay and setting the water quality objectives required to ensure that those uses are protected. The State Water Resources Control Board (SWRCB) regulates the discharge of stormwater through the National Pollutant Discharge Elimination System (NPDES) permit program. Stormwater runoff from construction sites disturbing 1 or more acres must be covered under the State's General Construction Activity Stormwater Permit (SWRCB Order No. 2009-0009-DWQ, NPDES No. CAS000002) and must be managed by a Storm Water Pollution Prevention Plan (SWPPP). The contractor would develop a SWPPP and a monitoring plan for the site to be approved by BART, who would be responsible for ensuring its implementation. In addition, BART Facilities Standards Section 1.08, Erosion and Sediment Control, requires BART contractors to develop an Erosion and Sediment Control Plan to prevent erosion and sedimentation impacts during construction activities. Section 1.08 also requires the contractors to comply with all applicable federal, state, and local laws, orders, and regulations concerning the prevention, control, and abatement of water pollution.

DISCUSSION

a) Water Quality Standards

Less-than-Significant Impact. The proposed Project could potentially result in a minor increase in surface water pollutants from construction activities. Construction activities can affect water quality temporarily because disturbed and eroded soil, petroleum products, and miscellaneous wastes could be discharged to waters of the San Francisco Bay watershed through existing stormwater collection facilities. Soil and associated contaminants that enter stream channels can increase turbidity, stimulate the growth of algae, increase sedimentation of aquatic habitat, and introduce compounds that are toxic to aquatic organisms.

Construction of the proposed Project would include small amounts of earth-moving activities. However, the majority of construction activities would take place on paved surfaces; therefore, substantial soil erosion would not occur. Construction activities would be required to comply with the proposed Project SWPPP and with BART Facilities Standards Section 1.08, Erosion and Sediment Control, which would minimize soil erosion and sediment transport to existing stormwater drainage systems. Implementation of required BMPs would reduce potential erosion and sediment impacts due to construction. Although a 1-inch-thick jacket may be installed on some of the aerial structure columns, the increase in impervious surface would be negligible. Upon proposed Project completion, the site would be restored to pre-construction condition. Therefore, impacts on water quality would be less than significant.

b) Groundwater

Less-than-Significant Impact. The proposed Project segments do not represent major groundwater recharge sources because they are surrounded by urban development and are almost entirely covered by impervious surfaces. As noted in the *Geology and Soils* section, depth to groundwater near the proposed Project site ranges from 4.4 feet to greater than 20 feet. If groundwater dewatering is required during construction, BART would apply for a permit from the San Francisco Regional Water Quality Control Board. Permit conditions may include discharge volume limits, discharge mass limits for specific contaminants, and/or pre-treatment of groundwater prior to discharge. The proposed Project would not involve groundwater injections, nor is it located over a natural recharge zone. Consequently, there would be no groundwater augmentation nor would changes in surface infiltration characteristics affect groundwater recharge. Additionally, the proposed Project would not increase demand for water, which would continue to be supplied to the proposed Project sites by the East Bay Municipal Utility District (EBMUD), from surface water resources. Therefore, impacts on groundwater would be less than significant.

c) Altering Drainage Pattern Resulting in Off-site Erosion or Siltation

Less-than-Significant Impact. As discussed in item a), construction-related impacts would be temporary in nature and offset by the implementation of erosion and sediment control measures, as required by the Construction Activity Storm Water General Permit and BART Facilities Standards. BMPs would control stormwater runoff during construction and would not alter the course of a stream or river. Upon proposed Project completion, the site would be restored to pre-construction condition, with no increase in impervious surface other than the 1-inch-thick jacket on some of the aerial structure columns. Therefore, the proposed Project would result in less-than-significant impacts related to off-site erosion and siltation.

d) Altering Drainage Pattern Resulting in On- or Off-site Flooding

No Impact. The proposed Project would not substantially alter drainage patterns. Proposed Project implementation would involve construction of wider aerial guideway footings along the proposed Project segments, but this process would not substantially increase the amount of impervious surface areas. Furthermore, it would not substantially affect the existing rate and amount of surface runoff, and would not result in flooding on or off site. The proposed Project would not alter the course of a stream or river, nor would it result in significant flooding on or off site; therefore, there would be no impact.

e) Stormwater Drainage Systems

Less-than-Significant Impact. The proposed Project would not permanently increase the amount of impervious surface area at the proposed Project segments. A temporary increase in impervious area would occur during construction; but the proposed Project sites would be restored to pre-construction conditions. Therefore, stormwater runoff generated at the proposed Project sites would be temporary and would not increase permanently. As described under items a) and b), construction-related surface runoff would not result in substantial water quality pollution. This impact would be less than significant.

f) Other Substantial Degradation of Water Quality?

No Impact. The proposed Project would not have substantial water quality impacts other than those described above. There would be no impact.

g) Housing within 100-Year Flood Hazard Area

No Impact. The proposed Project would not include housing. Therefore, no impact from placing housing in flood hazard areas would result.

h) Structures within 100-Year Flood Hazard Area

Less-than-Significant Impact. Seismic upgrading activities would result in slight size increases in some column jackets. However, this jacket size increase would be relatively minor and would not impede or redirect flood flows. The proposed Project would have a less-than-significant impact related to impeding or redirecting flood flows.

i) Levee or Dam Failure

No Impact. The proposed Project segments are not located within the vicinity of a dam or levee system. Proposed Project implementation would have no impact related to a dam or levee failure.

j) Inundation by Seiches, Tsunamis, or Mudflows

No Impact. The relatively flat, paved, or barren terrain of the proposed Project segments and immediate surroundings are not susceptible to landslide or mudflow. The project is located inland from the San Francisco Bay. As a result, proposed Project implementation would not result in impacts related to seiche, tsunami, or mudflow hazards. The proposed Project would have no impact.

REFERENCES

Bay Area Rapid Transit (BART). 2004. Facilities Standards, Standard Specifications, Section 1.08, Erosion and Sediment Control.

Bay Area Rapid Transit District (BART). 2006. Location Hydraulic Study: Seismic Retrofit of BART Aerial Structures and Stations along the Concord, Richmond, Daly City, and Fremont Lines.

City of Oakland. 2011. *Initial Study: Foothill Square Shopping Center Renovation/Redevelopment*. Prepared by Lamphier-Gregory, Oakland, CA. Available: www2.oaklandnet.com/w/oak027424. Accessed October 4, 2011.

LAND USE AND PLANNING

ENVIRONMENTAL ISSUES	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
10. Land Use and Planning				
Would the project:				
a) Physically divide an established community?	☐	☐	☐	☒
b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to, a general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?	☐	☐	☐	☒
c) Conflict with any applicable habitat conservation plan or natural community conservation plan?	☐	☐	☐	☒

ENVIRONMENTAL SETTING

The proposed Project segments pass through areas containing a variety of land uses, including light industrial, multi-family and single-family residential, large scale and small scale commercial, as well as recreational and open space areas, in the cities of Oakland and San Leandro, and the County of Alameda.

DISCUSSION

a) Division of Established Community

No Impact. Seismic upgrading activities associated with the proposed Project would take place within the existing BART right-of-way and would not physically divide any established communities. The proposed Project would have no impact.

b) Conflict with Land Use Plans, Policies, and Regulations

No Impact. California Government Code Section 53090 exempts rapid transit districts like BART from complying with local land use plans, policies, and zoning ordinances. Accordingly, any inconsistency with such plans, ordinances, and regulations is not considered an impact that is subject to mitigation. Nevertheless, BART intends to inform the public and local jurisdictions of the extent to which its projects are consistent with local requirements. Information from the local policy documents is presented here for informational purposes.

The proposed Project passes through various land use and zoning designations under the local general plans of the cities of Oakland and San Leandro and the County of Alameda. Proposed Project-related

activities would take place within the existing BART right-of-way, and would be consistent with current land use and zoning designations.

To minimize disturbance to adjacent land uses and the public throughout proposed Project construction implementation, BART will limit work hours to normal business hours (Monday through Friday, 7 a.m. to 7 p.m.) except in limited areas and will comply with the BART noise and vibration standard specifications. Access to the stations would be preserved throughout proposed Project construction activities. No permanent changes affecting adjacent land uses would occur. Therefore, disturbances to the public from implementation of the proposed Project would be minimized and temporary, and would follow those provisions and restrictions established by BART. Therefore, no impacts are anticipated.

c) Conflict with Conservation Plans

No Impact. The proposed Project corridor and station area are not included in either a habitat conservation plan or natural community conservation plan. Proposed Project-related activities would take place within the existing BART right-of-way. Therefore, the proposed Project would have no impact.

MINERAL RESOURCES

ENVIRONMENTAL ISSUES	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
11. Mineral Resources				
Would the project:				
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	☐	☐	☐	☒
b) Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan?	☐	☐	☐	☒

ENVIRONMENTAL SETTING

The state requires local jurisdictions with economically significant mineral resources to protect such areas from incompatible development. The CGS (under the authority of the Surface Mines and Reclamation Act of 1975) has classified aggregate mineral zones throughout the state. Proposed Project segments are not located in any identified significant mineral resource areas.

The only identified regionally significant mineral resource site in the City of Oakland is Leona rhyolite, located in the Oakland hills between Claremont Canyon and the San Leandro border (City of Oakland 1996). Rhyolite is volcanic rock used as material for road base, paving, curbs, and foundation stones. There are currently no active quarries in Oakland. The proposed Project sites are not located in the hills, where Leona rhyolite is found.

San Leandro's principal mineral resources are volcanic rocks, such as basalt, andesite, and rhyolite (City of San Leandro 2011). Rhyolite deposits in the East Bay Hills have been used for construction and development for more than a century. San Leandro's only quarry—east of the city limits on Lake Chabot Road, approximately 2 miles northeast of the Bay Fair Station—ceased operation in the 1980s. Although additional rock resources remain on the site, future quarrying activity is unlikely due to potential environmental impacts and stringent permitting requirements.

DISCUSSION

a), b) Loss of Known Mineral Resources or Locally Important Mineral Resources

No Impact. The proposed Project would not result in the loss of availability of a known or locally important mineral resource. The proposed Project segments are located in densely developed urban areas of Oakland and San Leandro and would not affect any mineral resource recovery sites; therefore, there would be no impact on mineral resources.

REFERENCES

City of Oakland. 1996. *General Plan, Open Space, Conservation, and Recreation Element*. Available: http://www.oaklandnet.com/government/ceda/revised/planningzoning/StrategicPlanningSection/Open%20SpaceConversationand%20RecreationOSCARElement/Chapter%203%20-%20Conservation.pdf. Accessed October 4, 2011.

City of San Leandro. 2011. *General Plan, Open Space, Parks and Conservation Element*. Available: http://www.sanleandro.org/depts/cd/plan/genplan/doc2002.asp. Accessed October 4, 2011.

NOISE

ENVIRONMENTAL ISSUES	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
12. Noise				
Would the project result in:				
a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☐	☒	☐	☐
b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?	☐	☒	☐	☐
c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☐	☐	☒
d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☒	☐	☐
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒
f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒

ENVIRONMENTAL SETTING

Existing Noise Sources and Sensitive Receptors

Sound is technically described in terms of amplitude (loudness) and frequency (pitch). The standard unit of sound amplitude measurement is the decibel (dB). The decibel scale is a logarithmic scale that describes the physical intensity of the pressure vibrations that make up any sound. The pitch of the sound is related to the frequency of the pressure vibration. Because the human ear is not equally sensitive to a given sound level at all frequencies, a special frequency-dependent rating scale has been devised to relate noise to human sensitivity. The A-weighted decibel scale (dBA) provides this compensation by discriminating against frequencies in a manner that approximates the sensitivity of the human ear.

Noise, on the other hand, is typically defined as unwanted sound. A typical noise environment consists of a base of steady “background” noise that is the sum of many distant and indistinguishable noise

sources. Superimposed on this background noise is the sound from individual local sources. These sounds can vary from an occasional aircraft or train passing by to virtually continuous noise from, for example, traffic on a major highway.

Several rating scales have been developed to analyze the adverse effect of community noise on people. Because environmental noise fluctuates over time, these scales consider that the effect of noise upon people is largely dependent upon the total acoustical energy content of the noise, as well as the time of day when the noise occurs. The L_{eq} is a measure of ambient noise, while the L_{dn} and Community Noise Equivalent Level (CNEL) are measures of community noise. Each is applicable to this analysis and defined as follows:

- *L_{eq}*, the equivalent energy noise level, is the average acoustic energy content of noise for a stated period of time. Thus, the L_{eq} of a time-varying noise and that of a steady noise are the same if they deliver the same acoustic energy to the ear during exposure. For evaluating community impacts, this rating scale does not vary, regardless of whether the noise occurs during the day or the night.
- *L_{dn}*, the Day-Night Average Level, is a 24-hour average L_{eq} with a 10 dBA "weighting" added to noise during the hours of 10:00 p.m. to 7:00 a.m. to account for noise sensitivity in the nighttime. The logarithmic effect of these additions is that a 60 dBA 24 hour L_{eq} would result in a measurement of 66.4 dBA L_{dn}.
- *CNEL*, the Community Noise Equivalent Level, is a 24-hour average L_{eq} with a 5 dBA "weighting" during the hours of 7:00 p.m. to 10:00 p.m. and a 10 dBA "weighting" added to noise during the hours of 10:00 p.m. to 7:00 a.m. to account for noise sensitivity in the evening and nighttime, respectively. The logarithmic effect of these additions is that a 60 dBA 24 hour L_{eq} would result in a measurement of 66.7 dBA CNEL.
- *L_{min}*, the minimum instantaneous noise level experienced during a given period of time.
- *L_{max}*, the maximum instantaneous noise level experienced during a given period of time.

Noise-sensitive receptors are generally considered humans engaged in activities, or utilizing land uses, that may be subject to stress from significant interference of noise. Activities usually associated with sensitive receptors include, but are not limited to, talking, eating, and sleeping. Land uses often associated with sensitive receptors include residential dwellings, mobile homes, hotels, motels, hospitals, nursing homes, education facilities, and libraries.

The proposed Project would upgrade three segments of aerial structures and three station locations along the Fremont Line. The nearest sensitive receptors to the proposed Project area are generally residential uses located within approximately 500 feet of proposed work areas.

The distance from the work areas to the nearest sensitive receptors are:

- **Bay Fair Station** - Approximately 100 feet west on Wagner Street for daytime and nighttime work.
- **Ashland Avenue** - Approximately 100 feet east and west on Elgin Street and Galway Drive, daytime work only.

- **Coliseum Station** - Approximately 450 feet northeast on 71st Avenue for daytime and nighttime work.
- **Between the Fruitvale and Coliseum Stations** - Approximately 30 feet east on 40th Avenue, daytime work only.
- **Fruitvale Station** - Approximately 100 feet east on 35th Avenue and approximately 70 feet east on 30th Avenue north of the Fruitvale Station for daytime work, approximately 100 feet east on 35th Avenue for nighttime work.
- **Nighttime construction work at 19th Avenue and 12th Street** – Approximately 350 feet east on 19th Avenue.

The closest distance to sensitive receptors during daytime work is 30 feet, and the closest distance during nighttime work is 100 feet.

A noise impact assessment has been conducted based on these distances to sensitive receptors. It is assumed for the analysis that any impacts found to be less than significant for these distances would also be less than significant for greater distances.

The existing noise environment within the proposed Project vicinity is primarily influenced by surface transportation noise from vehicular traffic on nearby roadways and from BART trains. Intermittent noise from outdoor activities at the surrounding residences (e.g., people talking, operation of landscaping equipment, car doors slamming, and dogs barking), although minor, also influences the existing noise environment.

Noise contour maps from the Noise Element of the City of Oakland General Plan show that traffic noise along the Fremont Line is between 65 and 70 dBA L_{dn} (City of Oakland 2005). Noise from rail traffic along the BART line and adjacent freight lines is also between 65 and 70 dBA L_{dn} (City of Oakland 2005, Figure 3). Noise levels in the San Leandro and Ashland Avenue proposed Project areas are the same as those described in the City of Oakland (City of San Leandro 2002, Alameda County 2010). Therefore, for this analysis, it is assumed that the background noise level at the nearest sensitive receptors to the proposed Project would be 65 dBA L_{dn}.

REGULATORY BACKGROUND

BART Noise Criteria

BART has adopted the Federal Transit Administration (FTA) noise and vibration impact thresholds as part of its facilities standards. However, the FTA does not establish criteria for construction noise impacts. The proposed Project contains no permanent noise sources, and proposed Project actions would consist of construction activities only. Accordingly, these standards do not apply.

The BART Facilities Standards contain construction noise criteria that limit the generation of continuous and intermittent noise levels because of operating construction equipment. BART Facilities Standards apply to all BART construction activities, including those undertaken with the proposed Project. The construction noise criteria used by BART are generally consistent with, but in some

circumstances even more restrictive than, those recommended by the State of California Office of Noise Control in its *Model Noise Control Ordinance*.

The BART construction noise standards are specified in terms of the temporal nature of the noise (i.e., continuous or intermittent), the time of day, and the sensitivity of the affected receptor. These standards are summarized in Tables N-1 and N-2. Continuous noise standards are applied to prevent noises from stationary sources, parked mobile sources, or any source or combination of sources producing repetitive or long-term noise lasting more than a few hours from the limits indicated. Intermittent noise standards are applied to prevent noises from non-stationary mobile equipment operated by a driver or from any source of non-scheduled intermittent, non-repetitive, short-term noises not lasting more than a few hours from exceeding the limits indicated.

Table N-1:
Limits for Continuous Construction Noise

	Maximum Allowable Continuous Hourly Noise Level, dBA	
	Daytime	Nighttime
Residential		
Single-family Residential	60	50
Along an Arterial or Multi-family Residential Area, including Hospitals	65	55
Semi-residential/Commercial Areas, including Hotels	70	60
At All Times		
Commercial		
Semi-residential/Commercial Areas, including Schools	65	
Pile Driving	70	
Industrial		
All Locations	80	

Note: Noise limits apply at 200 feet from the construction limits or at the nearest affected building, whichever is closer.
Source: BART 2004

Table N-2:
Limits for Intermittent Construction Noise

	Maximum Allowable Continuous Noise Level, dBA	
	Daytime	Nighttime
Residential		
Single-family Residential	75	60
Along an Arterial or Multi-family Residential Area, including Hospitals	75	65
Semi-residential/Commercial Areas, including Hotels	80	70
At All Times		
Commercial		
Semi-residential/Commercial Areas, including Schools	80	
Pile Driving	85	
Industrial		
All Locations	90	

Note: Noise limits apply at 200 feet from the construction limits or at the nearest affected building, whichever is closer.
Source: BART 2004

DISCUSSION

a) Exceed Noise Standards

Less than Significant with Mitigation Incorporated. Retrofitting of the BART aerial structures would result in the temporary generation of noise from the installation of new footings, piles, column jackets, shear keys, bent caps, and other miscellaneous activities. At the peak of construction, drill equipment, cranes, excavators, graders, haul trucks, watering trucks, generators, and other typical construction equipment would be present at the proposed Project site. Pile driving would be limited to temporary sheet piles for shoring, where necessary. Construction equipment would be limited to within 20 feet of structure work. Four areas have been identified where BART operations could be affected by retrofit activities, so that work in these areas must be done during non-operational hours (generally 12:30 a.m. to 4:00 a.m. on weekdays). Those locations are directly adjacent to or include the Fruitvale, Coliseum, and Bay Fair stations. One additional location is located north of the Fruitvale Station at 19th Avenue and 12th Street. Nighttime construction in these areas would only occur for 5 days per pier/bent.

All other construction activity would take place during daytime hours (7:00 a.m. to 7:00 p.m.). The duration of construction activities for each aerial structure would be approximately 6–8 weeks, with an additional 3–4 weeks where shear keys are required. Retrofitting activities for the Fremont Line would occur over approximately 4 years. BART or its construction contractors would employ noise reduction measures as necessary to minimize noise impacts, and would provide advance public notice of construction activities.

The simultaneous operation of on-site construction equipment could result in combined intermittent maximum noise levels up to 85 dBA L_{max} at 50 feet from the proposed Project sites, as shown in Table N-3. Fifty feet is a standard measuring distance for assessing environmental noise levels (FTA 2006). Hourly average noise levels would be approximately 78 dBA $L_{eq(h)}$ at 50 feet.

Table N-3:
Typical Construction-Equipment Noise Levels

Type of Equipment	Noise Level in dBA at 50 feet
Drill Rig	85
Crane	85
Excavator	85
Generator	82
Grader	80
Haul Truck	80
Pile Driving	95

Source: FHWA 2006

Based on these noise levels, exterior noise levels at noise-sensitive receptors within 167 feet (see Appendix C for noise propagation calculations) from the proposed Project site (e.g., residences) could exceed the BART Design Noise Criteria daytime standards of 75 dBA L_{max} and 65 dBA L_{eq}; and within 667 feet could exceed the BART Design Noise Criteria nighttime standards of 60 dBA L_{max} and 50 dBA L_{eq} without feasible noise controls. Intervening buildings, topographic features, and other noise sources, such as freeways and BART operations, would reduce the distance that noise from construction activities would be noticeable. However, 167 feet is the maximum distance at which noise would exceed applicable standards. More specifically, construction-generated noise levels could reach 84 dBA L_{eq} at the closest residence, within approximately 30 feet of the proposed retrofit locations. See Table N-4, below.

