

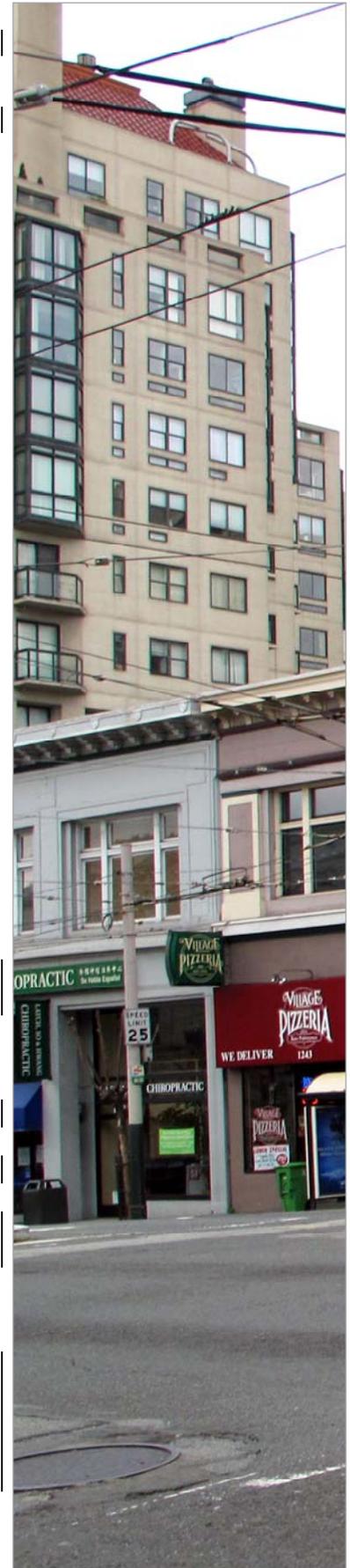
CHAPTER SUMMARY: This chapter summarizes how the No Build and the three build alternatives (including the LPA, with or without the Vallejo Northbound Station Variant) are expected to affect the environment, both positively and adversely, and also proposes avoidance, minimization, and mitigation measures for any adverse impacts. Topics covered in this chapter include Land Use, Growth Inducement, Community Impacts, Utilities, Visual/Aesthetics, Cultural Resources, Hydrology and Floodplain, Water Quality and Storm Water Runoff, Geology/Soils/Seismic/Topography, Hazardous Waste/Materials, Air Quality, Noise and Vibration, Energy, Biological Environment, and Construction Impacts.

CHAPTER 4

Affected Environment, Environmental Consequences, and Avoidance, Minimization, and/or Mitigation Measures

Environmental analyses presented in this chapter are primarily based on a series of technical studies prepared for the Van Ness Avenue BRT Project. These studies consist of the following:

- Tree Removal Evaluation and Planting Opportunity Analysis (BMS Design Group, 2013)
- Air Quality Technical Report and Addendum (Terry A. Hayes Associates Inc., 2013)
- Natural Resources Technical Memorandum (Garcia and Associates, 2009)
- Historic Property Survey (Parsons, 2010)
- Archaeological and Native American Cultural Resources Sensitivity Assessment (Far Western Anthropological Research Group, 2013)
- Historic Resources Inventory and Evaluation Report (JRP Historical Consulting, 2009)
- Finding of Effect (Parsons, 2013c)
- Visual Impact Assessment Memorandum (Parsons, 2010)
- Geologic Impacts Assessment Report (AGS Inc., 2009)
- Initial Site Assessment Report (AGS Inc., 2009)
- Overhead Cable System Support Poles/Streetlights Conceptual Engineering Report (San Francisco Department of Power and Water, 2009)
- Noise and Vibration Study (Parsons, 2010)
- Storm Water Data Report (Parsons, 2013d)
- Water Quality Technical Report (Parsons, 2013b)
- Vehicular Traffic Operations Technical Memorandum (CHS Consulting, 2013)
- Analysis of Non-motorized Transportation Impacts Technical Report and Addendum (Arup, 2013).
- BRT Design Criteria Technical Memorandum (BMS Design Group, 2008)
- Van Ness Avenue BRT Feasibility Study (San Francisco County Transportation Authority, 2006)



- Van Ness Corridor Initial Land Use and Urban Design Needs Assessment (City of San Francisco Planning Department, 2004)

The above technical studies were incorporated in the EIS/EIR by reference and are available upon request to SFCTA through the following contact:

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4.0 Introduction

The Locally Preferred Alternative (LPA) is a refinement of the two center-running build alternatives with limited left turns (Build Alternatives 3 and 4 with Design Option B). For many of the environmental impact areas described in Chapter 4, the LPA, with or without the Vallejo Northbound Station Variant, has identical environmental consequences to Build Alternatives 3 or 4 with Design Option B and is so noted. For some environmental consequences, the LPA, with or without the Vallejo Northbound Station Variant, falls within the range presented for Build Alternatives 3 and 4 in this chapter. When this is the case, it is described as such, and detailed information is provided in Chapter 10, Section 10.4.1, to explain the specific effects of the LPA for the following environmental factors: community impacts, aesthetics/visual resources, biological resources, cultural resources, utilities and public services, hydrology and water quality, and construction impacts.

4.1 Land Use

4.1.1 | Affected Environment

This section describes the land use setting or “affected environment” for the Van Ness Avenue BRT Project, presenting an overview of the corridor land use and development patterns in the areas and activity centers along the 2-mile stretch of Van Ness Avenue in San Francisco. Land use is broadly defined to encompass types of land uses, development and growth trends, activity centers, and local and regional land use policies.

4.1.1.1 | EXISTING LAND USES

The Van Ness Avenue corridor, along with side and parallel streets, includes diverse neighborhoods and land uses within the project limits. Land uses in the vicinity of the Van Ness Avenue corridor include residential, commercial/ tourism, institutional, open space, and mixed uses. Figure 4.1-1 shows land designations in the project area based on zoning. Figure 4.1-2 shows designated areas of commercial and industrial land uses. As shown in the aforementioned figures, Van Ness Avenue is a major shopping corridor, zoned primarily as *High Density Residential-Commercial Combined (RC-4)*. Existing land use is described below from south to north between Mission and North Point streets in the City and County of San Francisco.

Between Mission and Market streets, Van Ness Avenue extends through primarily civic, commercial/tourism, light industrial, and mixed-use land uses. This stretch of Van Ness Avenue is zoned *Downtown Commercial (C3-6)* and *Public (P)*. Automobile dealerships, retail shops, and art galleries are also located along this stretch of the corridor. Residential land uses are located west of Van Ness Avenue between Franklin and Laguna streets and east of Van Ness Avenue between 12th and 7th streets.