Sheet pile driving may be required for additional structure support in some locations. Pile driving activities would generate maximum noise levels of 95 dBA L_{max} at 50 feet each time the hammer head strikes the pile. It is estimated that the actual strike of an impact pile driver accounts for 20 percent of an hour, which results in an average hourly noise level of 88 dBA L_{eq} at 50 feet from the pile. Pile driving locations are not known at this time. Nonetheless, noise from pile driving could exceed applicable standards if it is conducted within 2,600 feet of sensitive receptors (see Appendix C for noise propagation calculations). However, it should be noted that BART has historically employed alternative methods of shoring, instead of pile driving, to reduce noise levels at sensitive receptors within 2,600 feet of development.

Construction of the proposed Project would also result in a short-term increase in traffic on the local area roadway network. Construction-related traffic would be distributed over the roadway network identified in the *Transportation and Traffic* section. Noticeable increases of 3 dBA do not typically occur without a substantial (i.e., doubling) increase in roadway traffic volumes. (Caltrans 2009: N-96). Due to the heavy traffic volumes on roadways surrounding the proposed Project sites, it is unlikely that construction traffic would double existing traffic volumes; therefore, the overall traffic noise levels would not change a substantial amount. See *Transportation and Traffic* for additional information.

Noise levels from on-site heavy-duty construction equipment would exceed standards set by BART at adjacent sensitive receptors (see Table N-4). In addition, noise from pile-driving activities would also exceed applicable standards within 2,600 feet of operations (see Appendix C for noise propagation calculations). Furthermore, construction may take place in the nighttime hours, which could cause annoyance, sleep disruption, and exceed applicable standards (e.g., at residences) in the proposed Project vicinity. This impact would be potentially significant. Implementation of the following mitigation measure will reduce the impact to less than significant.

Table N-4: Construction Noise Impact Summary						
Site Location	Distance to Nearest Sensitive Receptor (ft)	Applicable Standard (L_{max}/L_{eq})	Maximum Noise Level (dBA L_{max})	Hourly Noise Level (dBA L_{eq})	Mitigated Maximum Noise Level[1] (dBA L_{max})	Mitigated Hourly Noise Level[1] (dBA L_{eq})
North of Fruitvale BART Station	70	75/65	81	74	56	49
Fruitvale BART Station	100	75/65	77	70	52	45
Between Fruitvale and Coliseum BART Station	30	75/65	91	84	66[2]	59[2]
Coliseum BART Station	450	75/65	60	53	35	28
Bay Fair BART Station	100	75/65	77	70	52	45
Ashland Avenue	500	75/65	59	52	34	27
Pile Driving Activities[3]	250	75/65	77	70	52	45
Nighttime Construction 12th St and 19th Avenue	350	60/50	63	56	38	31
Nighttime Construction Fruitvale BART Station	100	60/50	77	70	52	45
Nighttime Construction Coliseum BART Station	450	60/50	60	53	35	28
Nighttime Construction Bay Fair BART Station	100	60/50	77	70	52	45

Notes:

[1] Assumes -20 dBA insertion loss from Mitigation Measures NOI-1 for daytime noise control measures, and 25 dBA insertion loss for nighttime noise control measures.

[2] Mitigation Measure NOI-1 would reduce impacts on sensitive receptors between 39th Avenue and 41st Avenue to a less-than-significant level.

[3] Pile driving may occur wherever it is necessary to drive sheet piles.

Source: FHWA 2006, AECOM 2012

Mitigation Measure NOI-1: Reduce Temporary Construction Noise

BART shall incorporate the following practices into the construction documents to be implemented by the proposed Project contractor. Such practices include, but are not limited to, the following measures:

- All construction equipment shall be properly maintained and equipped with all feasible noise control, such as mufflers, in accordance with manufacturers' specifications (10 dB insertion loss, BBN 1981).
- Noise-reducing enclosures or shielding shall be used around stationary noise-generating equipment (e.g., compressors and generators) (minimum 15 dB insertion loss, BBN 1981).

- To ensure minimal annoyance, sleep disturbance, and compliance with applicable BART Design Criteria, BART shall conduct retrofit construction activities during daytime hours (7:00 a.m. to 7:00 p.m.), except for the four locations (directly adjacent to or include the Fruitvale, Coliseum, and Bay Fair stations; one additional location is north of the Fruitvale Station at 19th Avenue and 12th Street).
- Construction activities during nighttime hours (7:00 p.m. to 7:00 a.m.) at 19th Avenue and 12th Street, and the Fruitvale, Coliseum, and Bay Fair BART stations shall implement the following noise abatement measures:
    - All nighttime construction noise sources shall use noise-attenuating buffers or shields such as structures, barriers, blankets, truck trailers, or soil piles between noise generation sources and sensitive receptors (10 – 25 dB insertion loss, FTA 2006, BBN 1981).
    - No nighttime construction shall be performed in locations closer than 100 feet from any residences or other sensitive land uses. Before construction activity begins within 100 to 150 feet of one or more residences or businesses, written notification shall be provided to the potentially affected residents or business owners, identifying the type, duration, and frequency of construction activities. Notification materials shall include a contact number and identify a mechanism for residents or business owners to register complaints if construction noise levels are overly intrusive. The distance of 150 feet is based on the approximate 65-dBA contour of the loudest anticipated construction activity; see Table N-2 for further discussion.
    - The primary contractor shall prepare and implement a detailed noise control plan based on the proposed construction methods. This plan shall identify specific measures to ensure compliance with above noise control measures and a minimum noise reduction of 20 dB from implemented control measures. The noise control plan shall be submitted to and approved by BART before any noise-generating construction activity begins.
- Construction equipment travel shall be arranged to minimize disturbance to occupied residences and shall remain in staging areas when not in use. Staging areas shall be located as far from residences as feasible. Equipment not in use shall not be left idling for more than 5 minutes (5 dB insertion loss over 1 hour, AECOM 2012).
- Installation of sheet piles for temporary shoring shall be restricted to daytime hours between 7:00 a.m. and 7:00 p.m.
- A disturbance coordinator shall be designated and the person's telephone number shall be posted in a noticeable location around the proposed Project sites and supplied to nearby sensitive receptors. The disturbance coordinator shall receive all public complaints and be responsible for determining the cause of the complaint and implementing any feasible measures to alleviate the problem.

b) Excessive Groundborne Vibration and Groundborne Noise

Less than Significant with Mitigation Incorporated. Construction activities have the potential to result in varying degrees of temporary groundborne vibration, depending on the specific construction equipment used and operations involved. Vibration generated by construction equipment spreads through the

ground and diminishes in magnitude with increases in distance. Table N-5 displays vibration levels for typical construction equipment.

As described above, on-site construction equipment would include graders, excavators, cranes, and haul trucks. According to the FTA, vibration levels associated with the use of heavy equipment range from approximately 0.003 to 0.089 inch per second (in/sec) peak particle velocity (PPV) at 25 feet, as shown in Table N-5. Using FTA's recommended procedure for applying a propagation adjustment to these reference levels, predicted worst-case vibration levels of approximately 0.12 in/sec PPV at the nearest sensitive residence (30 feet) could occur from the use of heavy equipment. These vibration levels would not exceed the FTA-recommended standard of 0.2 in/sec PPV with respect to the prevention of structural damage for normal buildings and to human annoyance for residential uses (FTA 2006: Chapters 8, 10, and 12).

Table N-5:
Typical Construction-Equipment Vibration Levels

Equipment	PPV at 25 feet (in/sec)[1]
Large Bulldozer	0.089
Trucks	0.076
Impact Pile Driver	0.644
Sonic Pile Driver	0.170

Note:
[1] Where PPV is the peak particle velocity.
Source: FTA 2006: Chapters 8, 10, and 12

Limited sheet pile driving for temporary shoring is also proposed under the proposed Project retrofit activities. Vibration levels associated with the use of pile driving range from approximately 0.17 to 0.644 in/sec PPV at 25 feet, as shown in Table N-5 and Appendix C. Using FTA's recommended procedure for applying a propagation adjustment to these reference levels, predicted worst-case vibration levels of approximately 0.49 in/sec PPV at the nearest sensitive receptor (30 feet) could occur from the use of pile-driving equipment. These vibration levels would exceed the FTA recommended standard of 0.2 in/sec PPV, with respect to the prevention of structural damage for normal buildings (FTA 2006: Chapters 8, 10, and 12).

As stated above, proposed Project-related vibration and groundborne noise from pile driving could expose persons to levels exceeding the recommendations of the FTA. This impact would be potentially significant. Mitigation Measure NOI-2 would locate vibration sources (e.g., pile driving) outside of the distances (see Appendix C) required for vibration to be less than applicable standards. Therefore, with implementation of Mitigation Measure NOI-2, this impact would be less than significant.

Mitigation Measure NOI-2: Reduce Temporary Construction Vibration

To prevent annoyance and structural damage from construction-related vibration:

- Heavy equipment shall not be operated within 50 feet of the nearest sensitive receptors to the proposed Project sites. Rubber tired equipment may be used with 50 feet of adjacent sensitive receptors.
- Impact pile driving shall not be operated within 160 feet of residences.
- Pile driving of sonic piles or pre-drilling shall be conducted at a distance of 65 feet or greater from residences.

c) Permanent Ambient Noise Increase

No Impact. The proposed Project contains no permanent noise sources. Proposed Project actions would consist of construction activities only and would not result in a permanent increase in ambient noise levels. Therefore, there would be no impact.

d) Temporary Ambient Noise Increase

Less than Significant with Mitigation Incorporated. As described in item a), noise levels are likely to be 78 dBA or more at 50 feet, which would be considered a substantial increase (+3 dBA [FTA 2006]) over existing noise levels of 65 dBA. Proposed Project-generated construction noise during daytime hours would not be considered significant because it would meet the requirements of BART Design Criteria. However, some construction activities would occur during the more noise-sensitive nighttime hours. If construction equipment were not properly equipped with noise control devices, construction-generated source noise could result in annoyance and/or sleep disruption to occupants of the nearby existing noise-sensitive land uses (e.g., residences) and create a substantial temporary increase in ambient noise levels in the proposed Project vicinity. As a result, this impact is considered potentially significant.

Implementation of Mitigation Measure NOI-1 would reduce short-term construction source noise to a less-than-significant level.

e), f) Project Located within Airport Land Use Plan or Near Public Airport or within Vicinity of Private Airstrip

No Impact. The proposed Project is not located within 2 miles of a public or private airport. The nearest airport is Oakland International Airport, more than 2 miles to the west. Therefore, the proposed Project would not expose people residing or working in the proposed Project area to excessive noise levels. There would be no impact from air traffic noise.

REFERENCES

AECOM. 2012. Attenuation calculation for limiting idling to less than 5 minutes when equipment is not in use. Sacramento, CA.

Alameda County. 2010. Noise Element of the Alameda County General Plan. Available: http://www.acgov.org/cda/planning/generalplans/documents/07_Noise.pdf. Accessed: September 19, 2011.

Bay Area Rapid Transit (BART). 2004. BART Facilities Standards, Standard Specifications, Division 1 Spec 01 57 00 Temporary Controls, Section 1.11, Noise Control.

Bolt, Beranek, and Newman, Inc. (BBN). 1981. Noise Control for Buildings and Manufacturing Plants. Boston, MA.

California Department of Transportation (Caltrans). 2009 (November). *Technical Noise Supplement.* Available : http://www.dot.ca.gov/hq/env/noise/pub/tens_complete.pdf. Accessed: September 19, 2011.

City of Oakland. 2005. Noise Element of the City of Oakland General Plan. Available: http://www2.oaklandnet.com/Government/o/CEDA/o/PlanningZoning/s/GeneralPlan/DOWD009019. Accessed: September 19, 2011.

City of San Leandro. 2002. Chapter 6 “Noise” of the City of San Leandro General Plan. Available: http://www.sanleandro.org/depts/cd/plan/genplan/doc2002.asp. Accessed: September 19, 2011.

Federal Highway Administration (FHWA). 2006 (January). Roadway Construction Noise Model Version 1.0 (FHWA RCNM V. 1.0). Washington DC.

Federal Transit Administration (FTA). 2006 (May). Transit Noise and Vibration Impact Assessment. Washington, D.C.

POPULATION AND HOUSING

ENVIRONMENTAL ISSUES	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
13. Population and Housing				
Would the project:				
a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	☐	☐	☐	☒
b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒
c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒

ENVIRONMENTAL SETTING

Areas near the proposed Project segments are characterized by dense urban and suburban development, including single-family and multi-family residential structures.

DISCUSSION

a) Population Growth Inducement

No Impact. The proposed Project does not include a residential component or elements that would induce growth or employment in the area. The site is in a developed area and is currently served by necessary infrastructure. The proposed Project would not require any additional infrastructure (e.g., water, sewer, or power lines) during construction or operation. Therefore, the proposed Project would have no impact related to inducing substantial population growth.

b), c) Housing Displacement or Displacement of People

No Impact. The proposed Project involves seismic upgrading of existing BART stations and aerial guideways within the existing BART right-of-way, which would not displace existing housing or people. Therefore, there would be no impact.

PUBLIC SERVICES

ENVIRONMENTAL ISSUES	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
14. Public Services				
Would the project:				
a) Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:				
Fire protection?	☐	☐	☐	☒
Police protection?	☐	☐	☐	☒
Schools?	☐	☐	☐	☒
Parks?	☐	☐	☐	☒
Other public facilities?	☐	☐	☐	☒

ENVIRONMENTAL SETTING

The proposed Project segments are located in urban areas where public services are already provided.

DISCUSSION

a) Impact Public Services

No Impact. Seismic upgrading activities would not result in a change in function or use of the proposed Project sites or increase ridership, and would not require additional fire and police protection, schools, parks, or other public facilities. Therefore, there would be no impact on public services.

RECREATION

ENVIRONMENTAL ISSUES	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
15. Recreation				
Would the project:				
a) Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	☐	☐	☐	☒
b) Include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment?	☐	☐	☐	☒

ENVIRONMENTAL SETTING

The proposed Project segments are located in urban areas already served by existing parks and urban open space areas. Although the proposed Project segments are near several recreational and open space areas, none of them encroaches or traverses such areas.

DISCUSSION

a), b) Physical Deterioration of Recreational Facilities

No Impact. The proposed Project does not include a residential component, would not directly or indirectly contribute to population increases, and would not contribute to increases in demand for or use of recreational facilities. Thus, the proposed Project would not affect the use of existing recreational facilities nor require the construction or expansion of recreation facilities. The proposed Project would have no impact.

TRANSPORTATION/TRAFFIC

ENVIRONMENTAL ISSUES	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
16. Transportation/Traffic				
Would the project:				
a) Conflict with an applicable plan, ordinance, or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?	☐	☐	☒	☐
b) Conflict with an applicable congestion management program, including but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?	☐	☐	☒	☐
c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?	☐	☐	☐	☒
d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☐	☐	☐	☒
e) Result in inadequate emergency access?	☐	☐	☒	☐
f) Conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks)?	☐	☐	☒	☐

ENVIRONMENTAL SETTING

The following analysis is based on a transportation and traffic study prepared for BART for the proposed Project (BART 2011). The complete traffic study is attached in Appendix D. The study evaluated potential impacts on traffic; parking; pedestrian, bus, and bicycle facilities; and access to aerial structures along portions of the Fremont Line within the proposed Project area, including E. 12th Street between 19th Avenue and Fruitvale Avenue; E. 12th Street and San Leandro Street between Fruitvale Avenue and 47th Avenue; and along San Leandro Street between 47th Avenue to slightly south of 69th Avenue. The roadway segments of Ashland Avenue between Lewelling Boulevard and E. 14th Street and three BART stations—Fruitvale, Coliseum, and Bay Fair—were also analyzed.

Twenty-three intersections and 11 roadway segments were analyzed for weekday a.m. and p.m. peak periods. Operation of these intersections and roadway crossings was evaluated for existing conditions and proposed Project conditions scenarios. Existing conditions are based on existing traffic counts, while proposed Project conditions are based on existing conditions plus circulation and parking changes associated with the proposed Project.

Public transit service in the area is provided by BART, AirBART shuttle, and AC Transit. There are three BART lines (Fremont–Richmond, Fremont–Daly City, Dublin–Pleasanton/Daly City–Millbrae/San Francisco International Airport) in the study area serving the Coliseum and Fruitvale stations. AC Transit has jurisdiction over public bus transit in Alameda County. Transit currently operates six local bus routes within the vicinity of the proposed Project. In addition, Amtrak (Capitol Corridor) provides service to Oakland with stations near the Coliseum Station and in Jack London Square.

The 2010 Oakland Bikeways Map details bicycle facilities along Fruitvale Avenue (Class II[4]) and 69th Avenue (Class III) within the proposed Project area. The 2009 Alameda County Bikeways Network Map indicates bicycle facilities near the proposed Project. Class I facilities are proposed along San Leandro Boulevard from Washington Avenue to Fruitvale Avenue. Class II facilities are also proposed along San Leandro Boulevard from Fruitvale Avenue to 19th Avenue. These facilities are ranked as "high priority." Other proposed facilities include Class II facilities along 54th Avenue, 12th Avenue, and Fruitvale Avenue. The proposed Project conditions analysis is based on a horizon year that is commensurate with an anticipated construction schedule of 4 years. The construction activities will be phased to minimize traffic disruptions and detours and to maintain safe traffic, bus transit, bicycle, and pedestrian operations. The phases/stages are subject to changes but represent the worst-case scenario. The analysis evaluated the temporary impacts associated with proposed Project construction. There would be no transportation or traffic-related impacts resulting from proposed Project operation.

Traffic conditions for the study intersections were evaluated using the designated methodologies provided in the 2000 Highway Capacity Manual (HCM). The intersection level of service (LOS) software analysis programs were analyzed using TRAFFIX or SYNCHRO. For reference purposes, LOS, as defined in the HCM, is a quality measure describing operating conditions within a traffic stream, generally in terms of service measures such as speed and travel time, freedom to maneuver, traffic interruptions, and comfort and convenience. The LOS evaluation indicates the degree of congestion that occurs during peak travel periods and is the principal measure of roadway and intersection performance. LOS can range from "A," representing free-flow conditions, to "F," representing extremely long delays. LOS B and C signify stable conditions with acceptable delays. LOS D is typically considered acceptable for a peak hour in urban areas. LOS E is approaching capacity and LOS F represents conditions at or above capacity.

The Metropolitan Transportation Commission (MTC) is the regional organization responsible for prioritizing transportation projects in a Regional Transportation Improvement Program for federal and state funding. The process is based on evaluating each project for need, feasibility, and adherence to

[4] Class I facilities (bike paths) are completely separated, with paved right-of-way (shared with pedestrians) that excludes general motor vehicle traffic. Class II facilities (bike lanes) consist of a striped lane for one-way bike travel on a roadway. Class III facilities (bike paths) are typically a street with low traffic volume and speed, with measures for preferential bike treatment.

TEA-21 (i.e., Transportation Equity Act for the 21st Century) policies and the local Congestion Management Program. Each local jurisdiction is required to analyze the impacts of land use decisions on regional transportation systems (including an estimate of the costs associated with mitigation) and, if highway and roadway level of service standards will not be maintained, to adopt and implement plans for improving performance.

The Metropolitan Transportation System (MTS) is the focus of MTC's regional transportation planning, system operations, and investment decisions. The MTS is the multi-modal transportation system of regional importance—those facilities that are crucial to the freight and passenger mobility needs of the nine-county San Francisco Bay Area. The MTS in the study area includes the following facilities:

- Roadways (street, high occupancy vehicle [HOV], highways, freeways, and expressways)
- Bus transit service
- Airports (military/federal, general aviation, and air carrier)
- Ports and ferries
- BART

The cities of San Leandro and Oakland have the responsibility of constructing and maintaining city streets within their respective city limits. Alameda County has the responsibility for unincorporated areas within the study area.

Based on the local, regional, or state agency LOS standards, an acceptable operating LOS is defined as LOS D or better at all signalized and unsignalized intersections during peak hours. The proposed Project would potentially impact vehicle traffic, including truck traffic, transit service, and bicycle and pedestrian travel during the construction period if it creates hazards for any of those travel modes, causes considerable delays, degrades existing LOS to worse than D, or eliminates access to adjoining areas.

The proposed Project would affect roadway crossings if it reduces the capacity and results in an operating deficiency. The proposed Project would affect bicyclists if it creates hazardous conditions for bicyclists or eliminates bicycle access to adjoining areas. The proposed Project would affect pedestrians if it results in overcrowding on public sidewalks, creates hazardous conditions for pedestrians, or eliminates pedestrian access to adjoining areas. The proposed Project would affect transit if it increases transit demand to the point where it could not be accommodated by existing or planned transit capacity.

Existing Intersection Operating Conditions

Vehicle turning movement counts were conducted in May 2011 during a typical weekday a.m. and p.m. peak hour at all study intersections. Table TRAN-1 lists all study intersections and their corresponding existing LOS.