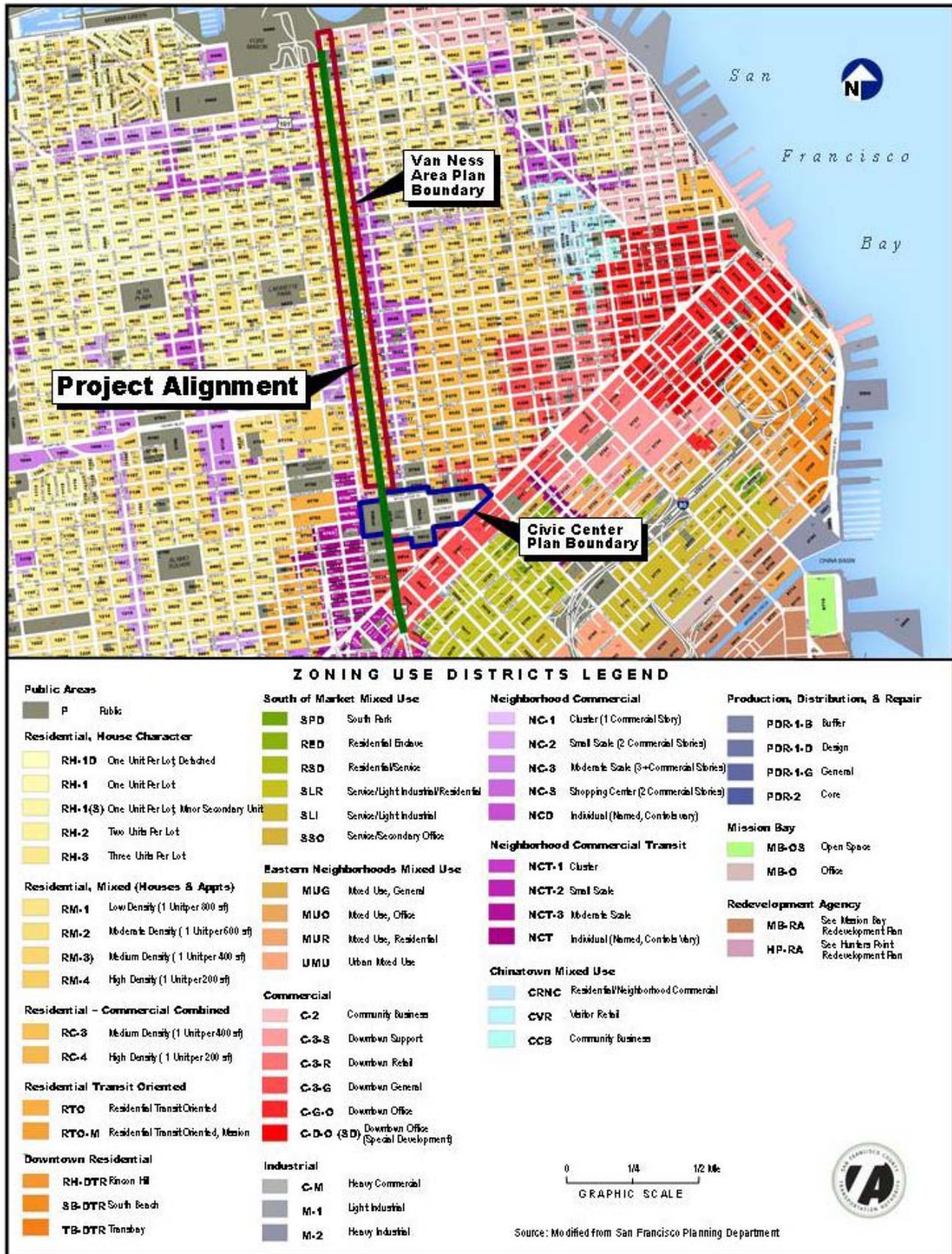


Figure 4.1-1: Zoning and Land Use

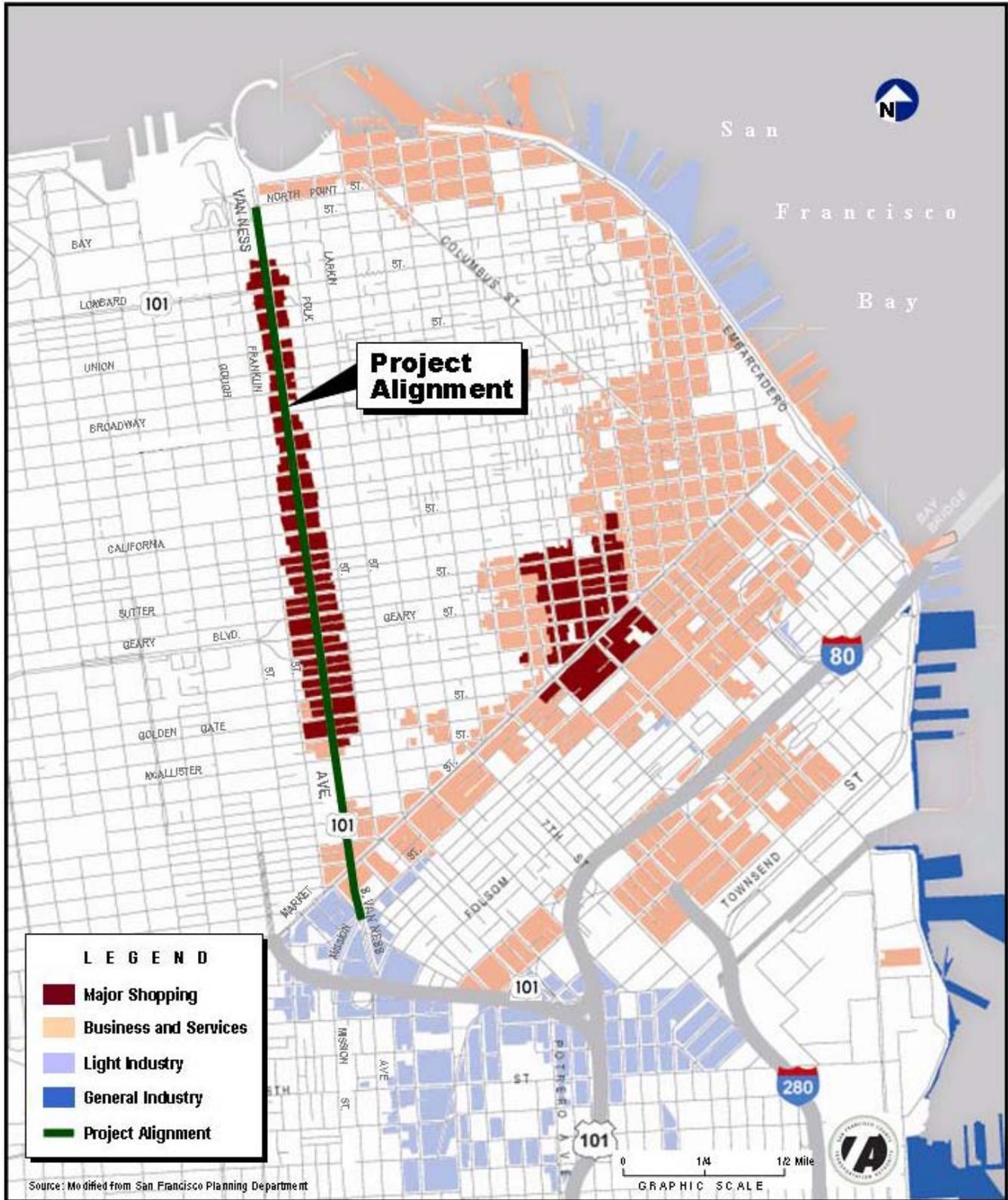


Figure 4.1-2: Commercial and Industrial Land Use

Land uses between Market and McAllister streets are primarily institutional, civic, and arts. The Civic Center is a major activity center in the Van Ness Avenue corridor that includes the San Francisco City Hall, Supreme Court of California, and other government facilities, in addition to the Civic Center Plaza, San Francisco Symphony, Opera Center, Herbst Theatre, Civic Auditorium, and other performing arts venues. This stretch of Van Ness Avenue is zoned *Downtown Commercial (C3-6)* and *Public (P)*. Residential, commercial, and mixed-use land uses are located one to two blocks west and east of Van Ness Avenue.

Van Ness Avenue supports a broad range of land uses between McAllister and California streets, including mixed-use, commercial/tourism, residential, and institutional. This stretch of Van Ness Avenue is zoned *High Density Residential-Commercial Combined (RC-4)* and *Community Business (C-2)*. A variety of retail and residential uses are situated in the Tenderloin/Polk Street and Cathedral Hill areas. The AMC Theatres multi-screen movie theater complex, automobile dealerships, and hotels are also located in these areas. The Regency Center is a landmark hotel and event venue, and it is a major activity center in the Van Ness Avenue corridor. Various high-density housing developments have been completed recently or are nearly complete in this segment of the corridor.

Between California Street and Broadway, Van Ness Avenue passes through residential, mixed-use, institutional, and commercial land uses. This stretch of Van Ness Avenue is zoned *High Density Residential-Commercial Combined (RC-4)*. A variety of religious and other institutions, as well as neighborhood-serving retail uses, are located along Polk Street, which is the primary neighborhood-scale commercial street in the area. This portion of the corridor is interspersed with large and small multi-unit residential buildings and relatively little new development.

Land uses along Van Ness Avenue, between Broadway and North Point Street, are primarily residential. A cluster of hotels are located near Lombard Street, and institutional and industrial land uses are situated in the Bay Street area. This segment of the corridor has a relatively well-defined pattern of individual apartment buildings lining the street, interspersed with neighborhood-serving retail uses, primarily located at the street corners. The Galileo Academy of Science and Technology, which is a high school, is located at the corner of Van Ness Avenue and Francisco Street. Fort Mason, which is part of the Golden Gate National Recreation Area (GGNRA) managed by the National Park Service (NPS), is located along the east side of Van Ness Avenue, north of Bay Street. Fort Mason is a major activity center in the Van Ness Avenue corridor that serves as an important cultural center in the city and is comprised of special event facilities, classrooms, offices, commercial establishments, open space, and waterfront facilities. This stretch of Van Ness Avenue is primarily zoned *Medium Density Residential-Commercial Combined (RC-3)*, with some blocks zoned *Low Density Residential, Mixed (Houses and Apartments) (RM-1)*, and *Public (P)*. Fort Mason and the Galileo Academy of Science and Technology comprise the *Public* zoned uses.