Table TRAN-1:
Fremont Line – Existing Conditions Intersection LOS Summary

Intersection #	Intersection Name	Control[1]	a.m. Peak		p.m. Peak	
			Delay[2] (sec)	LOS[3]	Delay[2] (sec)	LOS[3]
28	San Leandro St. & 75th Ave.	Signal	9.3	A	10.3	B
29	San Leandro St. & 69th Ave.	Signal	9.8	A	10.1	B
30	San Leandro St. & 66th Ave.	Signal	12.7	B	17.7	B
31	San Leandro St. & Seminary Ave	Signal	13.0	B	11.5	B
32	San Leandro St. & 54th Ave	TWSC	25.5	D	27.1	D
33	San Leandro St. & 50th Ave	Signal	10.7	B	11.3	B
34	San Leandro St. & 47th Ave	TWSC	18.6	C	21.8	C
35	E. 12th St & Fruitvale Ave	Signal	29.4	C	41.2	D
36	E. 12th St & 31st Ave	Unsig.	10.4	B	9.4	A
37	E. 12th St & Derby Ave (West)	TWSC	13.8	B	11.3	B
37-1	E. 12th St & Derby Ave (East)	TWSC	16.8	C	11.7	B
38	E. 12th St & 30th Ave (West)	TWSC	10.7	B	11.1	B
38-1	E. 12th St & 30th Ave (East)	TWSC	15.9	C	12.3	B
39	E. 12th St & 29th Ave	Signal	15.9	B	19.6	B
40	E. 12th St & 26th Ave (West)	TWSC	10.6	B	11.3	B
40-1	E. 12th St & 26th Ave (East)	TWSC	16.5	C	13.4	B
41	E. 12th St & 25th Ave	TWSC	**48.1**	**E**	21.9	C
42	E. 12th St & Miller Ave	TWSC	14.8	B	20.4	C
43	E. 12th St & 23rd Ave	Signal	26.9	C	27.4	C
44	E. 12th St & 22nd Ave	Signal	46.6	D	29.8	C
45	E. 12th St & 21st Ave	TWSC	**41.1**	**E**	24.5	C
46	E. 12th St & 20th Ave (West)	TWSC	10.9	B	12.3	B
46-1	E. 12th St & 20th Ave (East)	TWSC	17.8	C	13.7	B
47	E. 12th St & 19th Ave	TWSC	22.7	C	21.1	C

Notes: Shading and bold correspond to an intersection operating below an acceptable LOS.

[1] Control: Signal - signalized intersection; TWSC - two-way stop controlled intersection, AWSC - all-way stop controlled intersection.

[2] Delay: delay in seconds per vehicle. For signalized intersections, delay is based on the average stopped delay per vehicle. Delays greater than 80 seconds are beyond the calibrated upper limits of LOS delay estimation equations under the HCM 2000 Signalized Intersection Methodologies. Delays greater than 60 seconds are beyond the calibrated upper limits of LOS delay estimation equations under the HCM 1994 Signalized Intersection Methodologies. For unsignalized intersections, delay is based on the worst approach delay per vehicle. Delays greater than 50 seconds are beyond the upper limits of LOS delay estimation equations under the HCM 2000 Unsignalized Intersection Methodologies. Delays greater than 45 seconds are beyond the upper limits of LOS delay estimation equations under the HCM 1994 Unsignalized Intersection Methodologies.

[3] LOS: Level of Service

Source: BART 2011

Based on the intersection LOS standards, all study intersections currently operate at acceptable LOS for the existing conditions with the exceptions of:

- E. 12th Street & 25th Avenue (intersection # 41)
- E. 12th Street & 21st Avenue (intersection # 45)

These two intersections currently operate at LOS E during the a.m. peak hour.

Existing Roadway Conditions

At several locations, proposed seismic retrofit construction activities would be adjacent to mid-block segments of streets along the Fremont Line. To collect data for intersection analysis, 24-hour roadway tube counts were conducted in May 2011 during a typical weekday. Existing traffic conditions at selected roadway segments have been evaluated for a.m. and p.m. peak hours using the operational analysis procedures from the Transportation Research Board's 2000 HCM. The traffic study estimated mid-block lane capacities and LOS thresholds based on a volume-to-capacity ratio calculation (Appendix D). For all roadway segments, a capacity of 1,750 vehicles per lane per hour was used, as described by Urban Street Type II Facility in the 2000 HCM. Table TRAN-2 provides a summary of the existing operational conditions of the roadway segments, including volume-to-capacity ratios during the a.m. and p.m. peak hours. Based on the roadway volume-to-capacity analysis results, all analyzed roadway segments in the study area currently operate well below capacity.

Transportation and Traffic Conditions Throughout Proposed Project Implementation

Traffic conditions plus proposed Project condition traffic levels (during construction activities) were estimated for the proposed Project. Construction-related activities associated with the proposed Project would potentially result in temporary changes to traffic patterns or capacity. For the proposed Project conditions analysis, the lowest LOS for each intersection or roadway segment was used to provide a worst-case scenario.

Intersection operation and LOS assume the worst-case scenario (lane closures, rerouting, etc.) at each location compared to the existing condition. Where rerouting of traffic was assumed, traffic was assigned to the roadway network based on the likely travel patterns. The proportion of these trips that would travel through other study intersections was used for the intersection LOS analysis under the proposed Project condition.

Table TRAN-2: Fremont Line – Existing Conditions Roadway Crossing LOS Summary							
City	#	Roadway Crossing	Peak Period	Peak Hour	Highest Peak Hour Volume	Existing	
						# of Lanes	V/C
San Leandro	12	Ashland Ave (EB)	a.m.	7:30-8:30	468	1	0.27
			p.m.	3:00-4:00	457		0.26
			a.m.	7:30-8:30	554	1	0.32
			p.m.	5:00-6:00	370		0.21
Oakland	13	45th Avenue (EB)	a.m.	11:30-12:30	29	1	0.02
			PM	4:00-5:00	41		0.02
		45th Avenue (WB)	a.m.	11:30-12:30	57	1	0.03
			p.m.	3:30-4:30	70		0.04
Oakland	14	44th Avenue (EB)	a.m.	7:30-8:30	468	1	0.27
			p.m.	3:00-4:00	457		0.26
		44th Avenue (WB)	a.m.	7:30-8:30	554	1	0.32
			p.m.	5:00-6:00	370		0.21
Oakland	15	High Street (EB)	a.m.	11:45-12:45	526	2	0.15
			p.m.	4:15-5:15	637		0.18
		High Street (WB)	a.m.	7:45-8:45	683	2	0.20
			p.m.	1:00-2:00	534		0.15
Oakland	16	42nd Avenue (EB)	a.m.	7:45-8:45	366	2	0.10
			p.m.	4:45-5:45	763		0.22
		42nd Avenue (WB)	a.m.	6:45-7:45	708	2	0.20
			p.m.	5:00-6:00	672		0.19
Oakland	17	41st Avenue (EB)	a.m.	7:00-8:00	2	1	0.00
			p.m.	3:45-4:45	4		0.00
		41st Avenue (WB)	a.m.	7:30-8:30	3	1	0.00
			p.m.	2:00-3:00	3		0.00
Oakland	18	40th Avenue (EB)	a.m.	11:45-12:45	64	1	0.04
			p.m.	4:15-5:15	80		0.05
		40th Avenue (WB)	a.m.	11:45-12:45	29	1	0.02
			p.m.	2:00-3:00	43		0.02
Oakland	19	39th Avenue (EB)	a.m.	11:30-12:30	47	1	0.03
			p.m.	3:30-4:30	80		0.05
		39th Avenue (WB)	a.m.	7:45-8:45	104	1	0.06
			p.m.	3:00-4:00	63		0.04

Table TRAN-2:
Fremont Line – Existing Conditions Roadway Crossing LOS Summary

City	#	Roadway Crossing	Peak Period	Peak Hour	Highest Peak Hour Volume	Existing	
						# of Lanes	V/C
Oakland	20	38th Avenue (EB)	a.m.	8:00-9:00	5	1	0.00
			p.m.	1:00-2:00	4		0.00
		38th Avenue (WB)	a.m.	8:00-9:00	3	1	0.00
			p.m.	5:15-6:15	4		0.00
Oakland	21	37th Avenue (EB)	a.m.	8:00-9:00	197	1	0.11
			p.m.	5:00-6:00	231		0.13
		37th Avenue (WB)	a.m.	8:00-9:00	167	1	0.10
			p.m.	5:15-6:15	130		0.07
Oakland	22	35th Avenue (EB)	a.m.	8:00-9:00	260	1	0.15
			p.m.	4:30-5:30	263		0.15
		35th Avenue (WB)	a.m.	7:45-8:45	237	1	0.14
			p.m.	4:15-5:15	322		0.18

EB = east bound.
WB = west bound.
V/C = volume to capacity ratio.

Source: BART 2011

Based on the traffic analysis (Appendix D, Tables 6 and 7), intersection LOS during a.m. and p.m. peak hours do not vary from those presented in Table TRAN-1, with the following exceptions:

A.M. Peak LOS Change:

- #28 San Leandro Street & 75th Avenue – LOS A to B
- #29 San Leandro Street & 69th Avenue – LOS A to B
- #37 E. 12th Street & Derby Avenue (West) – LOS B to C
- #42 E. 12th Street & Miller Avenue – LOS B to C
- #43 E. 12th Street & 23rd Avenue – LOS C to D
- #46-1 E. 12th Street & 20th Avenue (East) – LOS C to D

P.M. Peak LOS Change:

- #30 San Leandro Street & 66th Avenue – LOS B to D
- #40 E. 12th Street & 26th Avenue (West) – LOS B to C
- #40-1 E. 12th Street & 26th Avenue (East) – LOS B to C
- #46-1 E. 12th Street & 20th Avenue (East) – LOS B to C

DISCUSSION

a) Conflict with Plans, Ordinances, or Policies Related to Circulation Systems

Less-than-Significant Impact. The proposed Project would not reduce LOS at any of the study intersections beyond levels that would be considered unacceptable (e.g., degrade existing LOS to worse than D). Intersections 41 and 45, which operate at unacceptable LOS E under existing a.m. peak conditions, would continue to operate at LOS E during proposed Project construction activities. Accordingly, the proposed Project's impact would be less than significant.

In addition, it should be noted that the LOS standards are designed to determine the significance of permanent increases in traffic congestion. The proposed Project would only contribute to short-term traffic increases at the study intersections for the duration of retrofit activities at a given location. There are no separate standards for construction traffic. However, because the proposed Project's contribution to traffic would not result in unacceptable LOS even if it were permanent, the temporary nature of the impact further supports the conclusion that the impact is less than significant.

b) Conflict with Congestion Management Program

Less-than-Significant Impact. Please refer to the analysis in the *Environmental Setting* section and item a) for a description of proposed Project conditions. Potential construction impacts would be temporary and would not significantly affect regional roadways or highways during the 4-year phased construction period. Because construction and operation of the proposed Project would not reduce LOS at any intersection below LOS D and would not worsen LOS at intersections currently operating below acceptable LOS, the proposed Project would not conflict with any congestion management plans. Therefore, impacts would be less than significant.

c) Change in Air Traffic Patterns

No Impact. The nearest airport is Oakland International, more than 2 miles to the west. Implementation of the proposed Project would not change air traffic patterns; therefore, there would be no impact on air traffic patterns.

d) Increase Hazards due to Design Feature Hazards

No Impact. The proposed Project would not include the modification of existing roadways or construction of new roadways. All existing roadways would remain intact and no hazards due to a design feature or incompatible uses would result from the proposed Project. Therefore, there would be no impact.

e) Inadequate Emergency Access

Less-than-Significant Impact. Proposed Project construction activities would require temporary street closures. Detours would be provided to allow traffic to flow around the Project area. Street closures and detours would be temporary. Such temporary changes in traffic patterns in the vicinity of the proposed Project segments would not restrict emergency access adjacent to or within the general vicinity of the proposed Project sites.

Access to some of the escalators, stairs, pedestrian crossings, and bus stops may also be temporarily impacted at the three BART stations. However, appropriate signage and rerouting would be provided so that access to all stations and emergency access would be maintained. Potential temporary impacts on pedestrian facilities (e.g., sidewalks) are described further under item f). All impacts would be temporary during the duration of construction. Alternative parking locations, duration of construction, and signs notifying patrons of parking issues would be identified as part of the construction Staging and Traffic Maintenance Plan and would reduce this impact to a less-than-significant level.

f) Conflict with Alternative Transportation Policies, Plans, and Programs

Less-than-Significant Impact. The proposed Project would retrofit portions of the BART Fremont Line to an Operability Level, improving the transit system's performance in the event of a major earthquake. This is a beneficial effect.

Temporary impacts along major bus transit routes would occur. Proposed Project implementation would involve the use of signage for patrons to identify temporary transit stop relocations and/or schedule or route changes. Construction schedules and bus stop modifications would be coordinated with AC Transit. Based on the traffic analysis, delays to transit service, if any, would be minimal. With the incorporation of signage to identify any transit stop relocations and/or schedule or route changes, temporary construction-related impacts on bus transit would be reduced to a less-than-significant level.

The Class II bike lanes along Fruitvale Avenue would be temporarily removed, and detours would be set up via signage. Pedestrian facilities would be temporarily detoured during construction in the proximity of BART aerial columns. Thirty-three pedestrian facilities (sidewalks and crosswalks) would be potentially impacted by the temporary, staggered construction-related activity associated with

proposed Project implementation. Proposed Project implementation would involve the use of signage to identify detour paths and locations of safe, alternate crossings. Safe and continuous pedestrian paths would be maintained in the construction areas, reducing the proposed Project's impact to a level of less than significant.

REFERENCES

Bay Area Rapid Transit District (BART). 2011. Draft Traffic Technical Study, Seismic Operability Retrofit of BART Aerial Structures along the Fremont (A-Line) Line North Supplement. Prepared by DKS Associates.

UTILITIES AND SERVICE SYSTEMS

ENVIRONMENTAL ISSUES	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
17. Utilities and Service Systems				
Would the project:				
a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	☐	☐	☐	☒
b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☐	☒
c) Require or result in the construction of new stormwater drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☐	☒
d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?	☐	☐	☐	☒
e) Result in a determination by the wastewater treatment provider that serves or may serve the project that it has adequate capacity to serve the project's projected demand, in addition to the provider's existing commitments?	☐	☐	☐	☒
f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?	☐	☐	☒	☐
g) Comply with federal, state, and local statutes and regulations related to solid waste?	☐	☐	☐	☒

ENVIRONMENTAL SETTING

The BART system uses the various public service and utility systems in their service area. These services include water, wastewater, storm drainage systems, electrical services, and landfills.

DISCUSSION

a) Exceed Wastewater Treatment Requirements

No Impact. Implementation of the proposed Project would not result in a new source of wastewater or exceed treatment requirements; therefore, the proposed Project would not exceed wastewater requirements of the RWQCB and there would be no impact.

b) New/Expanded Water or Wastewater Treatment Facilities

No Impact. The proposed Project would require the use of watering trucks on site during the proposed Project construction period to control fugitive dust produced during construction activities. The amount of water needed for construction activities would be small, as would the corresponding amount of wastewater. The proposed Project would not alter the amount of water currently used or wastewater generated by existing operations. Because any increase in water used or wastewater generated by the proposed Project would be minor and temporary, the proposed Project would have no impact related to water and wastewater treatment facilities.

c) New/Expanded Stormwater Drainage Facilities

No Impact. Proposed Project construction and operation would not result in an increase in overall stormwater production. There would be no increase in impervious surfaces following construction, and therefore, no additional flow to stormwater drains. Therefore, new stormwater drainage facilities or the expansion of existing facilities would not be required, and there would be no impact.

d) Sufficient Water Supply

No Impact. Proposed Project implementation would not alter the functions and operations that occur daily at the proposed Project segments. Therefore, current water requirements would remain unchanged following proposed Project implementation, and there would be no impact.

e) Wastewater Treatment Capacity

No Impact. Implementation of the proposed Project would not significantly increase the generation of wastewater from the proposed Project site, so there would be no increase in demand on wastewater treatment facilities. Therefore, no impact would occur.

f) Landfill Capacity

Less-than-Significant Impact. Proposed Project construction activities would produce excavated soils, debris, and construction-related materials, generating small quantities of solid waste, which would be transported to local landfills.

Waste Management of Alameda County provides solid waste disposal service to the proposed Project area (City of Oakland 2011). Waste is collected and brought to the Davis Street Transfer Station in San Leandro, with the vast majority of the waste ultimately disposed at the Altamont Landfill in Livermore. The Altamont Landfill is a fully licensed and permitted facility and has a total estimated capacity of 62 million cubic yards of solid waste, of which 16.3 million cubic yards was filled as of August 2005

(CalRecycle 2012). The landfill has remaining capacity to last until the anticipated closure date of 2029. The Altamont Landfill is permitted to receive up to a maximum of approximately 11,150 tons of solid waste per day. The proposed Project's waste contribution levels would be relatively minor, and therefore, would result in a less-than-significant impact.

g) Federal, State, and Local Solid Waste Statutes and Regulations

No Impact. The proposed Project would generate small quantities of solid waste, and all solid waste would be disposed of off site in accordance with applicable federal, state, and local statutes and regulations. Therefore, the proposed Project would have no impact.

REFERENCES

CalRecycle. 2012. Facility/Site Summary Details: Altamont Landfill & Resource Recovery. Available: http://www.calrecycle.ca.gov/SWFacilities/Directory/01-AA-0009/Detail/. Accessed January 28, 2012.

City of Oakland. 2011. *Initial Study: Foothill Square Shopping Center Renovation/Redevelopment*. Prepared by Lamphier-Gregory, Oakland, CA. Available: www2.oaklandnet.com/w/oak027424. Accessed October 4, 2011.

MANDATORY FINDINGS OF SIGNIFICANCE

ENVIRONMENTAL ISSUES	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
18. Mandatory Findings of Significance				
a) Does the project have the potential to substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of an endangered, rare, or threatened species, or eliminate important examples of the major periods of California history or prehistory?	☐	☐	☐	☒
b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects.)	☐	☐	☒	☐
c) Does the project have environmental effects that will cause substantial adverse effects on human beings, either directly or indirectly?	☐	☒	☐	☐

DISCUSSION

a) Potential to Degrade Quality of Environment

No Impact. The proposed Project segments are located in areas that are currently developed and surrounded by urban land uses. Based on the findings of this IS/MND, the proposed Project would not degrade the quality of the environment, reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, or reduce the number or restrict the range or a rare or endangered plant or animal. No important examples of California history or pre-history are known to exist in the proposed Project area.

b) Potential for Cumulatively Considerable Impacts

Less-than-Significant Impact. The proposed Project will have no permanent effects that could combine with the effects of other projects in the vicinity to cause significant cumulative impacts. Cumulative construction related impacts from projects occurring during the BART construction period will be less than significant due to BART coordinating construction schedules with the cities, the counties, and transportation agencies as appropriate. Retrofit construction would be staged in a way to avoid or minimize conflicts with the concurrent construction projects in the area.

c) Potential for Direct or Indirect Effects on Human Beings

Less than Significant with Mitigation Incorporated. The proposed Project has the potential to have adverse impacts on people in the proposed Project segment areas, particularly in the areas of aesthetics, air quality, hazardous materials, and noise. Mitigation measures have been incorporated into the proposed Project to reduce these impacts to less-than-significant levels.

LIST OF PREPARERS

BART

Janie Layton, Environmental, Administrator System Safety

Shirley Ng, Project Manager, Earthquake Safety Program

AECOM

Vick Germany, AICP, Senior Environmental Planner

Lauren Inglish, Technical Editor

Chris Mundhenk, Environmental Planner

David Reel, Principal

Jake Weirich, Environmental Analyst

APPENDIX A

Air Quality Modeling Results

9/19/2011 9:36:01 PM

Urbemis 2007 Version 9.2.4

Detail Report for Annual Construction Unmitigated Emissions (Tons/Year)

File Name:

Project Name: BART

Project Location: Bay Area Air District

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

9/19/2011 9:36:01 PM

CONSTRUCTION EMISSION ESTIMATES (Annual Tons Per Year, Unmitigated)

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10 Total	PM2.5 Dust	PM2.5 Exhaust	PM2.5 Total	CO2
2012	0.55	5.70	2.31	0.00	0.65	0.21	0.86	0.14	0.19	0.33	711.74
Fine Grading 01/01/2012-12/31/2014	0.55	5.70	2.31	0.00	0.65	0.21	0.86	0.14	0.19	0.33	711.74
Fine Grading Dust	0.00	0.00	0.00	0.00	0.65	0.00	0.65	0.14	0.00	0.14	0.00
Fine Grading Off Road Diesel	0.55	5.69	2.15	0.00	0.00	0.21	0.21	0.00	0.19	0.19	695.10
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.01	0.01	0.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	16.64
2013	0.51	5.28	2.24	0.00	0.65	0.20	0.85	0.14	0.18	0.32	711.75
Fine Grading 01/01/2012-12/31/2014	0.51	5.28	2.24	0.00	0.65	0.20	0.85	0.14	0.18	0.32	711.75
Fine Grading Dust	0.00	0.00	0.00	0.00	0.65	0.00	0.65	0.14	0.00	0.14	0.00
Fine Grading Off Road Diesel	0.51	5.28	2.09	0.00	0.00	0.20	0.20	0.00	0.18	0.18	695.10
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.00	0.01	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	16.65
2014	0.48	4.81	2.16	0.00	0.65	0.17	0.83	0.14	0.16	0.29	711.76
Fine Grading 01/01/2012-12/31/2014	0.48	4.81	2.16	0.00	0.65	0.17	0.83	0.14	0.16	0.29	711.76
Fine Grading Dust	0.00	0.00	0.00	0.00	0.65	0.00	0.65	0.14	0.00	0.14	0.00
Fine Grading Off Road Diesel	0.48	4.81	2.02	0.00	0.00	0.17	0.17	0.00	0.16	0.16	695.10
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.00	0.01	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	16.66

Phase Assumptions

Phase: Fine Grading 1/1/2012 - 12/31/2014 - Default Fine Site Grading Description

Total Acres Disturbed: 0

Maximum Daily Acreage Disturbed: 0.25

Fugitive Dust Level of Detail: Default

20 lbs per acre-day

On Road Truck Travel (VMT): 0

9/19/2011 9:36:01 PM

Off-Road Equipment:

1 Cranes (399 hp) operating at a 0.43 load factor for 8 hours per day

1 Excavators (168 hp) operating at a 0.57 load factor for 8 hours per day

1 Generator Sets (549 hp) operating at a 0.74 load factor for 8 hours per day

1 Graders (174 hp) operating at a 0.61 load factor for 6 hours per day

1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

9/19/2011 9:35:51 PM

Urbemis 2007 Version 9.2.4

Detail Report for Summer Construction Unmitigated Emissions (Pounds/Day)

File Name:

Project Name: BART

Project Location: Bay Area Air District

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

9/19/2011 9:35:51 PM

CONSTRUCTION EMISSION ESTIMATES (Summer Pounds Per Day, Unmitigated)

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10 Total	PM2.5 Dust	PM2.5 Exhaust	PM2.5 Total	CO2
Time Slice 1/2/2012-12/31/2012 Active Days: 261	**4.22**	**43.66**	**17.72**	**0.00**	**5.01**	**1.58**	**6.58**	**1.05**	**1.45**	**2.50**	5,453.96
Fine Grading 01/01/2012-12/31/2014	4.22	43.66	17.72	0.00	5.01	1.58	6.58	1.05	1.45	2.50	5,453.96
Fine Grading Dust	0.00	0.00	0.00	0.00	5.00	0.00	5.00	1.04	0.00	1.04	0.00
Fine Grading Off Road Diesel	4.18	43.60	16.49	0.00	0.00	1.57	1.57	0.00	1.45	1.45	5,326.41
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.04	0.07	1.23	0.00	0.01	0.00	0.01	0.00	0.00	0.00	127.54
Time Slice 1/1/2013-12/31/2013 Active Days: 261	3.93	40.49	17.15	**0.00**	**5.01**	1.50	6.50	**1.05**	1.38	2.42	5,454.03
Fine Grading 01/01/2012-12/31/2014	3.93	40.49	17.15	0.00	5.01	1.50	6.50	1.05	1.38	2.42	5,454.03
Fine Grading Dust	0.00	0.00	0.00	0.00	5.00	0.00	5.00	1.04	0.00	1.04	0.00
Fine Grading Off Road Diesel	3.90	40.43	16.01	0.00	0.00	1.49	1.49	0.00	1.38	1.38	5,326.41
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.04	0.06	1.14	0.00	0.01	0.00	0.01	0.00	0.00	0.00	127.62
Time Slice 1/1/2014-12/31/2014 Active Days: 261	3.68	36.89	16.56	**0.00**	**5.01**	1.32	6.32	**1.05**	1.21	2.26	**5,454.09**
Fine Grading 01/01/2012-12/31/2014	3.68	36.89	16.56	0.00	5.01	1.32	6.32	1.05	1.21	2.26	5,454.09
Fine Grading Dust	0.00	0.00	0.00	0.00	5.00	0.00	5.00	1.04	0.00	1.04	0.00
Fine Grading Off Road Diesel	3.64	36.83	15.51	0.00	0.00	1.31	1.31	0.00	1.21	1.21	5,326.41
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.03	0.06	1.05	0.00	0.01	0.00	0.01	0.00	0.00	0.00	127.68

Phase Assumptions

Phase: Fine Grading 1/1/2012 - 12/31/2014 - Default Fine Site Grading Description

Total Acres Disturbed: 0

Maximum Daily Acreage Disturbed: 0.25

Fugitive Dust Level of Detail: Default

20 lbs per acre-day

9/19/2011 9:35:51 PM

On Road Truck Travel (VMT): 0

Off-Road Equipment:

1 Cranes (399 hp) operating at a 0.43 load factor for 8 hours per day

1 Excavators (168 hp) operating at a 0.57 load factor for 8 hours per day

1 Generator Sets (549 hp) operating at a 0.74 load factor for 8 hours per day

1 Graders (174 hp) operating at a 0.61 load factor for 6 hours per day

1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

APPENDIX B

Cortese List Results in the Vicinity of the Project

Cortese List Sites Located Within ¼-Mile of Project Segments			
Site Name	**Address**	**Contaminants**	**Status**
Dutch Boy #3	4825 San Leandro Street, Oakland	Lead, arsenic	DTSC Cleanup - Certified
General Electric – Oakland	5441 E. 14th Street, Oakland	PCBs, TCE, vinyl chloride	DTSC Cleanup - Active
Port of Oakland – Embarcadero Cove	Dennison and Embarcadero Streets, Oakland	Benzene, dioxin, organochlorine pesticides, petroleum, etc	DTSC Cleanup - Certified
Union Pacific Oakland Coliseum Site	700 73rd Avenue, Oakland	Metals, petroleum, PCBs, VOCs	DTSC Cleanup - Active
Port of Oakland	1755 Embarcadero, Oakland	Waste oil	Completed – Closed
William Wurzbach Company	1200 20th, Oakland	Gasoline	Completed – Closed
Exxon #7-7516 / Continental Auto Sales	2200 International, Oakland	Gasoline	Completed – Closed
Exxon #7-0238	2200 East 12th Street, Oakland	Benzene, fuel oxygenates, gasoline	Completed – Closed
Contractor's Equipment Rental	2250 12th, Oakland	Gasoline	Completed – Closed
Children's Hospital	1050 22nd, Oakland	Gasoline	Completed – Closed
West Coast Vending	2124 Livingston Street, Oakland	Gasoline	Open
Kilpatrick's Bakery	2100 Livingston, Oakland	Gasoline	Completed – Closed
Southern Pacific Transportation Company	12th Street and 22nd, Oakland	Heating oil, fuel oil	Completed – Closed
Taxi Taxi Inc.	2345 International, Oakland	Gasoline	Completed – Closed
23rd Avenue Partners	1125 Miller, Oakland	Diesel	Open
Delaware Development Corporation	2530 International, Oakland	Gasoline	Completed – Closed
Tri City Cleaners	2560 International, Oakland	Solvent, mineral spirits, distillates	Completed – Closed
St. Joseph's Professional Center	2647 International, Oakland	Diesel	Completed – Closed
PG&E – Former Oakland Station H	1134 Miller Avenue, Oakland	Arsenic, lead, cadmium	Voluntary Cleanup - Certified
Eandi Metal Works	2440 11th, Oakland	Gasoline	Open
Earthgrains Baking Company	955 Kennedy Street, Oakland	Diesel	Open
Kilpatrick's Garage	955 Kennedy, Oakland	Diesel	Completed – Closed

Cortese List Sites Located Within ¼-Mile of Project Segments			
Site Name	**Address**	**Contaminants**	**Status**
Goodwill Industries	1301 30th, Oakland	Waste oil	Completed – Closed
Melrose Ford	3050 International, Oakland	Gasoline	Completed – Closed
Highland General Hospital	1411 31st, Oakland	Diesel	Completed – Closed
Arco #0402 Parking Lot	1450 Fruitvale, Oakland	Gasoline	Open
Oil Changer #616	3132 12th, Oakland	Gasoline	Completed – Closed
State Shingle	880 Fruitvale, Oakland	Gasoline	Completed – Closed
Del Monte Plant #37	3100 9th, Oakland	Heating oil, fuel oil	Completed – Closed
Fruitvale Transit Village	3501-3601 East 12th Street, Oakland	Chromium, gasoline, waste oil	RWQCB - Open
Tony's Express Auto Service	3609 International, Oakland	Gasoline	Completed – Closed
Shell #13-5682	3750 International, Oakland	Gasoline	Completed – Closed
Chevron #9-4612	3616 San Leandro Street, Oakland	Gasoline, waste oil	Open
On Time Towing	3800 Wattling, Oakland	Gasoline	Completed – Closed
Guy's Service Station	3820 San Leandro Street, Oakland	Gasoline	Open
New Genico	3927 International, Oakland	Gasoline	Completed – Closed
Motor Partners	1234 40th, Oakland	Gasoline	Completed – Closed
Dorothy Day Trust	4028 International Boulevard, Oakland	Gasoline	Open
Continental Volvo	4030 International, Oakland	Gasoline	Completed – Closed
Motor Partners	1236-1238 41st, Oakland	Gasoline	Completed – Closed
Pressure Cast Products	4210 12th, Oakland	Waste oil	Completed – Closed
Unocal #2656	4251 International, Oakland	Waste oil	Completed – Closed
Super Tire	4256 International, Oakland	Gasoline, PCE, waste oil	Completed – Closed
Residential	1421 45th, Oakland	Gasoline	Completed – Closed
Eagle Gas	4301 San Leandro Street, Oakland	Gasoline	Open
Southern Pacific Transportation Company	744 High Street, Oakland	Lead, PCBs, solvent, mineral spirits, distillates, waste oil	Open
Roy Hatton Project	752 High Street, Oakland	Waste oil	Completed – Closed
Exxon #7-3006	720 High Street, Oakland	Gasoline	Open
Peterson Property	1066 47th, Oakland	Diesel	Completed – Closed
Chevron Asphalt Plant (Former)	4525 San Leandro Street, Oakland	Petroleum, fuels, oils, VOCs	Completed – Closed Land Use Restrictions
Union Pacific Railroad Company	833 47th Avenue, Oakland	Benzene, DDD/DDE/DDT, diesel, gasoline, etc	RWQCB – Open

Cortese List Sites Located Within ¼-Mile of Project Segments			
Site Name	**Address**	**Contaminants**	**Status**
Pacific Galvanizing	715 46th Avenue, Oakland	Lead, zinc	Voluntary Cleanup - Active
Cohn Warehouse	1212 47th, Oakland	Gasoline	Completed – Closed
Norcal	1234 47th, Oakland	Waste oil	Open
AAA Equipment Company	745 50th, Oakland	Acetone, gasoline, lead	RWQCB – Open
Mepaco	1226 49th Avenue, Oakland	Gasoline	Completed – Closed
Western Stucco	5115 8th Street, Oakland	Gasoline	Open
Foreman Property	5105 8th, Oakland	Lead	Open
A-Paratransit	829 54th Avenue, Oakland	Gasoline	Open
Coliseum Way Properties	5200 Coliseum, Oakland	Acetone, solvents	Open
Volvo GMC	5050 Coliseum Way, Oakland	Gasoline	Completed – Closed
Volvo GM Heavy Truck	750 50th Avenue, Oakland	Arsenic, chromium, copper, lead, mercury, nickel	Open
PG&E GC Gas Service	4930 Coliseum Way, Oakland	Diesel	Open
L&M Plating	920-930 54th Avenue, Oakland	Lead, chromium, cyanide, nickel	DTSC Cleanup – Certified
General Electric – Oakland	5441 East 14th Street, Oakland	PCBs, TCE, vinyl chloride	DTSC Cleanup – Active
Armor Equipment Sales	1137 57th, Oakland	Gasoline	Completed – Closed
Pamco Property	5601 San Leandro Street, Oakland	Gasoline	Completed – Closed
Rock Transport Inc.	5900 Coliseum, Oakland	Gasoline	Completed – Closed
Pacific Bell	1189 58th, Oakland	Gasoline	Completed – Closed
SBC	1189 58th, Oakland	Gasoline	Completed – Closed
Hertz-Penske	725 Julie Ann Way, Oakland	Diesel, gasoline	Open
McCosker Equipment	740 Julie Ann, Oakland	Gasoline	Completed – Closed
Ronald Day Trans Inc.	733 Kevin, Oakland	Diesel	Completed – Closed
Economy Lumber	6233 San Leandro Street, Oakland	Gasoline	Open
AC Transit	1100 Seminary Avenue, Oakland	Benzene, diesel, gasoline	Open
Western Union	732 Kevin, Oakland	Gasoline	Completed – Closed
Mauck Sheet Metal	755 Independent, Oakland	Gasoline	Completed – Closed
SPK Industrial Property	700 Independent, Oakland	Gasoline	Completed – Closed
Seven-Up Bottling Company	6505 San Leandro Street, Oakland	Diesel	Completed – Closed
Unocal #3135	845 66th Avenue, Oakland	Gasoline	Open

Cortese List Sites Located Within ¼-Mile of Project Segments			
Site Name	**Address**	**Contaminants**	**Status**
Pacific Electric Motor	1009 66th, Oakland	Gasoline	Open
Cruise America Inc. / McGuire Hester	796 66th, Oakland	Gasoline	Completed – Closed
Allied Crane Maintenance	727 66th Avenue, Oakland	Gasoline	Open
Coliseum Gardens	801 69th Avenue, Oakland	Lead, petroleum, PCBs	Voluntary Cleanup – Certified
Ace Recycling	830-844 69th Avenue, Oakland	None specified	Completed – Closed
Silva Association Roofing	814 69th, Oakland	Gasoline	Completed – Closed
S.A. Russo Window Frames	6925 San Leandro Street, Oakland	Petroleum, fuels, oils, diesel	Completed – Closed
World Auto Repair	15225 Hesperian Boulevard, San Leandro	Gasoline	Open – Inactive
Bayfair Mall	248 Bayfair Drive, San Leandro	Diesel	Completed – Closed

Sources:

California Department of Toxic Substances Control. 2007. Hazardous Waste and Substances Site List. Available: http://www.envirostor.dtsc.ca.gov/public/search.asp?cmd=search&reporttype=CORTESE&site_type=CSITES%2COPEN%2CFUDS%2CCLOSE&status=ACT%2CBKLG%2CCOM&reporttitle=HAZARDOUS%20WASTE%20AND%20SUBSTANCES%20SITE%20LIST. Accessed November 22, 2011.

California State Water Resources Control Board. 2011. Alameda County. Available: https://geotracker.waterboards.ca.gov/search.asp?cmd=search&hidept=True&status=&reporttitle=Alameda+County&county=Alameda. Accessed November 22, 2011.

APPENDIX C

Noise Modeling Results

Appendix

Project-Generated Construction Source Noise Prediction Model

BART IS/MND

Location	Distance to Nearest Receiver in feet	Combined Predicted Noise Level (L_{eq} dBA)
Threshold*	667	50.0
	30	84.0
	50	78.1
	70	74.3
	100	70.2
	150	65.6
	200	62.3
	250	59.7
	300	57.6
	350	55.9
	400	54.3
	450	53.0
	500	51.8

Assumptions:	Reference Emission Noise Levels (L_{eq}) at 50 feet[1]	Usage Factor[1]
Auger Drill Rig	77.0	0.2
Crane	73.0	0.16
Excavator	77.0	0.4
Generator	78.0	0.5

Ground Type	Soft
Source Height	8
Receiver Height	5
Ground Factor	0.63

Predicted Noise Level [2]	L_{eq} dBA at 50 feet[2]
Auger Drill Rig	70.0
Crane	65.1
Excavator	73.0
Generator	75.0

Combined Predicted Noise Level (L_{eq} dBA at 50 feet)
78.1

Sources:

[1] Obtained from the FHWA Roadway Construction Noise Model, January 2006.

[2] Based on the following from the Federal Transit Noise and Vibration Impact Assessment, 2006.

$L_{eq}(equip) = E.L.+10*\log(U.F.) - 20*\log(D/50) - 10*G*\log(D/50)$

Where: E.L. = Emission Level;

U.F.= Usage Factor;

G = Constant that accounts for topography and ground effects; and

D = Distance from source to receiver.

*Project specific threshold

Appendix

Project-Generated Construction Source Noise Prediction Model

BART IS/MND

Location	Distance to Nearest Receiver in feet	Combined Predicted Noise Level (L_{eq} dBA)
Threshold*	1,256	60.0
	30	100.8
	50	95.0
	70	91.2
	100	87.1
	150	82.4
	200	79.1
	250	76.6
	300	74.5
	350	72.7
	400	71.2
	450	69.9
	2600	49.8

Assumptions:	Reference Emission Noise Levels (L_{max}) at 50 feet[1]	Usage Factor[1]
Impact Pile Driver	95	0.2
Ground Type	Soft	
Source Height	8	
Receiver Height	5	
Ground Factor	0.63	

Predicted Noise Level [2]	L_{max} dBA at 50 feet[2]
Impact Pile Driver	95.0

Maximum Noise Level (L_{max} dBA at 50 feet)
95.0

Sources:

[1] Obtained from the FHWA Roadway Construction Noise Model, January 2006.

[2] Based on the following from the Federal Transit Noise and Vibration Impact Assessment, 2006.

$L_{eq}(equip) = E.L.+10*\log(U.F.) - 20*\log(D/50) - 10*G*\log(D/50)$

Where: E.L. = Emission Level;

U.F.= Usage Factor;

G = Constant that accounts for topography and ground effects; and

D = Distance from source to receiver.

*Project specific threshold

Appendix

Project-Generated Construction Source Noise Prediction Model

BART IS/MND

Location	Distance to Nearest Receiver in feet	Combined Predicted Noise Level (Lmax dBA)
Threshold*	126	75.0
	30	90.8
	50	85.0
	70	81.2
	100	77.1
	150	72.4
	200	69.1
	250	66.6
	300	64.5
	350	62.7
	400	61.2
	450	59.9
	500	58.7

Assumptions:	Reference Emission Noise Levels (L_{max}) at 50 feet[1]	Usage Factor[1]
Backhoe	80	0.4
Dump Truck	84	0.4
Excavator	85	0.4
Front End Loader	80	0.4

Ground Type	Soft
Source Height	8
Receiver Height	5
Ground Factor	0.63

Predicted Noise Level [2]	L_{max} dBA at 50 feet[2]
Backhoe	80.0
Dump Truck	84.0
Excavator	85.0
Front End Loader	80.0

Maximum Noise Level (L_{max} dBA at 50 feet)
85.0

Sources:

[1] Obtained from the FHWA Roadway Construction Noise Model, January 2006.

[2] Based on the following from the Federal Transit Noise and Vibration Impact Assessment, 2006.

$L_{eq}(equip) = E.L.+10*\log(U.F.) - 20*\log(D/50) - 10*G*\log(D/50)$

Where: E.L. = Emission Level;

U.F.= Usage Factor;

G = Constant that accounts for topography and ground effects; and

D = Distance from source to receiver.

*Project specific threshold

Appendix

Project-Generated Construction Source Vibration Prediction Model

BART IS/MND

Location	Distance to Nearest Receiver in feet	Predicted Vibration Level (PPV)	Predicted Vibration Level (VdB)
Distance to PPV Impact	50	0.031	77.9
Distance to Receptor	30	0.068	84.6
Distance to PPV Impact	160	0.040	80.0
Distance to Receptor	30	0.490	101.8
Distance to PPV Impact	65	0.041	80.1
Distance to Receptor	30	0.129	90.2

Equipment	Reference Distance	PPV at 25 feet (in/sec)[1]	Approximate Lv (VdB) at 25 feet[2]
Large Bulldozer	25	0.089	87
Pile Driver (Impact)	25	0.644	104
Pile Driver (sonic)	25	0.170	93

Sources:

[1] Where PPV is the peak particle velocity

[2] Where Lv is the RMS velocity expressed in vibration decibels (VdB), assuming a crest factor of 4.

Source: FTA 2006

APPENDIX D

Traffic Technical Study

Traffic Technical Study

DRAFT

Seismic Operability Retrofit of BART Aerial Structures along the Fremont (A-Line) Line North Supplement

August 2011

Prepared By: _____ Date: _____

Approved By: _____ Date: _____

TABLE OF CONTENTS

List of Tables

List of Figures

APPENDICES

Appendix A Fremont (A Line) Line North

1 EXECUTIVE SUMMARY

This report provides a re-evaluation of traffic and transportation issues related to the proposed Seismic Operability Retrofit of the BART Aerial Structures along the Fremont line that will be implemented as part of the BART Earthquake Safety Program. The proposed project's seismic upgrade is needed to minimize interruption of the BART system during a major earthquake and includes the BART operating facilities within the four-county area served by the system. This report revisits the Seismic Retrofit of BART Aerial Stations and Structures along the Fremont (A-Line) Line North, originally published on October 30, 2006.

That report examined the temporary construction-related impacts relating to a seismic upgrade to a "life safety" standard. The purpose of this report is to detail the temporary construction-related impacts with respect to an "operability" standard seismic upgrade and potential permanent impacts. For the purposes of this report, the temporary construction-related impacts would be present between six and nine months for each construction stage and two months per aerial pier. The scope of this study is restricted to aerial structures along the A Line North which includes E. 12th Street between 19th Avenue and Fruitvale Avenue, E. 12th St and San Leandro Street between Fruitvale Avenue and 47th Avenue, and along San Leandro Street between 47th Avenue to slightly south of 69th Avenue. Also analyzed are the roadway segment of Ashland Drive between Lewelling Boulevard and E. 14th Street and three BART stations: Fruitvale, Coliseum, and Bay Fair.