Development Trends

Development trends and growth projections for the City and the study area are primarily derived from data presented in the San Francisco General Plan, the United States Census Bureau's 2000 Census, the ABAG's Projections for 2007, and the FOCUS Program: a development and conservation strategy for the San Francisco Bay Area.

Based on the 2000 U.S. Census and the 2007 ABAG projections used in the adopted Regional Transportation Plan: Transportation 2035, the City is expected to gain 66,610 new households between 2000 and 2035, which represents a 20 percent increase in new households. As discussed in Section 4.2, Community Impacts, the Van Ness Avenue corridor is expected to see an increase in the number of households by 12,208, which is a 28 percent increase, during the same period. This growth trend is consistent with the City's land use policies and planned redevelopment, which is discussed below.

The Van Ness Avenue corridor is planned by the City for high-density mixed-use development, in addition to transformation of the street into a transit-served pedestrian

promenade that supports the Civic Center and commercial uses along Van Ness Avenue. Overall, no major vacant parcels are available for development in the project area; however, some parcels have been identified as having the potential for reuse or additional development (ABAG, 2007). The City adopted the Van Ness Area Plan in 1986 and created a Van Ness Avenue Special Use District to the Planning Code in 1988 to implement the plan. The plan is intended to promote Van Ness Avenue as the City's most prominent north-south boulevard, lined with high-density mixed-use development. Since the adoption of the special use district, approximately 1,000 housing units have been developed along Van Ness Avenue (San Francisco Planning Department, 1995).

The FOCUS Program, led by ABAG and MTC, works with local governments and others in the Bay Area to collaboratively address issues such as high housing costs, traffic congestion, and protection of natural resources. A primary goal of FOCUS is to encourage future growth near transit and in the existing communities that surround the San Francisco Bay, enhancing existing neighborhoods and providing housing and transportation choices for all residents. FOCUS identifies Priority Development Areas (PDAs) or locally identified infill development opportunity areas within existing communities. PDAs are areas within an existing community that are near existing or planned fixed transit or are served by comparable bus service and are planned for more housing. The proposed PDAs included in FOCUS could accommodate more than half of the Bay Area's projected housing growth to the year 2035, mostly at relatively moderate densities (FOCUS, 2009). The Van Ness Avenue corridor is included in San Francisco's planned PDA.

Within the PDAs, there are five redevelopment project areas designated by the City Redevelopment Agency in the downtown San Francisco vicinity, including the Federal Office Building, Yerba Buena Center, SoMa, Transbay, and the Rincon Point-South Beach Redevelopment Project Areas. The redevelopment project areas include projects that support the City's goal for high-density, mixed-use, and residential infill development in the downtown area.

In summary, growth and development trends support high-density, transit-supportive redevelopment and infill in the project area.

4.1.1.2 | MAJOR PLANNED PROJECTS

Several residential and mixed-use development projects have recently been completed, are under construction, or are planned within the project corridor. Most of these residential developments include affordable housing and single-room occupancy (SRO) hotels planned to serve senior citizen and low-income populations. In addition, approximately 2,500 housing units are proposed around the South Van Ness Avenue and Mission Street area.

The CPMC has proposed a new campus, known as the Cathedral Hill Campus, on Van Ness Avenue between Geary Boulevard and Post Street. This major development along the project alignment would consist of a hospital and a medical office; it would occupy an entire block on both sides of Van Ness Avenue.

Major approved and active projects within the study corridor are listed in Table 4.1-1. For more detailed information on these projects, refer to Chapter 2, Section 2.7, Related and Planned Projects.