The transportation analysis presented in this Traffic Technical Study has been prepared to comply with California Environmental Quality Act (CEQA) documentation requirements to assess potential environmental impacts, and provides a general description of the transportation facilities in the project vicinity and summarizes existing, project and cumulative conditions within the study area. Particular attention is given to construction related impacts on vehicular, parking, transit, bicycle and pedestrian facilities along the proposed project. It follows review and incorporation, where appropriate, of data from local, regional and state agencies.

In addition, data provided in this report are based on a review of construction limit drawings, recent correspondence and conversations with staff from the Cities and Counties in the study area, BART staff, segment design team staff, and site visits conducted in May 2011. The construction stages and are presented in this report are conceptual and subject to change but represents the worst-case scenario.

The seismic retrofit project for the Fremont (A-Line) Line North would be conducted over five stages as detailed in Table ES 1. This report analyzes the traffic conditions during the weekday A.M. (7:00 a.m. – 9:00 a.m.) and P.M. (4:00 – 6:00 p.m.) Peak Hours for City study intersections. The potential transportation impacts of the proposed project have been estimated using the current level of service methodologies set forth by the designated agency.

Table ES 1 – Retrofit Construction Stages

Stage	Roadways		Columns	
1	▪ 18th Ave to 20th Ave ▪ 21st Ave to 22nd Ave ▪ 23rd Ave to 25th Ave	▪ 29th Ave to 30th Ave ▪ Near 33rd Ave	▪ P-2 to P-6, B-7 to B-8 ▪ P-18 to P-20 ▪ P-30 to P-39	P-65 to P-70 P-84
1 – Fruitvale Ave Detour	▪ Derby Ave to Fruitvale Ave		▪ P-74 to P-82	
2	▪ 19th Ave to 21st Ave ▪ 22nd Ave to 23rd Ave ▪ 25th Ave to 29th Ave	▪ 30th Ave to Derby Ave ▪ Near 33rd Ave	▪ B-7 to B-8, P-9 to P-12 ▪ P-21 to P-29 ▪ P-40 to P-64	▪ P-71 to P-73 ▪ P-85
2 – Fruitvale Ave Detour	▪ Fruitvale Ave		▪ P-83	
3	▪ 20th Ave to 22nd Ave	▪ Near 33rd Ave	▪ P-13 to P-17	▪ P-86 to P-88
4	▪ 36th Ave to 37th Ave ▪ 38th Ave to 40th Ave ▪ SH 77 to High Street	▪ 44th Ave to 45th Ave ▪ 47th Ave to 54th Ave ▪ 54th Ave to 66th Ave ▪ 69th Ave to south of 69th Ave	▪ P-103 to P-104 ▪ P-109 to P-116 ▪ P-124 to P-127	▪ P-132 to P-135 ▪ P-144 to P-167 ▪ P-170 to P-222 ▪ P-234 to P-239
4 – 54th Ave Detour	▪ 54th Ave		▪ P-168 to P-169	
5	▪ 36th Ave to 37th Ave ▪ 37th Ave to 38th Ave ▪ 40th Ave to 41st Ave	▪ High St to 44th Ave ▪ 45th Ave to 47th Ave ▪ 66th Ave to 69th Ave	▪ P-100 to P-102 ▪ P-105 to P-108 ▪ P-117 to P-120	▪ P-128 to P-131 ▪ P-136 to P-143 ▪ P-223 to P-233

Source: DKS Associates, 2011

The intersection level of service has been evaluated at 23 intersections which represent those intersections that are most likely to be impacted by the proposed project. In addition, 11 roadway segment crossings have been evaluated based on a volume-to-capacity ratio analysis to determine whether the proposed project would result in any capacity or operational impacts. The list of intersections and roadway crossings locations is outlined in the report. The operation of these intersections and roadway crossings have been evaluated for the following scenarios:

- **Existing Conditions** – based on existing traffic counts.
- **Project Conditions** – Existing Conditions plus circulation and parking changes associated with the proposed project. The Project Conditions analysis is based on a horizon year that is commensurate with an anticipated construction schedule.

This report also addresses vehicular, pedestrian and bicyclist safety within the study area. In addition, other roadway crossings and intersections near the proposed project have been qualitatively reviewed.

Project Findings

Construction operations on existing facilities will be staged to minimize traffic disruptions and detours, and to maintain safe traffic, bus transit, bicycle and pedestrian operations. All impacts will be temporary and last six (6) to nine (9) months per construction stage. Table ES 2 provides a summary of the impacted facilities along the Fremont (A Line) Line North during construction.

Intersections

23 intersections have been evaluated as part of this report. Based on the analysis results, no temporary construction-related impacts are anticipated for any of the intersections analyzed.

Roadway Crossings

11 roadway crossings have been evaluated for mid-block lane capacities and Level of Service (LOS) thresholds have been determined based on a volume-to-capacity ratio calculation. Based on the analysis results, no temporary construction-related impacts are anticipated for any of the roadway crossings analyzed.

Stations

Temporary construction-related impacts on operations at the stations would occur. To minimize impacts to public access and parking, signage will be provided for pedestrians of sidewalk closures and detours, bicycle rack removals, transit stop relocations at station bays, and parking removals near aerial columns at each station. Station impacts will not be significant with safe and continuous pedestrian, bicyclist, transit and motorist access maintained in the construction areas.

Bus Transit

Temporary construction-related impacts along major transit routes would occur. Recommendations for each location would include signage for transit riders to identify temporary transit stop relocation and/or change in schedule. Bus transit impacts will not be significant due to the projected minimal traffic delays and implementation of a construction traffic management plan.

Bicycle

Temporary construction-related impacts (such as restricted access, bike lane detour etc.) along the existing bicycle facilities would occur. Recommendations for each location include signage to identify temporary bike lane detours and alternate bike routes. Bicycle impacts will not be significant due to the identification and implementation of short detour bike routes in the construction traffic management plan.

Pedestrian

Temporary construction-related impacts along the existing pedestrian facilities would occur. Recommendations for each location include signage to indicate temporary pedestrian path detours, and locations of alternate safe crossings. Safe and continuous pedestrian paths would be maintained in the construction areas.

Although pedestrians will be temporarily detoured, the impacts would not be significant, due to the short pedestrian detours and the implementation of a construction traffic mitigation plan.

Parking

The number of on-street and off-street BART parking spaces will be reduced due to construction related activities. As a means to reduce the number of parking spaces impacted in adjacent areas, BART is phasing the project into stages. Alternate parking locations, duration of construction and signs notifying patrons of parking issues will be identified as part of the Construction Traffic Management Plan.

Table ES 2 provides a summary of the facilities temporary impacts to facilities anticipated for this project.

Table ES 2 - Facilities Impact Summary - Fremont Line

Facilities Type	Number of Facilities Impacted	Names of Facilities Impacted		
Intersections	0			
BART Station	3	▪ Fruitvale Station	▪ Oakland Coliseum Station	▪ Bay Fair Station
Bus Transit	1 Agency	▪ AC Transit		
Bicycle	2	▪ Fruitvale Ave	▪ Fruitvale Station	
Pedestrian	33	▪ E. 12th St & 19th Ave ▪ E. 12th St & 21st Ave ▪ E. 12th St & 22nd Ave ▪ E. 12th St & 23rd Ave ▪ E. 12th St & Miller Ave ▪ E. 12th St & 25th Ave ▪ E. 12th St & 26th Ave ▪ E. 12th St & 29th Ave ▪ E. 12th St & Derby Ave ▪ E. 12th St & Fruitvale Ave ▪ Along 33rd Ave	▪ Along 37th Ave south of E 12th St ▪ Guideway near 37th Ave and 38th Ave ▪ South of 37th Ave under Guideway ▪ South side of 37th Ave ▪ North side of 40th Ave ▪ Along 40th Ave south of E 12th St ▪ Along 41st Ave north of San Leandro St ▪ North side of High St ▪ South side of High St ▪ North side of 44th Ave ▪ South side of 44th Ave	▪ South side of 45th Ave ▪ North side of 47th Ave ▪ South side of 47th Ave ▪ San Leandro St and 50th Ave ▪ San Leandro St and 54th Ave ▪ San Leandro St and Seminary Ave ▪ San Leandro St and 66th Ave ▪ NB San Leandro St between 66th Ave and 69th Ave ▪ San Leandro St and 66th Ave ▪ NB San Leandro St south of 69th St

Source: DKS Associates, 2011

Cumulative Conditions Discussion

Construction-related activities associated with major transportation projects in the Bay Area occurring concurrently would potentially result in temporary changes to traffic patterns or capacity. Table ES 3 provides a summary of future projects that would potentially occur at the same time as the project.

Table ES 3 - Capital Improvement Project Summary

City	Agency	Capital Improvement Projects Listing	Construction Year	Project
San Leandro	City of San Leandro	ACTIA	Beginning Summer 2012	BART-Downtown Pedestrian Improvements
San Leandro	City of San Leandro	ACTIA	Summer 2011	Marina Boulevard Street Rehabilitation
San Leandro	City of San Leandro	ACTIA	2012	East 14th Street-Hesperian Boulevard-150th Street Improvements
San Leandro	City of San Leandro	ACTIA	Summer 2011	Street Reconstruction including Andover St, Begier Ave, Astor Dr, Pearson Ave, Valley St, Johnson St, and Maria Dr
San Leandro	City of San Leandro	ACTIA	Fall 2011	Street light Undergrounding – East 14th (150th to Southern City Limit)
San Leandro	City of San Leandro	ACTIA	Summer 2011	Preda Street Pipe Bridges Upgrade
San Leandro	City of San Leandro	ACTIA	Summer 2011	San Leandro Boulevard/Davis Sewer Capacity Improvements – Phase 1
San Leandro	City of San Leandro	ACTIA	October 2011	Par Course Improvements
Oakland	BART	BART	2011-2014	Oakland Airport Connector

Source: DKS Associates 2011
Notes: Capital Improvement Projects: Capital Improvement Project

Cumulative construction related impacts due to schedule overlaps would be avoided by coordinating construction schedules with the various cities, counties, and transportation agencies responsible for the projects listed. Retrofit construction would be staged in a manner that would avoid or minimze conflict with the concurrent construction projects in the area.

Conclusions

This report summarizes the potential transportation impacts associated with the BART aerial structure seismic retrofit project for the A Line North section of the Fremont Line. Several impacts have been identified, and avoidance and minimization measures have been developed to address intersection, roadway, transit, bicycle, pedestrian and parking elements. The construction traffic management plans for each site will include elements such as signage, use of cones, field personnel to direct traffic, and temporary detours of vehicles, pedestrians and bicyclists. Following the temporary construction period, all transportation conditions are anticipated to return to their existing condition, with no permanent impacts.

2 Introduction

This report expands on the traffic study report for the Seismic Retrofit of BART Aerial Station and Structures along the Concord, Richmond, Daly City and Fremont Lines originally prepared by DKS Associates and released on October 30, 2006. The A Line North is a portion of the Fremont Line where the aerial structure was analyzed in the October 30, 2006 report with an assumption of a "life safety" standard for the aerial structure columns. This report assumes that the aerial structure columns along the A-Line North between P-2 and P-239 would be retrofitted to an "operability" standard. All of the construction plans, roadway data, and analysis have been updated for 2011.

The study area includes two cities: Oakland and San Leandro. Along the A Line North, the Oakland/San Leandro border is located near West Broadmoor Boulevard along San Leandro Boulevard. The study area follows E. 12th Street between 19th Avenue and Fruitvale Avenue, along E. 12th St and San Leandro Street from Fruitvale Avenue to 47th Avenue, and along San Leandro Street from 47th Avenue to slightly south of 69th Avenue. Also included in the study area are Ashland Drive between Lewelling Boulevard and E. 14th Street and three BART stations: Fruitvale, Coliseum, and Bay Fair. Data has been collected in May 2011 for the analysis of 23 intersections and 11 roadway segments for the weekday AM and PM peak periods. Intersection turning movement counts can be found in Appendix A-1 while roadway segment counts are in Appendix A-2. Figure 1 shows a map of this portion of the Fremont BART line. As this report details construction-related changes in traffic operations, all of the impacts are considered "temporary impacts" which would last between 6 and 9 months for each construction stage and 2 months per aerial structure.

Figure 1 - Fremont Line Retrofit Locations

3 Fremont Line

To evaluate traffic conditions, as well as provide a basis for comparison of traffic conditions before and during project construction, intersection Level of Service (LOS) analysis has been evaluated at 23 study intersections and 10 roadway segments in Oakland and 1 roadway segment in San Leandro. Signal timing sheets have been provided by the city agencies for all signalized study intersections and used in this analysis.

3.1 Study Methodology

Intersections

Per the individual City or Agency requirements, traffic conditions for the study intersections has been evaluated using the designated methodologies provided in the 2000 Highway Capacity Manual (HCM), as described in Table 1. The intersection level of service software analysis programs have been analyzed using TRAFFIX or SYNCHRO, as required by the agency. For reference purposes, LOS as defined in the Highway Capacity Manual, is a quality measure describing operating conditions within a traffic stream, generally in terms of service measures such as speed and travel time, freedom to maneuver, traffic interruptions, and comfort and convenience.

Table 1 provides a summary of the intersection LOS methodologies, thresholds and software for each city/agency in the project study area.

Table 1 - Fremont Line LOS Methodology & Thresholds

Local, Regional or State Agency	LOS Methodology		LOS Software	LOS Threshold
	Signalized	Unsignalized		
Alameda County	HCM 2000	HCM 2000	Traffix	D
City of San Leandro	HCM 2000	HCM 2000	SYNCHRO	D
City of Oakland	HCM 2000	HCM 2000	SYNCHRO	D

Source: DKS Associates, Inc.

Roadway Crossings

As described in the 2000 Highway Capacity Manual, the determination of operation for roadway segments is based on volume to capacity ratio calculated as:

$$v / c = \frac{V}{1,750 * N}$$

where, v/c: volume to capacity

v: peak hour volume (vehicles per hour, vph)

N: number of travel lanes (lanes); assumed capacity of 1,750 vehicles per lane.

3.2 Level of Service (LOS) Definition

The LOS evaluation indicates the degree of congestion that occurs during peak travel periods and is the principal measure of roadway and intersection performance. Level of Service can range from "A" representing free-flow conditions, to "F" representing extremely long delays. LOS B and C signify stable conditions with acceptable delays. LOS D is typically considered acceptable for a peak hour in urban areas. LOS E is approaching capacity and LOS F represents conditions at or above capacity.

Total delay is defined as the total elapsed time from when a vehicle stops at the end of the queue until the vehicle departs from the stop line. This time includes the time required for the vehicle to travel from the last-in-queue position to the first-in-queue position. Table 2 provides definitions of LOS for unsignalized intersections as defined by the 2000 Highway Capacity Manual.

Table 2 - Fremont Line - Unsignalized Intersection LOS Thresholds (HCM 2000)

Level of Service	Expected Delay	Average Control Delay (seconds per vehicle)[1]
A	Little or no delay	≤10
B	Short traffic delay	>10 and ≤ 15
C	Average traffic delays	>15 and ≤ 25
D	Long traffic delays	>25 and ≤ 35
E	Very long traffic delays	>35 and ≤ 50
F	Extreme delays potentially affecting other traffic movements in the intersection	>50

Source: Transportation Research Board, Special Report 209, Highway Capacity Manual, Chapter 17 - Unsignalized Intersections, 2000.
[1] Worst Approach Delay (seconds per vehicle).

Signalized Intersections

At signalized intersections, the level of service is evaluated based on average stopped delay for all vehicles at the intersection. Table 3 defines the levels of service for signalized intersections based on the 2000 Highway Capacity Manual.

Table 3 - Fremont Line - Signalized Intersection LOS Thresholds (HCM 2000)

Level of Service	Average Stopped Delay[1] (seconds/vehicle)	Description
A	Delay ≤ 10.0	Free flow; minimal to no delay
B	10.0 < Delay ≤ 20.0	Stable flow, but speeds are beginning to be restricted by traffic condition; slight delays.
C	20.0 < Delay ≤ 35.0	Stable flow, but most drivers cannot select their own speeds and feel somewhat restricted; acceptable delays.
D	35.0 < Delay ≤ 55.0	Approaching unstable flow, and drivers have difficulty maneuvering; tolerable delays.
E	55.0 < Delay ≤ 80.0	Unstable flow with stop and go; delays
F	Delay > 80.0	Total breakdown; congested conditions with excessive delays.

Source: Transportation Research Board, Special Report 209, Highway Capacity Manual, Chapter 16 – Signalized Intersections, 2000.
[1] Control Delay per vehicle (seconds per vehicle).

3.3 Evaluation Criteria

Based on the local, regional or state agency level of service standards, an acceptable operating level of service (LOS) is defined as LOS D or better at all signalized and unsignalized intersections during the peak hours. The project would potentially impact vehicle traffic, including truck traffic, transit service, bicycle and pedestrian travel during the construction period if it creates hazards for any of those travel modes, caused considerable delays, or eliminated access to adjoining areas. In this study, all of the 23 analyzed intersections and 10 of the 11 roadway crossings are within the City of Oakland. One roadway crossing is within the City of San Leandro.

3.3.1 Intersections

The City of Oakland[1] defines a traffic impact as significant if:

- Signalized intersection which is located outside the Downtown area, the project would cause the level of service (LOS) to degrade to worse than LOS D (i.e. E);
- Signalized intersection which is located within the Downtown area, the project would cause the LOS to degrade to worse than LOS E (i.e. F);
- Signalized intersection outside the Downtown area where the level of service is LOS E, the project would cause the total intersection average vehicle delay to increase by four (4) or more seconds, or degrade to worse than LOS E (i.e. F);

[1] City of Oakland, CEQA Thresholds/Criteria of Significance Guidelines. July 15, 2008.

- Signalized intersection for all areas where the level of service is LOS E, the project would cause an increase in the average delay for any of the critical movements of six (6) seconds or more, or degrade to worse than LOS E (i.e. F);
- Signalized intersection for all areas where the level of service is LOS F, the project would cause (a) the total intersection average vehicle delay to increase by two (2) or more seconds, or (b) an increase in average delay for any of the critical movements of four(4) seconds or more or (c) the volume-to-capacity ("V/C") ratio exceeds three (3) percent (but only if the delay values cannot be measured accurately);
- Unsignalized intersection the project would add ten (10) or more vehicles and after the project completion satisfy the Caltrans peak hour volume warrant;
- For a Congestion Management Program (CMP) required analysis, (i.e. projects that generate 100 or more PM peak hour trips) cause a roadway segment on the Metropolitan Transportation System to operate at LOS F or increase the V/C ratio by more than three (3) percent for a roadway segment that would operate at LOS F without the project;

3.3.2 Roadway Crossings

The project would impact roadway crossings if it reduced the capacity and resulted in an operating deficiency.

3.3.3 Bicycle

The project would impact bicyclists if it created hazardous conditions for bicyclists or eliminated bicycle access to adjoining areas.

3.3.4 Pedestrian

The project would impact pedestrians if it resulted in overcrowding on public sidewalks, created hazardous conditions for pedestrians, or eliminated pedestrian access to adjoining areas.

3.3.5 Bus Transit

The project would impact transit if it increased transit demand to the point where it could not be accommodated by existing or planned transit capacity.

3.4 Existing Setting

This section provides an evaluation of existing traffic and transportation conditions related to the proposed project. A description of the existing transportation system facilities in terms of the roadway network facilities, intersections, transit service, bicycles, pedestrians and parking is provided below. Figure 2 through Figure 4 show the study area along the Fremont (A-Line) Line North.

3.4.1 Regulatory Setting

The Metropolitan Transportation Commission (MTC) is the regional organization responsible for prioritizing transportation project in a Regional Transportation Improvement Program (RTIP) for federal and state funding. The process is based on evaluating each project for need, feasibility, and adherence to TEA-21 policies and the local Congestion Management Program (CMP). Each local jurisdiction is required to analyze the impacts of land use decisions on regional transportation

systems (including an estimate of the costs associated with mitigation) and, if highway and roadway level of service standards will not be maintained, to adopt and implement plans for improving performance.

The Metropolitan Transportation System (MTS) is the focus of MTC's regional transportation planning, system operations and investment decisions. The MTS is the multi-modal transportation system of regional importance –those facilities that are crucial to the freight and passenger mobility needs of the nine-county San Francisco Bay Area. The MTS in the study area includes the following facilities:

- Roadways (Street, HOV, Highways, Freeways, and Expressways)
- Bus Transit Service
- Airports (Military/Federal, General Aviation, and Air Carrier)
- Ports and Ferries
- BART

The Cities of San Leandro and Oakland have responsibility for constructing and maintaining city streets within their respective city limits. Alameda County has the responsibility for unincorporated areas within the study area.