Table 4.1-1: Major Approved and Active Projects in the Study Area

NO.	PROJECT NAME	ADDRESS	APPROVED/ PLANNED USE	NUMBER OF RESIDENTIAL UNITS	PROJECT STATUS
1	810-826 Van Ness Avenue	810-826 Van Ness Avenue	Mixed Residential	53	Completed
2	990 Polk	990 Polk Street	Mixed Residential	110	Completed
3	Arnett Watson Apartments	650 Eddy Street	Mixed Residential	83	Completed
4	10th and Mission Family Housing	1400 Mission Street	Mixed Residential	156	Under construction
5	Mission Family Housing	1036-1040 Mission Street	Mixed Residential	90	Completed in 2012
6	Eddy and Taylor Family Apartments	168-186 Eddy Street; 238 Taylor Street	Mixed Residential	130	Completion anticipated in 2014
7	Market and Octavia Better Neighborhoods Plan	N/A*	Mixed Residential	2,500	Preliminary planning
8	California Pacific Medical Center (Cathedral Hill Campus)	Van Ness Avenue and Geary Boulevard	Medical	N/A	In planning
9	100 Van Ness	100 Van Ness	Multi-family Residential	399	In planning
10	1401 Market Street	1401 Market Street	Mixed Residential	719	Under construction

* The Plan comprises several individual housing projects around South Van Ness Avenue and Mission Street.

SOURCES: McCormick, 2008; San Francisco Planning Department, 2008b; San Francisco Planning Department, 2008d.

4.1.1.3 | REGIONAL AND LOCAL PLANNING GOALS AND POLICIES

Land use planning goals and policies are guided by the *San Francisco General Plan*. The information provided in the *San Francisco General Plan* is made more precise in individual area plans that cover designated geographic areas of the City. The *San Francisco General Plan* and associated area plans located within or near the project corridor are discussed below, in addition to other relevant regional and local planning documents.

San Francisco General Plan (October 2000)

The City is governed by the *San Francisco General Plan* in an effort to guide decision making for the future of the area. The plan contains objectives and policies in seven elements and eight area plans to ensure that future development is consistent with development goals of the City. Objectives and policies in the transportation element of the general plan give priority to public transit development and improvement, as well as other alternatives to the private automobile. Relevant general plan land use and transportation-related objectives and policies include the following:

- Encourage development that efficiently coordinates land use with transit service, requiring developers to address transit concerns as well as mitigate traffic problems.

Objectives and policies in the transportation element of the *San Francisco General Plan* give priority to public transit development and improvement.

- Use the transportation system as a means for guiding development and improving the environment.
- Maintain public transit as the primary mode of transportation in San Francisco and as a means through which to guide future development and improve regional mobility and air quality.
- Use rapid transit and other transportation improvements in the City and region as the catalyst for desirable development.
- Maintain and improve the TPS Program to make transit more attractive and viable as a primary means of travel.
- Encourage ridership and clarify transit routes by means of a citywide plan for street landscaping, lighting, and transit preferential treatments.
- Provide convenient transit service that connects the regional transit network to major employment centers outside the downtown area.

Van Ness Avenue Area Plan (July 1995)

The *Van Ness Area Plan* is intended to promote Van Ness Avenue as the City's prominent north-south boulevard.

The City adopted the *Van Ness Area Plan* in 1986 and created a Van Ness Avenue Special Use District of the Planning Code in 1988 to implement the plan. The plan is intended to promote Van Ness Avenue as the City's most prominent north-south boulevard, lined with high-density mixed-use development and including design features that support a transit-served pedestrian promenade. The *Van Ness Area Plan* identifies the following land use objectives and corresponding policies:

- Objective 1. Continue existing development of the avenue and add a significant increment of new housing between Redwood and Broadway Street.
 - Policies 1.1 through 1.5 support maximizing the number of housing units in this stretch of the corridor and providing more affordable housing, while maintaining commercial use in existing commercial structures.
- Objective 2. Maintain the scale, character, and density of this predominantly residential neighborhood located between Broadway and Bay streets.
 - Policy 2.1 supports infill with “carefully designed,” medium-density, new housing.
- Objective 3. Transform the area between Bay Street and the Municipal Pier into an attractive gateway to the residential boulevard (Van Ness Avenue) and a transition from Fisherman's Wharf and the GGNRA.
 - Policies 3.1 through 3.2 support creating tree-lined sidewalks and a landscaped median within Van Ness Avenue, and supporting NPS plans for improvement within the boundaries of the GGNRA.
- Objective 4. Permit densities and land uses that are compatible with existing land uses and proposed residential development of Van Ness Avenue.