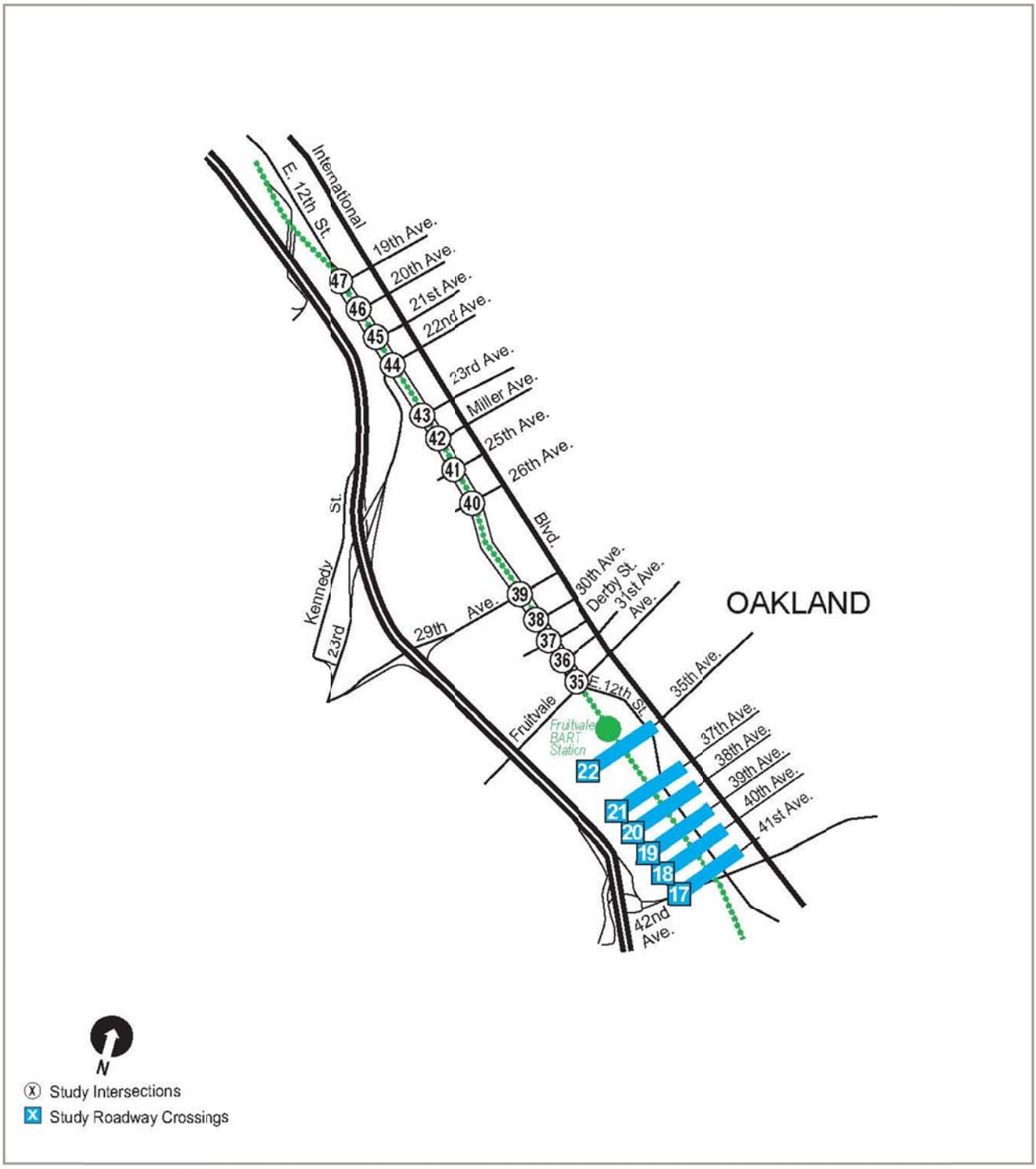


Figure 2: Fremont Line Study Area Locations – Oakland (North)

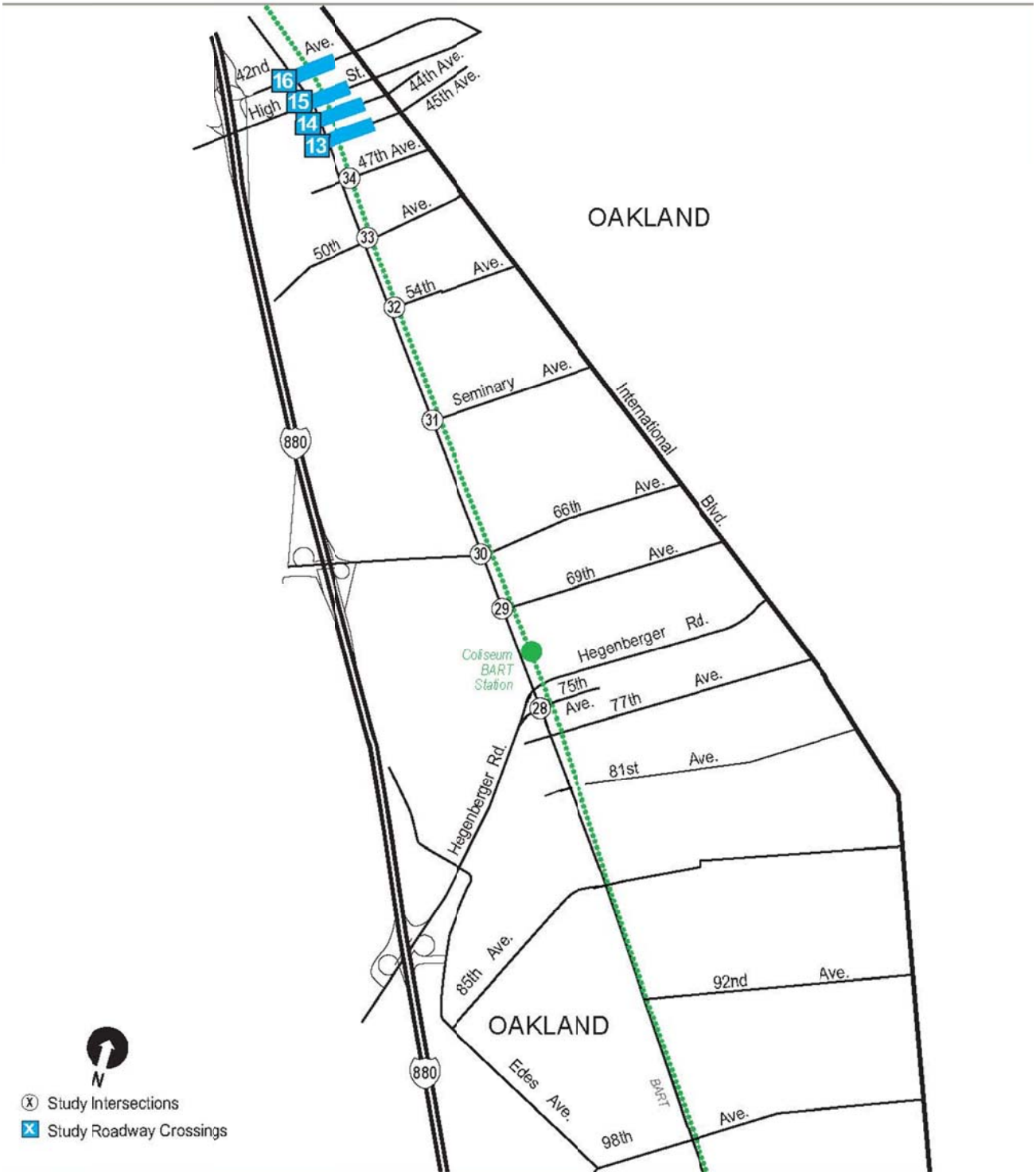


Figure 3: Fremont Line Study Area Locations – Oakland (South)

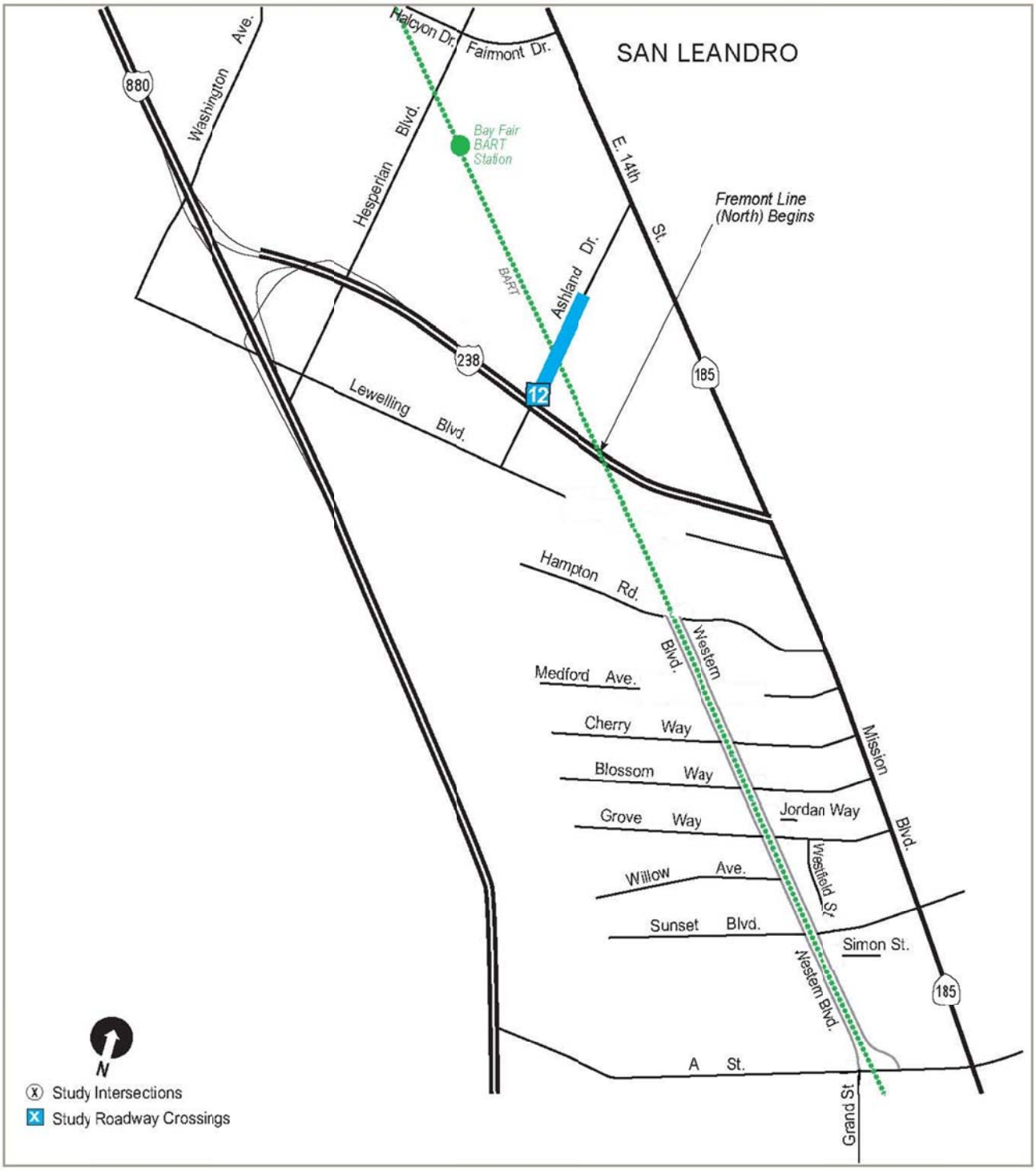


Figure 4: Fremont Line Study Area Locations – San Leandro

3.4.2 Roadway Network

Construction at retrofit locations would not directly impact any of the mainline freeways in the project area; however, some components of the construction work would impact specific freeway ramps and ramp intersections connected to local streets. Lane closures and detours within public streets, alterations to public parking, and alternations to public transit stops related to retrofit construction activities on aerial guideways and stations, would potentially occur within the Cities of San Leandro and Oakland.

Interstate 880 – Near the project, this facility runs in the north-south direction, and includes six to eight lanes. Interstate 880 provides access to the project study area with its interchanges at 66th Ave, High St, 29th Ave and 23rd Ave.

State Route (SR) 185 - This facility extends from SR-92 in Hayward, to its terminus at 42nd Ave in the north where it becomes International Blvd, in Oakland. SR-185 becomes 14th St just north of an intersect with I-238. Near the project, SR-185 runs in the north-south direction. SR-185 provides access to the project study area via 69th Ave, 66th Ave, Seminary Ave, 54th Ave, 52nd Ave, 51st Ave, 50th Ave, 48th Ave to 44th Ave, High St and 42nd Ave, in Oakland and Ashland Avenue in San Leandro

Streets

The following streets have been evaluated for intersection analysis as part of this study. These streets would potentially be affected by the retrofit construction.

Figure 2 through Figure 4 illustrate the location of these streets.

Oakland

San Leandro St extends from 98th Ave to its terminus at Fruitvale Ave in the north. It has a posted speed limit of 35 mph.

12th St is a major arterial roadway; it extends from 54th Ave in the south to Pine St in the north. Near the project, it runs in a north-south direction. It has a posted speed limit of 35 mph

75th Ave is an arterial roadway with an east-west direction. 75th Ave extends from San Leandro St in the west to its terminus at International Blvd in the east, where it becomes Sunshine Court.

69th Ave is an arterial roadway with an east-west direction. 75th Ave extends from San Leandro St in the west to its terminus at Arthur St in the east.

66th Ave is a two-lane local street; it extends from just west of I-880 to its terminus at E. 14th St. 66th Ave continues north of E. 14th St to Bancroft Ave. 66th Ave has a posted speed limit of 30 mph; it runs in an east-west direction.

Seminary Ave is a major arterial roadway; it extends from San Leandro St in the west to its terminus at Kuhnle Ave in the east just west of I-580. Near the project, Seminary Ave runs in an east-west direction.

54th Ave extends from E. 8th St in the west to International Blvd in the east. 54th Ave continues east of International Blvd in the north to Bancroft Ave where it becomes Vicksburg Ave. Near the project, 54th Ave runs in an east-west direction.

50th Ave extends from Vicksburg Ave in the east to its terminus just west of Reade Rd in the west and it runs in an east-west direction.

47th Ave is a two-lane local street; it extends from just west of San Leandro St in the west to International Blvd in the east. 47th Ave continues east of International Blvd to the south to Congress Ave. In the vicinity of the project, 47th Ave runs in an east-west direction and is approximately 35-feet curb-to-curb. On-street parking and four-foot sidewalks are provided on both sides of the street

31st Ave is a minor street that extends from E. 12th St to E. 15th St. 31st Street runs in an east-west direction.

Derby Ave is a minor street that extends just east of E. 12th St to E. 15th St. Derby Avenue runs in an east-west direction.

30th Ave is a minor street that extends from E. 12th St to International Blvd. 30th Avenue runs in an east-west direction.

29th Ave extends from 17th St in the east to its terminus at 23rd Ave in the west, where it becomes Park St. Park Street extends to Shore Line Dr in the west. In the vicinity of the project, 29th Ave runs in an east-west direction.

26th Ave extends from International Blvd in the east to just east of E. 12th St in the west. In the vicinity of the project, it runs in an east-west direction.

25th Ave extends from just west of E. 12th St to E. 16th St. 25th Ave runs in an east-west direction.

Miller Ave is a minor street with an east-west direction. It extends from E. 12th St in the west to Foothill Blvd in the east.

23rd Ave extends from E. 12th St to MacArthur Blvd in the east. 23rd Ave runs in an east-west direction.

22nd Ave extends from E. 12th St to E. 21st St. 22nd Ave continues to the west from Embarcadero to just west of I-880. 22nd Ave runs in an east-west direction.

21st Ave extends from E. 12th St to E. 30th St. 21st Ave runs in an east-west direction.

20th Ave extends from E. 12th St to E. 21st St. 20th Ave runs in an east-west direction.

19th Ave extends from just west of E. 12th St to 19th St. It continues from E. 20th Ave to its terminus at 14th Ave. 19th Ave runs in an east-west direction.

Roadway Crossings

Traffic operations have been evaluated for 11 roadway crossings in the study area based on the ratio determined from the roadway volume to the roadway capacity (V/C ratio). The following roadway crossings have been evaluated for analysis as part of this study.

San Leandro

Ashland Ave is a two-lane major roadway; it extends from Lewelling Blvd in the south to E. 14th St in the north. It is approximately 55-feet curb-to-curb, including a 6-foot raised median and 10-foot shoulder. Sidewalks (four-feet) are provided on both sides of the street. It has a posted speed limit of 30 mph.

Oakland

45th Ave extends from Coliseum Way in the west to Courtland Ave in the east. 45th Ave is closed to through traffic between Coliseum Way and San Leandro St and from Foothill Blvd to Ignacio Ave. Adjacent to San Leandro St, 45th Ave is approximately 36 feet curb-to-curb. On-street parking is provided on both sides of the street with five-foot sidewalks.

44th Ave extends from San Leandro St in the west to Bancroft Ave in the east.

High St is a major arterial; it extends from Bayview Dr in the west to its terminus at Tompkins Ave in the east. In the vicinity of the project, it runs in an east-west direction.

42nd Ave extends from I-880 in the west to Foothill Blvd in the east. It runs in an east-west direction and provides direct access to I-880.

41st Ave is a two-lane street; it extends from San Leandro St in the west to International Blvd in the east. 41st St is closed to through traffic from its crossing with the BART aerial structure to 12th St. It continues south from International Blvd to Santa Rita St in the east. Near the project, 41st Ave runs in an east-west direction and is approximately 32 feet curb-to-curb with on-street parking on both sides and five-foot sidewalks on both sides of the street, as well.

40th Ave is a two-lane street; it extends from Watling St in the west to Santa Rita St in the east. In the vicinity of the project, 40th Ave runs in an east-west direction and is approximately 40-feet curb-to-curb with on-street parking. Sidewalks (four-foot) are provided on both sides of 40th Ave.

39th Ave is a two-lane street; it extends from Watling St in the west to Foothill Blvd in the east. 39th Ave continues from Mera St to Santa Rita St in the east. Near the project, 39th Ave runs in an east-west direction and is approximately 30-feet curb-to-curb with on-street parking and 13-foot sidewalks on both sides of the street.

38th Ave is a two-lane street; it extends from Watling St in the west to its terminus at California St in the east. In the vicinity of the project, 38th Ave runs in an east-west direction but is closed off east of its crossing with the BART aerial crossing due to construction.

37th Ave is a two-lane street; it extends just west of E. 8th St and continues on the east side of Interstate of 880 from E. 9th St to its terminus just east of E. 16th St near Cesar Chavez Park. 37th Ave runs in an east-west direction.

35th Ave extends from E. 9th St in the west to a dead end. It continues just west of San Leandro St to it terminus at Jordan Rd where it becomes Redwood Rd. 35th Ave runs in an east-west direction.

3.4.3 Transit Service

Public transit service in the study area is provided by BART, AirBART shuttle, and Alameda-Contra Costa Transit (AC Transit). There are three BART lines (Fremont – Richmond, Fremont – Daly City, Dublin – Pleasanton / Daly City–Millbrae/SFO) in the study area serving the Coliseum and Fruitvale stations. AC Transit has jurisdiction over public bus transit in Alameda County. Transit currently operates six local bus routes within the vicinity of the proposed project. In addition, Amtrak (Capitol Corridor) provides service to Oakland with stations located next to the Coliseum BART Station and in Jack London Square. The Coliseum Amtrak Station in Oakland is located away from BART stations and structures.

The AC Transit bus routes that are mostly used as single or connecting routes in the study area are Routes 356, 98, 62, 45, 21, and 20.

Route 356 – East Oakland Shopper. This route provides service from the Coliseum BART Station to the South Shore Center in Alameda. Weekday service is provided between 10:30 A.M. and 11:11 A.M. northbound direction. In the southbound direction, service is provided between 12:50 P.M. and 1:33 P.M. Route 356 travels along San Leandro Blvd near the project.

Route 98 – 98th Ave. This route provides service from 98th/MacArthur to the Coliseum BART Station. Weekday service is provided between 5:59 A.M. and 10:43 P.M. in the counterclockwise direction, at 20-minute headways during the peak periods (7:00 A.M. – 9:00 A.M. and 4:00 P.M. - 6:00 P.M.). In the clockwise direction, service is provided between 6:03 A.M. and 10:29 P.M, at 20-minute headways during the peak periods (7:00 A.M. – 9:00 A.M. and 4:00 P.M - 6:00 P.M.). Weekend and holiday service is provided. Route 98 travels along 66th Ave and San Leandro Blvd to the Coliseum BART Station, near the project.

Route 62 – San Antonio. This route provides service from the Fruitvale BART Station to the West Oakland BART Station. Weekday service is provided between 6:20 A.M. and 1:02 A.M. in the eastbound direction, at 20-minute headways during the peak periods (7:00 A.M – 9:00 A.M and 4:00 P.M - 6:00 P.M.). In the westbound direction, service is provided between 5:30 a.m. and 12:39 A.M, at 20-minute headways during the peak periods (7:00 A.M – 9:00 A.M. and 4:00 P.M - 6:00 P.M.). Weekend and holiday service is provided. Route 62 travels along 12th St and 23rd Ave, in the vicinity of the project.

Route 45 – Sobrante Park. This route provides service from the Coliseum Station to the Foothill Square. Weekday service is provided between 6:00 A.M and 10:39 P.M. in the eastbound direction, at 30-minute headways during the peak periods (7:00 A.M – 9:00 A.M and 4:00 P.M. - 6:00 P.M.). In the westbound direction, service is provided between 5:25 A.M and 10:35 P.M., at 30-minute headways during the peak periods (7:00 A.M. – 9:00 A.M. and 4:00 P.M.- 6:00 P.M.). Weekend

service is provided. Route 45 travels along San Leandro Blvd to the Coliseum BART Station near the project.

Route 20 – Otis. This route provides service between downtown Oakland and the Fruitvale BART Station via Alameda and 29th Avenue. Weekday service is provided between 4:59 A.M. and 12:20 A.M. in the eastbound direction, at 30 minute headway s during the peak periods (7:00 A.M. – 9:00 A.M. and 4:00 P.M.- 6:00 P.M). In the westbound direction, service is provided between 5:00 A.M. and 11:56 P.M., at 30 minute headways during the peak periods (7:00 A.M. – 9:00 A.M. and 4:00 P.M.- 6:00 P.M.). Weekend service is provided. Route 20 travels along E. 12th St in the vicinity of the project.

Route 21 – Bay Farm Island. This route provides service between Fruitvale BART Station and Oakland International Airport via Alameda and 29th Avenue. Weekday service is provided between 6:14 A.M. and 10:04 P.M. in the eastbound direction, at 30 minute headway s during the peak periods (7:00 A.M. – 9:00 A.M. and 4:00 P.M.- 6:00 P.M.). In the westbound direction, service is provided between 6:15 A.M. and 9:58 P.M., at 30 minute headways during the peak periods (7:00 A.M. – 9:00 A.M. and 4:00 P.M.- 6:00 P.M). Weekend service is provided. Route 21 travels along E. 12th St near the project.

Bay Area Rapid Transit (BART)

The BART system provides rail transit services from Fremont to/from Richmond, Fremont to/from Daly City, Dublin-Pleasanton to/from Daly City – Millbrae/SFO. As of May 2011, weekday service is provided from Fremont to Richmond between 4:00 a.m. to midnight, in the northbound direction at 15- 20 minute headways. In the southbound direction, service is provided from 4:20 a.m. to 12:17 a.m., at 15-20 minute headways.

From Fremont to Daly City, service is provided from 5:06 A.M. to 5:51 P.M., in the northbound direction at 15-minute headways. In the southbound direction, service is provided between 6:13 A.M. and 6:58 P.M., at 15-minute headways.

Service from the Dublin/Pleasanton Station to Daly City is provided between 4:13 A.M. to 11:58 P.M. at 15- to 20-minute headways. From the Daly City to Dublin/Pleasanton, service is provided from 4:06 A.M. to 11:59 P.M., at 15- to 20-minute headways.

3.4.4 Bicycle and Pedestrian Facilities

The 2010 Oakland Bikeways Map details bicycle facilities along Fruitvale Avenue (Class II)[2] and 69th Ave (Class III) within the project study area.

The 2009 Alameda County Bikeways Network Map[3] indicates bicycle facilities near the project. Class I facilities are being proposed along San Leandro Blvd from Washington Ave to Fruitvale

[2] Class I facilities (bike path) – are completely separated, with paved right of way (shared with pedestrians) which excludes general motor vehicle traffic.
Class II facilities (bike lane) – a striped lane for one-way bike travel on a roadway.
Class III facilities (bike route) – typically a street with low traffic volumes and speeds, with measures for preferential bike treatment.

[3] 2006 Alameda County Bikeways Network Map. Revised May 30, 2006. http://www.accma.ca.gov/pages/HomeBicyclePlan.aspx

Ave. Class II facilities are also proposed along San Leandro Blvd from Fruitvale Ave to 19th Ave. These facilities are ranked as "high priority". Other facilities proposed include Class II facilities along 54th Ave, along 12th Ave, and along Fruitvale Ave.

The Bikeways Map also illustrates several "Financially Constrained Corridors" Financially Constrained Corridors are identified as those corridors which may be constructed in the future but have not secured funding. Financially Constrained Corridors include the following:

- Corridor 25/35 - Albany to Fremont
- Corridor 5 - Albany to Fremont
- Corridor 10 - Alameda to Oakland
- Corridor 30 - San Leandro to Alameda County Line

3.5 Existing Conditions

Vehicle turning movement counts were conducted in May 2011 during a typical weekday A.M. and P.M. peak hour at all study intersections. Table 4 lists all study intersections and their corresponding existing levels of service. **Appendix A-3** includes the detailed level of service analysis sheets, including the weekday A.M. and P.M. peak hours.

Table 4 - Fremont Line - Existing Conditions Intersection LOS Summary

City	Int. #	Intersection Name	Control[1]	A.M. PEAK		P.M. PEAK	
				Delay[2] (sec)	LOS[3]	Delay[2] (sec)	LOS[3]
Oakland	28	San Leandro St. & 75th Ave.	Signal	9.3	A	10.3	B
	29	San Leandro St. & 69th Ave.	Signal	9.8	A	10.1	B
	30	San Leandro St. & 66th Ave.	Signal	12.7	B	17.7	B
	31	San Leandro St. & Seminary Ave	Signal	13.0	B	11.5	B
	32	San Leandro St. & 54th Ave	TWSC	25.5	D	27.1	D
	33	San Leandro St. & 50th Ave	Signal	10.7	B	11.3	B
	34	San Leandro St. & 47th Ave	TWSC	18.6	C	21.8	C
	35	E. 12th St & Fruitvale Ave	Signal	29.4	C	41.2	D
	36	E. 12th St & 31st Ave	Unsig.	10.4	B	9.4	A
	37	E. 12th St & Derby Ave (West)	TWSC	13.8	B	11.3	B
	37-1	E. 12th St & Derby Ave (East)	TWSC	16.8	C	11.7	B
	38	E. 12th St & 30th Ave (West)	TWSC	10.7	B	11.1	B
	38-1	E. 12th St & 30th Ave (East)	TWSC	15.9	C	12.3	B
	39	E. 12th St & 29th Ave	Signal	15.9	B	19.6	B
	40	E. 12th St & 26th Ave (West)	TWSC	10.6	B	11.3	B
	40-1	E. 12th St & 26th Ave (East)	TWSC	16.5	C	13.4	B
	41	E. 12th St & 25th Ave	TWSC	**48.1**	**E**	21.9	C
	42	E. 12th St & Miller Ave	TWSC	14.8	B	20.4	C
	43	E. 12th St & 23rd Ave	Signal	26.9	C	27.4	C
	44	E. 12th St & 22nd Ave	Signal	46.6	D	29.8	C
	45	E. 12th St & 21st Ave	Unsig.	**41.1**	**E**	24.5	C
	46	E. 12th St & 20th Ave (West)	Unsig.	10.9	B	12.3	B
	46-1	E. 12th St & 20th Ave (East)	Unsig.	17.8	C	13.7	B
	47	E. 12th St & 19th Ave	Unsig.	22.7	C	21.1	C

Source: Transportation Research Board, Highway Capacity Manual, Chapter 10 – Signalized and Unsignalized Intersections, 1994. Transportation Research Board, Special Report 209, Highway Capacity Manual, Chapter 16 – Signalized Intersections, 2000. Chapter 17 - Unsignalized Intersections, 2000
Notes: **Shading and bold** corresponds to an intersection operating below an acceptable LOS.
[1] Control: Signal - signalized intersection; TWSC- two-way stop controlled intersection, AWSC all-way stop controlled intersection,
[2] Delay: delay in seconds per vehicle. *For signalized intersections*, delay is based on the average stopped delay per vehicle. Delays greater than 80 seconds are beyond the calibrated upper limits of LOS delay estimation equations under the HCM 2000 Signalized Intersection Methodologies. Delays greater than 60 seconds are beyond the calibrated upper limits of LOS delay estimation equations under the HCM 1994 Signalized Intersection Methodologies. *For unsignalized intersections*, delay is based on the worst approach delay per vehicle. Delays greater than 50 seconds are beyond the upper limits of LOS delay estimation equations under the HCM 2000 Unsignalized Intersection Methodologies. Delays greater than 45 seconds are beyond the upper limits of LOS delay estimation equations under the HCM 1994 Unsignalized Intersection Methodologies.
[3] LOS: Level of Service

3.5.1 Existing Conditions – Intersection Level of Service

According to the intersection level of service standards, all study intersections currently operate at acceptable levels of service for the existing conditions with the exceptions of:

- E. 12th St & 25th Ave (Int. # 41)
- E. 12th St & 21st Ave (Int. # 45)

The intersections of E. 12th St & 25th Ave and 12th St & 21st Ave currently operate at LOS E during the A.M. peak hour.

3.5.2 Existing Conditions – Roadway Crossings

At several locations, proposed seismic retrofit construction would be adjacent to mid-block segments of streets along the Fremont Line. In an effort to collect data for intersection analysis, 24-hour roadway tube counts were conducted in May 2011 during a typical weekday. **Appendix A-2** includes the roadway segment 24-hour traffic counts.

Existing traffic conditions at selected roadway segments have been evaluated for A.M. and P.M. peak hours using the operational analysis procedures from the Transportation Research Board's 2000 Highway Capacity. For purposes of this study, DKS Associates estimated mid-block lane capacities and LOS thresholds based on a volume-to-capacity ratio calculation. For all roadway segments, a capacity of 1,750 vehicles per lane per hour has been used as described by Urban Street Type II Facility as described in the 2000 Highway Capacity Manual. Table 5 provides a summary of the roadway segments operational conditions, including volume-to-capacity ratios during the A.M and P.M. peak hours, respectively.

Roadway Crossing Operation

According to the roadway volume-to-capacity analysis results, all analyzed roadway segments within the study area currently operate well below capacity.

Table 5 - Fremont Line - Existing Conditions Roadway Crossing LOS Summary

City	#	Roadway Crossing	Peak Period	Peak Hour	Highest Peak Hour Volume	Existing	
						# of lanes	V/C[1]
San Leandro	12	Ashland Ave (EB)	AM	7:30-8:30	468	1	0.27
			PM	3:00-4:00	457		0.26
		Ashland Ave (WB)	AM	7:30-8:30	554	1	0.32
			PM	5:00-6:00	370		0.21
Oakland	13	45th Ave (EB)	AM	11:30-12:30	29	1	0.02
			PM	4:00-5:00	41		0.02
		45th Ave (WB)	AM	11:30-12:30	57	1	0.03
			PM	3:30-4:30	70		0.04
	14	44th Ave. (EB)	AM	7:30-8:30	468	1	0.27
			PM	3:00-4:00	457		0.26
		44th Ave. (WB)	AM	7:30-8:30	554	1	0.32
			PM	5:00-6:00	370		0.21
	15	High St (EB)	AM	11:45-12:45	526	2	0.15
			PM	4:15-5:15	637		0.18
		High St (WB)	AM	7:45-8:45	683	2	0.20
			PM	1:00-2:00	534		0.15
	16	42nd Ave (EB)	AM	7:45-8:45	366	2	0.10
			PM	4:45-5:45	763		0.22
		42nd Ave (WB)	AM	6:45-7:45	708	2	0.20
			PM	5:00-6:00	672		0.19
	17	41st Ave (EB)	AM	7:00-8:00	2	1	0.00
			PM	3:45-4:45	4		0.00
		41st Ave (WB)	AM	7:30-8:30	3	1	0.00
			PM	2:00-3:00	3		0.00
	18	40th Ave (EB)	AM	11:45-12:45	64	1	0.04
			PM	4:15-5:15	80		0.05
		40th Ave (WB)	AM	11:45-12:45	29	1	0.02
			PM	2:00-3:00	43		0.02
	19	39th Ave (EB)	AM	11:30-12:30	47	1	0.03
			PM	3:30-4:30	80		0.05
		39th Ave (WB)	AM	7:45-8:45	104	1	0.06
			PM	3:00-4:00	63		0.04
	20	38th Ave (EB)	AM	8:00-9:00	5	1	0.00
			PM	1:00-2:00	4		0.00
		38th Ave (WB)	AM	8:00-9:00	3	1	0.00
			PM	5:15-6:15	4		0.00
	21	37th Ave (EB)	AM	8:00-9:00	197	1	0.11
			PM	5:00-6:00	231		0.13
		37th Ave (WB)	AM	8:00-9:00	167	1	0.10
			PM	5:15-6:15	130		0.07
	22	35th Ave (EB)	AM	8:00-9:00	260	1	0.15
			PM	4:30-5:30	263		0.15
		35th Ave (WB)	AM	7:45-8:45	237	1	0.14
			PM	4:15-5:15	322		0.18

Source: DKS Associates, 2011
Notes:
Shading and bold corresponds to the highest peak hour of the day and does not correspond directly to the A.M. peak period (7:00-9:00 a.m.) or P.M. peak period (4:00-6:00 p.m.)
[1] V/C: Volume-to-Capacity ratio. Capacity is 1,750 vehicles per hour per lane.

3.6 Project Conditions

This section evaluates traffic conditions plus project condition traffic estimated for the proposed project. Construction-related activities associated with the project would potentially result in temporary changes to traffic patterns or capacity. For the Project Conditions analysis, the lowest level of service between the five construction stages for each intersection or roadway segment has been included to provide a worst-case scenario.

3.6.1 Project Conditions – Intersection Level of Service

The analysis results (changes in intersection geometry, rerouting of existing traffic, lane closures, etc.) have been estimated based on construction limit drawings provided to DKS Associates by HQE and discussions with the segment design team. The intersection operation and LOS assumes the worst-case scenario (lane closures, rerouting, etc.) at each location compared to the existing condition. Intersections estimated to operate below acceptable LOS D are denoted in boldface and shaded.

Where rerouting of traffic has been assumed, the traffic has been assigned to the roadway network based on the likely travel patterns. The proportion of these trips that would travel through other study intersections has been used for the intersection LOS analysis under the Project Condition.

For the purpose of this analysis, only those locations likely to be impacted are presented. Intersection operational level of service along with their associated delays are summarized in Table 6 for the AM Peak Hour. Table 7 lists the PM Peak Hour intersection operational levels of service. **Appendix A-4** includes the detailed level of service analysis sheets, including the weekday AM and PM Peak Hours.

Table 6 - Fremont Line - Project Conditions Intersection LOS Summary (AM Peak)

City	Int. #	Intersection Name	Control[1]	Existing		Project		
				Delay[2] (sec)	LOS[3]	Delay[2] (sec)	LOS[3]	Stage
Oakland	28	San Leandro St. & 75th Ave.	Signal	9.3	A	10.8	B	5
	29	San Leandro St. & 69th Ave.	Signal	9.8	A	10.5	B	5
	30	San Leandro St. & 66th Ave.	Signal	12.7	B	13.2	B	4,5
	31	San Leandro St. & Seminary Ave	Signal	13.0	B	13.5	B	4
	32	San Leandro St. & 54th Ave	TWSC	25.5	D	25.5	D	Existing
	33	San Leandro St. & 50th Ave	Signal	10.7	B	11.2	B	4 Detour
	34	San Leandro St. & 47th Ave	TWSC	18.6	C	19.6	C	4
	35	E. 12th St & Fruitvale Ave	Signal	29.4	C	45.7	D	1
	36	E. 12th St & 31st Ave	Unsig.	10.4	B	10.4	B	Ex
	37	E. 12th St & Derby Ave (West)	TWSC	13.8	B	15.6	C	2
	37-1	E. 12th St & Derby Ave (East)	TWSC	16.8	C	19.7	C	1
	38	E. 12th St & 30th Ave (West)	TWSC	10.7	B	11.2	B	2
	38-1	E. 12th St & 30th Ave (East)	TWSC	15.9	C	20.5	C	2
	39	E. 12th St & 29th Ave	Signal	15.9	B	15.9	B	Existing
	40	E. 12th St & 26th Ave (West)	TWSC	10.6	B	14.3	B	1
	40-1	E. 12th St & 26th Ave (East)	TWSC	16.5	C	33.5	D	1
	41	E. 12th St & 25th Ave	TWSC	**48.1**	**E**	**48.1**	**E**	Existing
	42	E. 12th St & Miller Ave	TWSC	14.8	B	16.9	C	2
	43	E. 12th St & 23rd Ave	Signal	26.9	C	38.6	D	1
	44	E. 12th St & 22nd Ave	Signal	46.6	D	48.8	D	2
	45	E. 12th St & 21st Ave	Unsig.	**41.1**	**E**	**41.1**	**E**	Existing
	46	E. 12th St & 20th Ave (West)	Unsig.	10.9	B	12.1	B	3
	46-1	E. 12th St & 20th Ave (East)	Unsig.	17.8	C	28.4	D	3
	47	E. 12th St & 19th Ave	Unsig.	22.7	C	22.7	C	Existing

Source: Transportation Research Board, Highway Capacity Manual, Chapter 10 – Signalized and Unsignalized Intersections, 1994. Transportation Research Board, Special Report 209, Highway Capacity Manual, Chapter 16 – Signalized Intersections, 2000. Chapter 17 - Unsignalized Intersections, 2000
Notes:
Shading and bold corresponds to an intersection operating below an acceptable LOS.
[1] Control: Signal - signalized intersection; TWSC- two-way stop controlled intersection, AWSC all-way stop controlled intersection,
[2] Delay: delay in seconds per vehicle. *For signalized intersections*, delay is based on the average stopped delay per vehicle. Delays greater than 80 seconds are beyond the calibrated upper limits of LOS delay estimation equations under the HCM 2000 Signalized Intersection Methodologies. Delays greater than 60 seconds are beyond the calibrated upper limits of LOS delay estimation equations under the HCM 1994 Signalized Intersection Methodologies. *For unsignalized intersections*, delay is based on the worst approach delay per vehicle. Delays greater than 50 seconds are beyond the upper limits of LOS delay estimation equations under the HCM 2000 Unsignalized Intersection Methodologies. Delays greater than 45 seconds are beyond the upper limits of LOS delay estimation equations under the HCM 1994 Unsignalized Intersection Methodologies.
[3] LOS: Level of Service

Table 7 - Fremont Line - Project Conditions Intersection LOS Summary (PM Peak)

City	Int. #	Intersection Name	Control[1]	Existing		Project		
				Delay[2] (sec)	LOS[3]	Delay[2] (sec)	LOS[3]	Stage
Oakland	28	San Leandro St. & 75th Ave.	Signals	10.3	B	10.9	B	5
	29	San Leandro St. & 69th Ave.	Signal	10.1	B	10.5	B	5
	30	San Leandro St. & 66th Ave.	Signal	17.7	B	50.3	D	4,5
	31	San Leandro St. & Seminary Ave	Signal	11.5	B	13.4	B	4
	32	San Leandro St. & 54th Ave	TWSC	27.1	D	27.1	D	Existing
	33	San Leandro St. & 50th Ave	Signal	11.3	B	12.8	B	5
	34	San Leandro St. & 47th Ave	TWSC	21.8	C	22.2	C	4
	35	E. 12th St & Fruitvale Ave	Signal	41.2	D	51.4	D	1
	36	E. 12th St & 31st Ave	Unsig.	9.4	A	9.4	A	Existing
	37	E. 12th St & Derby Ave (West)	TWSC	11.3	B	12.0	B	1
	37-1	E. 12th St & Derby Ave (East)	TWSC	11.7	B	12.7	B	1 Detour 2 Detour
	38	E. 12th St & 30th Ave (West)	TWSC	11.1	B	11.7	B	2
	38-1	E. 12th St & 30th Ave (East)	TWSC	12.3	B	13.2	B	2
	39	E. 12th St & 29th Ave	Signal	19.6	B	19.6	B	Existing
	40	E. 12th St & 26th Ave (West)	TWSC	11.3	B	15.2	C	1
	40-1	E. 12th St & 26th Ave (East)	TWSC	13.4	B	22.2	C	1
	41	E. 12th St & 25th Ave	TWSC	21.9	C	21.9	C	Existing
	42	E. 12th St & Miller Ave	TWSC	20.4	C	22.9	C	2
	43	E. 12th St & 23rd Ave	Signal	27.4	C	45.8	D	1
	44	E. 12th St & 22nd Ave	Signal	29.8	C	30.5	C	1
	45	E. 12th St & 21st Ave	Unsig.	24.5	C	24.5	C	Existing
	46	E. 12th St & 20th Ave (West)	Unsig.	12.3	B	13.9	B	3
	46-1	E. 12th St & 20th Ave (East)	Unsig.	13.7	B	16.5	C	3
	47	E. 12th St & 19th Ave	Unsig.	21.1	C	21.7	C	2

Source: Transportation Research Board, Highway Capacity Manual, Chapter 10 – Signalized and Unsignalized Intersections, 1994. Transportation Research Board, Special Report 209, Highway Capacity Manual, Chapter 16 – Signalized Intersections, 2000. Chapter 17 - Unsignalized Intersections, 2000
Notes:

Shading and bold corresponds to an intersection operating below an acceptable LOS.

[1] Control: Signal - signalized intersection; TWSC- two-way stop controlled intersection, AWSC all-way stop controlled intersection,

[2] Delay: delay in seconds per vehicle. *For signalized intersections*, delay is based on the average stopped delay per vehicle. Delays greater than 80 seconds are beyond the calibrated upper limits of LOS delay estimation equations under the HCM 2000 Signalized Intersection Methodologies. Delays greater than 60 seconds are beyond the calibrated upper limits of LOS delay estimation equations under the HCM 1994 Signalized Intersection Methodologies. *For unsignalized intersections*, delay is based on the worst approach delay per vehicle. Delays greater than 50 seconds are beyond the upper limits of LOS delay estimation equations under the HCM 2000 Unsignalized Intersection Methodologies. Delays greater than 45 seconds are beyond the upper limits of LOS delay estimation equations under the HCM 1994 Unsignalized Intersection Methodologies.

[3] LOS: Level of Service

3.6.1.1 Intersection Operation

According to the intersection level of service standards, all study intersections would operate at acceptable levels of service under the project conditions with the exceptions of

- E. 12th St and 25th Ave – AM (Int. # 41)
- E. 12th St and 21th Ave - AM (Int. # 45)

These two intersections would operate at LOS E for the Existing Condition and would not worsen with the Project Condition. All other intersections would operate at LOS D or better for the Project Condition. For some intersections, the delay and LOS would improve because of the construction related activities.

3.6.1.2 Roadway Crossing Operation Level of Service

Project traffic conditions at selected roadway segments have been evaluated for AM and PM Peak Hours using the operational analysis procedures from the Transportation Research Board's *2000 Highway Capacity*. The analysis results (changes in intersection geometry, rerouting of existing traffic, lane closures, etc.) have been estimated based on construction limit drawings provided to DKS Associates by HQE and discussions with the segment design team. Table 8 provides a summary of the roadway segment operational conditions, including volume-to-capacity ratios during the AM and PM Peak Hour. In comparison to the Existing Conditions, all roadway crossings within the study area would continue to operate well below capacity for the Project Conditions. Temporary construction impacts to the roadway segments due to the retrofit construction would be as follows:

Oakland

47th Ave. The sidewalk would be detoured and the parking lane would be closed in the eastbound and westbound directions.

45th Ave. The sidewalk would be detoured and the parking lane would be closed in the eastbound and westbound directions.

44th Ave. The sidewalk would be detoured and the parking lane would be closed in the eastbound and westbound directions.

High St. The sidewalk would be detoured and the parking lane would be closed in the eastbound and westbound directions.

41st Ave. The sidewalk would be detoured and the parking lane would be closed in the westbound direction.

40th Ave. The sidewalk would be detoured and the parking lane would be closed in the eastbound and westbound directions.

39th Ave. The sidewalk would be detoured and the parking lane would be closed in the eastbound and westbound directions.

37th Ave. The sidewalk would be detoured and the parking lane would be closed in the eastbound and westbound directions.

Table 8 - Fremont Line - Project Conditions Roadway Crossing LOS Summary

City	#	Roadway Crossing	Peak Period	Peak Hour	Highest Peak Hour Volume	Existing		Project		
						# of lanes	V/C[1]	# of lanes	V/C[1]	Stage
San Leandro	12	Ashland Ave (EB)	AM	7:30-8:30	468	1	0.27	1	0.27	Ex, All
			PM	3:00-4:00	457		0.26		0.26	Ex, All
		Ashland Ave (WB)	AM	7:30-8:30	554	1	0.32	1	0.32	Ex, All
			PM	5:00-6:00	370		0.21		0.21	Ex, All
Oakland	13	45th Ave (EB)	AM	11:30-12:30	29	1	0.02	1	0.02	Ex, All
			PM	4:00-5:00	41		0.02		0.02	Ex, All
		45th Ave (WB)	AM	11:30-12:30	57	1	0.03	1	0.03	Ex, All
			PM	3:30-4:30	70		0.04		0.04	Ex, All
	14	44th Ave. (EB)	AM	7:30-8:30	468	1	0.27	1	0.27	Ex, All
			PM	3:00-4:00	457		0.26		0.26	Ex, All
		44th Ave. (WB)	AM	7:30-8:30	554	1	0.32	1	0.32	Ex, All
			PM	5:00-6:00	370		0.21		0.21	Ex, All
	15	High St (EB)	AM	11:45-12:45	526	2	0.15	2	0.15	Ex, All
			PM	4:15-5:15	637		0.18		0.18	Ex, All
		High St (WB)	AM	7:45-8:45	683	2	0.20	2	0.20	Ex, All
			PM	1:00-2:00	534		0.15		0.15	Ex, All
	16	42nd Ave (EB)	AM	7:45-8:45	366	2	0.10	2	0.10	Ex, All
			PM	4:45-5:45	763		0.22		0.22	Ex, All
		42nd Ave (WB)	AM	6:45-7:45	708	2	0.20	2	0.20	Ex, All
			PM	5:00-6:00	672		0.19		0.19	Ex, All
	17	41st Ave (EB)	AM	7:00-8:00	2	1	0.00	1	0.00	Ex, All
			PM	3:45-4:45	4		0.00		0.00	Ex, All
		41st Ave (WB)	AM	7:30-8:30	3	1	0.00	1	0.00	Ex, All
			PM	2:00-3:00	3		0.00		0.00	Ex, All
	18	40th Ave (EB)	AM	11:45-12:45	64	1	0.04	1	0.04	Ex, All
			PM	4:15-5:15	80		0.05		0.05	Ex, All
		40th Ave (WB)	AM	11:45-12:45	29	1	0.02	1	0.02	Ex, All
			PM	2:00-3:00	43		0.02		0.02	Ex, All
	19	39th Ave (EB)	AM	11:30-12:30	47	1	0.03	1	0.03	Ex, All
			PM	3:30-4:30	80		0.05		0.05	Ex, All
		39th Ave (WB)	AM	7:45-8:45	104	1	0.06	1	0.06	Ex, All
			PM	3:00-4:00	63		0.04		0.04	Ex, All
	20	38th Ave (EB)	AM	8:00-9:00	5	1	0.00	1	0.00	Ex, All
			PM	1:00-2:00	4		0.00		0.00	Ex, All
		38th Ave (WB)	AM	8:00-9:00	3	1	0.00	1	0.00	Ex, All
			PM	5:15-6:15	4		0.00		0.00	Ex, All
	21	37th Ave (EB)	AM	8:00-9:00	197	1	0.11	1	0.11	Ex, All
			PM	5:00-6:00	231		0.13		0.13	Ex, All
		37th Ave (WB)	AM	8:00-9:00	167	1	0.10	1	0.10	Ex, All
			PM	5:15-6:15	130		0.07		0.07	Ex, All
	22	35th Ave (EB)	AM	8:00-9:00	260	1	0.15	1	0.15	Ex, All
			PM	4:30-5:30	263		0.15		0.15	Ex, All
		35th Ave (WB)	AM	7:45-8:45	237	1	0.14	1	0.14	Ex, All
			PM	4:15-5:15	322		0.18		0.18	Ex, All

Source: DKS Associates, 2011
Notes: **Shading and bold** corresponds to the highest peak hour of the day and does not correspond directly to the A.M. peak period (7:00-9:00 a.m.) or P.M. peak period (4:00-6:00 p.m.)
[1] V/C: Volume-to-Capacity ratio

3.6.1.3 Station Analysis

Seismic retrofits are proposed at the Fruitvale and Oakland Coliseum Stations for this stage. Retrofit construction activity at are BART stations would displace parking spaces, close sidewalks or other pedestrian facilities, and remove bicycle parking.

The Fruitvale Station, an aerial station, consists of eleven 2-column reinforced concrete bents and 10-single columns bents. Approximately 170 parking spaces would be unavailable during construction. Only 30 spaces maximum would be impacted at any stage of construction. It should be noted that the unavailability of these spaces would be spread out over the five stages of construction over a 2.5 year period. Bicycle racks, access to escalators, stair access, pedestrian crossings and bus stop access would also be potentially impacted.

At the Oakland Coliseum Station, approximately twelve parking spaces would be unavailable during construction. Bicycle racks, access to escalators, stair access, pedestrian crossings and bus stop access would also be potentially impacted.

At the Bay Fair Station, retrofit work consists of fifteen 2-column reinforced concrete bents and 1-single column bent. Approximately 60 parking spaces would be unavailable during the construction phase. Bicycle racks, access to escalators, stair access, pedestrian crossings and bus stop access would also be potentially impacted.

3.6.1.4 Potential Bicycle and Pedestrian Impacts

The Class II bike lanes along Fruitvale Ave would experience temporary lane removals and would be detoured elsewhere via signage. Pedestrian facilities would temporarily be detoured during construction in the proximity of BART aerial columns. Thirty-three (33) pedestrian locations shown in Table 10 would be potentially impacted by the temporary, staggered construction-related activity.

3.6.1.5 Potential Access and Circulation Impacts

Direct access to the Fruitvale BART Station parking garage would be closed at the eastern entrance with all traffic diverted to the access point along 33rd Ave during Stage 1. Additionally, a potential circulation impact may occur with the construction associated with P-85 in Stage 2. Construction activity associated with this pier would encroach on nearby parking spaces and circulation aisles within the station area. The Construction Staging and Traffic Maintenance Plan would address the temporary construction-related impacts and reduce the impact to less than significant.

3.6.1.6 Parking

Anticipated impacts to parking facilities both on and off-street are presented below in Table 9**.** All impacts during the project condition would be temporary during the duration of the construction for the five construction stages. As a means to reduce the number of parking spaces impacted in adjacent areas, BART is phasing the project into stages. Alternate parking locations, duration of construction and signs notifying patrons of parking issues will be identified as part of the Construction Staging and Traffic Maintenance Plan.

Table 9 - Fremont Line - Project Conditions Parking Impact Summary

Location	Type of BART Structure for Retrofit	Type of Parking Impact (On-Street or BART Off-Street)	Number of Parking Spaces Available [1]	Number of Parking Spaces Impacted [2] [3]	Percentage of Parking Spaces Impacted [4]
Lake Merritt Station to Fruitvale Station	Aerial Guideway	On-Street	na	284	na
Fruitvale Station to Oakland Coliseum Station	Aerial Guideway	On-Street	na	193	na
Fruitvale Station	Aerial Station	BART Off-Street	871	170	13%
Oakland Coliseum Station	Aerial Station	BART Off-Street	984	12	0.002%
Bay Fair Station	Aerial Station	BART Off-Street	1672	60	4%

Source: DKS Associates and Carter & Burgess: Seismic Retrofit of BART Aerial Station and Structures along the Concord, Richmond, Daly City and Fremont Lines, October 30, 2006
Notes: (1) Number of spaces available is based on BART parking and access occupancy survey conducted in Fall 2005.
(2) On-street parking impacts include impacts to parking spaces along roadways that perpendicularly intersect the BART line. At these locations, it has been assumed that no more than 3 parking spaces along the perpendicular roadway in each direction would be impacted, for a total of 12 spaces impacted at each intersection roadway.
(3) A maximum of 30 parking spaces would be impacted at any one construction stage.
(4) Temporary impacts are assumed to last between 6 to 9 months per stage based on construction staging and sequencing.
na: not available.

3.6.2 Project Findings

Construction operations on existing BART facilities would be regulated to minimize traffic disruptions and detours, and to maintain safe traffic circulation operations. Table 10 is a summary of impacts by facility type and the number of facilities that would be impacted. All impacts to the stations are temporary and less than significant.

Table 10 - Fremont Line – Impacts Summary

Facilities Type	Number of Facilities Impacted	Names of Facilities Impacted		
Intersections	0			
BART Station	3	▪ Fruitvale Station	▪ Oakland Coliseum Station	▪ Bay Fair Station
Bus Transit	1 Agency	▪ AC Transit		
Bicycle	2	▪ Fruitvale Ave	▪ Fruitvale Station	
Pedestrian	33	▪ E. 12th St & 19th Ave ▪ E. 12th St & 21st Ave ▪ E. 12th St & 22nd Ave ▪ E. 12th St & 23rd Ave ▪ E. 12th St & Miller Ave ▪ E. 12th St & 25th Ave ▪ E. 12th St & 26th Ave ▪ E. 12th St & 29th Ave ▪ E. 12th St & Derby Ave ▪ E. 12th St & Fruitvale Ave ▪ Along 33rd Ave	▪ Along 37th Ave south of E 12th St ▪ Guideway near 37th Ave and 38th Ave ▪ South of 37th Ave under Guideway ▪ South side of 37th Ave ▪ North side of 40th Ave ▪ Along 40th Ave south of E 12th St ▪ Along 41st Ave north of San Leandro St ▪ North side of High St ▪ South side of High St ▪ North side of 44th Ave ▪ South side of 44th Ave	▪ South side of 45th Ave ▪ North side of 47th Ave ▪ South side of 47th Ave ▪ San Leandro St and 50th Ave ▪ San Leandro St and 54th Ave ▪ San Leandro St and Seminary Ave ▪ San Leandro St and 66th Ave ▪ NB San Leandro St between 66th Ave and 69th Ave ▪ San Leandro St and 66th Ave ▪ NB San Leandro St south of 69th St

Source: DKS Associates, 2011

3.6.2.1 Intersections

23 intersections have been evaluated as part of this report. Based on the analysis results, no impacts are anticipated for the study intersections for any of the 5 construction stages.

3.6.2.2 Stations

Temporary impacts on operations at three stations, Fruitvale, Oakland Coliseum, and Bay Fair would occur. Improvement measures for each station would include signage for pedestrians to identify sidewalk closures, bicycle rack removals, and parking removals near aerial columns. Safe and continuous pedestrian access would need to be maintained in the construction areas.

With the implementation of these recommended measures, the temporary construction-related impacts would be reduced.

3.6.2.3 Bus Transit

Temporary impacts along major transit routes would occur. Recommendations for each location would include signage for patrons to identify temporary transit stop relocation and/or change in schedule or route. Contact with AC Transit would be required to coordinate the construction schedule and to modify and bus stops. Based on the traffic analysis, delays to transit service, if any, would be minimal. With the implementation of these recommended measures, the temporary construction-related impacts would be reduced.

3.6.2.4 Bicycle

Temporary impacts for the existing bicycle facilities would occur. Recommendations for each location include identification of detour routes, signage identifying temporary bike lane detours and temporary replacement bicycle racks at BART stations displaced by construction.

With the implementation of recommended measures, the temporary construction-related impacts would be reduced.

3.6.2.5 Pedestrian

Recommendations for each location include signage to identify detour paths and locations of safe, alternate crossings. Safe and continuous pedestrian paths would need to be maintained in the construction areas.

With the implementation of recommended measures, the temporary construction-related impacts would be reduced.

3.6.2.6 Parking

Temporary impacts for on-street and off-street BART parking spaces and avoidance and minimization measures to reduce impacts are shown in Table 11. As a means to reduce the number of parking spaces impacted in adjacent areas, BART is phasing the project into stages. Duration of construction and signs notifying patrons of parking issues will be identified as part of the Construction Traffic Management Plan.

Table 11 - Fremont Line – Parking Improvement Measures

Location	Type of BART Structure for Retrofit	Type of Parking Impact (On-Street or Off-Street)	Type of Impact (Temporary or Permanent) (1)	Impacts to Residents, Businesses, or Special Needs	Avoidance and Minimization Measures
Lake Merritt Station to Fruitvale Station	Aerial Guideway	On-Street	Temporary	Public parking for various businesses	Avoidance of impacts can be accomplished by completing seismic retrofit in phases so there will be a limited number of parking spaces impacted at one time. The construction contractor would prepare/implement a construction phasing plan and a traffic management plan (TMP) involving: coordination with the City to relax parking permit restrictions, re-scheduling of street cleaning operations, and notification of all parking closures. Additionally, BART would provide on-site or off-site replacement parking, if necessary.
Fruitvale Station to Oakland Coliseum Station	Aerial Guideway	On-Street	Temporary	Public parking for various businesses	Avoidance of impacts can be accomplished by completing seismic retrofit in phases so there will be a limited number of parking spaces impacted at one time. The construction contractor would prepare/implement a construction phasing plan and a traffic management plan (TMP) involving: coordination with the City to relax parking permit restrictions, re-scheduling of street cleaning operations, and notification of all parking closures. Additionally, BART would provide on-site or off-site replacement parking, if necessary.
Fruitvale Station	Aerial Station	BART Off-Street	Temporary	44 spaces	There may privately owned spaces available at the new Fruitvale parking garage. There is unrestricted parking at nearby streets, including 13th St between Derby and 31st St, which appeared full. There is also unrestricted parking between 31st St and Fruitvale on 13th St. There is limited parking availability on 12th St between 31st St and Derby. There is restricted parking on 12th St near Fruitvale Village due to one-hour parking meters. Nearby parking is available at the Fruitvale Village AAMPCO paid lot adjacent to and directly west of the BART parking lot with access from 35th Ave. The lot is large running from 35th to 37th Aves with over 100 spaces available.
Oakland Coliseum Station	Aerial Station	BART Off-Street	Temporary	2 spaces	There is unrestricted parking along 69th Ave from Snell St to Hawley St. Parking is restricted along 71st Ave and 70th Ave between Snell St and Hawley St. Parking is also restricted along Hawley St from 69th Ave to 73rd Ave.
Bay Fair Station	Aerial Station	BART Off-Street	Temporary	30 Handicapped Spaces	It is recommended to stripe the two closest rows of regular parking immediately east and adjacent to handicap spaces. Regular spaces would need to be replaced. North of the station is a residential area where there are some on-street parking opportunities available. The following streets have unrestricted parking: Linnea St, Videll St, and Connelly; however, parking in these areas was near capacity. A more feasible strategy would be to use the nearby Bay Fair shopping center where there was a large amount of available spaces. BART could lease these spaces on a temporary basis. South of Bay Fair Station, there is a fence separating the lot from a residential area but there is a small pedestrian access to the adjacent residential area. Colby and Wagner Street are restricted. Doane and Demody Street are unrestricted. The restricted streets could be used for shorter trips while long-term parking could occur at Bay Fair Center.

Source: Carter & Burgess
Notes: (1) Temporary impacts are assumed to last approximately 6 to 9 months based on construction staging and sequencing.

3.7 Cumulative Conditions

This section evaluates future projects that would potentially occur at the same time as the project. Construction-related activities associated with major transportation project would potentially result in temporary changes to traffic patterns or capacity.

The projects that are scheduled to occur during the project condition are listed below.

- San Leandro: BART-Downtown Pedestrian Improvements – Summer 2012
- San Leandro: Marina Boulevard Street Rehabilitation – Summer 2011
- San Leandro: East 14th Street-Hesperian Boulevard-150th Street Improvements - 2012
- San Leandro: Street Reconstruction including Andover St, Begier Ave, Astor Dr, Pearson Ave, Valley St, Johnson St, and Maria Dr – Summer 2011
- San Leandro: Street light Undergrounding – East 14th (150th to Southern City Limit) – Fall 2011
- San Leandro: Preda Street Pipe Bridges Upgrade – Summer 2011
- San Leandro: San Leandro Boulevard/Davis Sewer Capacity Improvements – Phase 1 – Summer 2011
- San Leandro: Par Course Improvements – October 2011
- Oakland: Oakland Airport Connector – Estimated Completion: 2014

Improvement Measures

Cumulative construction related impacts due to schedule overlaps would be minimized by coordinating construction schedules with the various cities, counties, and transportation agencies responsible for the projects listed. Retrofit construction would be staged in a way to avoid or minimize conflicts with the concurrent construction projects in the area.

3.8 Conclusions/Findings

This report used fieldwork observations to (1) verify the assumptions made in this study, (2) collect information to determine impacts to traffic, pedestrian, and bicycle circulation, and (3) collect potential mitigation data. The seismic retrofit construction would take place in five stages as shown in Table 12.

Table 12 – Retrofit Construction Stages

Stage	Roadways	Columns
1	▪ 18th Ave to 20th Ave ▪ 21st Ave to 22nd Ave ▪ 23rd Ave to 25th Ave ▪ 29th Ave to 30th Ave ▪ Near 33rd Ave	▪ P-2 to P-6, B-7 to B-8 ▪ P-18 to P-20 ▪ P-30 to P-39 P-65 to P-70 P-84
1 – Fruitvale Ave Detour	▪ Derby Ave to Fruitvale Ave	▪ P-74 to P-82
2	▪ 19th Ave to 21st Ave ▪ 22nd Ave to 23rd Ave ▪ 25th Ave to 29th Ave ▪ 30th Ave to Derby Ave ▪ Near 33rd Ave	▪ B-7 to B-8, P-9 to P-12 ▪ P-21 to P-29 ▪ P-40 to P-64 ▪ P-71 to P-73 ▪ P-85
2 – Fruitvale Ave Detour	▪ Fruitvale Ave	▪ P-83
3	▪ 20th Ave to 22nd Ave ▪ Near 33rd Ave	▪ P-13 to P-17 ▪ P-86 to P-88
4	▪ 36th Ave to 37th Ave ▪ 38th Ave to 40th Ave ▪ SH 77 to High Street ▪ 44th Ave to 45th Ave ▪ 47th Ave to 54th Ave ▪ 54th Ave to 66th Ave ▪ 69th Ave to south of 69th Ave	▪ P-103 to P-104 ▪ P-109 to P-116 ▪ P-124 to P-127 ▪ P-132 to P-135 ▪ P-144 to P-167 ▪ P-170 to P-222 ▪ P-234 to P-239
4 – 54th Ave Detour	▪ 54th Ave	▪ P-168 to P-169
5	▪ 36th Ave to 37th Ave ▪ 37th Ave to 38th Ave ▪ 40th Ave to 41st Ave ▪ High St to 44th Ave ▪ 45th Ave to 47th Ave ▪ 66th Ave to 69th Ave	▪ P-100 to P-102 ▪ P-105 to P-108 ▪ P-117 to P-120 ▪ P-128 to P-131 ▪ P-136 to P-143 ▪ P-223 to P-233

Source: DKS Associates, 2011

All impacts are temporary and each stage would last between six and nine months for each construction stage and two months per aerial pier per consultation with BART and related staff. The staging plans are conceptual and are subject to change but represent the worst case scenario. Avoidance and minimization measures have been developed to address potential impacts, and once construction is completed all locations and facilities would be restored to pre-construction conditions. No intersections would experience significant impacts while construction measures are in place.