The *Van Ness Area Plan* identifies the following relevant streetscape objectives and corresponding policies:

- Objective 8. Create an attractive street and sidewalk space that contributes to the transformation of Van Ness Avenue into a residential boulevard.
 - Policies 8.1 through 8.4 support landscaping and tree plantings, and maintaining existing sidewalk space abutting major renovation or new development projects.
 - Policies 8.5 through 8.7 support maintaining existing sidewalk widths and providing uniform aesthetic sidewalk treatments.
 - Policies 8.8 through 8.10 support a uniform architectural style in the design of streetlights and poles, clustering of newspaper racks at specific corner locations, and provision of attractive street furniture at convenient locations throughout Van Ness Avenue.

Policies 8.5 through 8.10 of the *Van Ness Area Plan* support a uniform aesthetic for sidewalk and streetscape elements.

The *Van Ness Area Plan* identifies the following relevant transportation objectives and corresponding policies:

- Objective 9. Provide safe and efficient movement among all users on Van Ness Avenue.
 - Policies 9.1 through 9.4 support transit service, including reducing conflicts between transit vehicles and other moving and parked vehicles.
 - Policies 9.5 through 9.8 support auto circulation, including provision of parking from minor east-west streets and prohibiting new parking access from Van Ness Avenue.
 - Policies 9.10 through 9.12 include measures to enhance pedestrian circulation.
 - Policy 9.13 discourages freight loading facilities from Van Ness Avenue.

Policies 9.1 through 9.4 of the *Van Ness Area Plan* support transit service, including reducing conflicts between transit vehicles and other moving and parked vehicles.

The Civic Center Area Plan (October 1989)

The *Civic Center Area Plan* outlines a series of policies to guide development in and around City Hall and the surrounding government offices and cultural performing arts facilities. The plan provides a comprehensive program of street and pedestrian improvements in the area, including improvements to Van Ness Avenue.

Market and Octavia Area Plan (October 2007)

The *Market and Octavia Area Plan* is a community plan that grew out of the Market and Octavia Neighborhood Plan. The plan calls for new residential development centered on transit and provides land use, urban design, and transportation policies to support development. Extensive public investments in streets, including pedestrian crossings, and streetscapes are envisioned as part of the improvements to transit service on Van Ness Avenue, anchored by a new transit transfer facility on South Van Ness Avenue between Market and Mission streets. The *Market and Octavia Area Plan* identifies Van Ness Avenue as a potential BRT corridor and supports innovative transit solutions that include dedicated bus lanes on Van Ness Avenue.

Western SoMa Community Plan (Adopted March 2013)

The Draft Western SoMa Community Plan includes the southern portion of the project alignment. It supports improved pedestrian connections and transit improvements as part of the overall improvements to the transportation network that supports this mixed commercial and residential neighborhood.

Tenderloin-Little Saigon Neighborhood Transportation Plan Final Report (March 2007)

The *Tenderloin-Little Saigon Neighborhood Transportation Plan* is a community-based transportation plan that prioritizes community transportation needs and develops improvements in the Tenderloin and Little Saigon neighborhoods. The plan identifies primary needs of the community, including the need for improved transit service reliability and accessibility for low-income individuals.

San Francisco Better Streets Plan (Adopted December 2010)

The *San Francisco Better Streets Plan* provides a blueprint for the future of San Francisco's pedestrian environment. It describes a vision, provides design guidelines, and identifies next steps to create streets that are publicly accessible and support multi-modal use with a particular emphasis on pedestrians and transit. Policies promote design of street intersection crossings to maximize pedestrian safety and comfort.

Golden Gate National Recreation Area General Management Plan and Environmental Impact Statement (Draft September 2011)

NPS is in the process of finalizing the *General Management Plan*, which includes plans for the GGNRA and, more specifically, Fort Mason. The *General Management Plan* provides for facilities, and educational and programming plans at popular arrival nodes and recreation destinations in the GGNRA.

2004 Countywide Transportation Plan

The CWTP is the City's blueprint to guide transportation development and investment over the next 30 years and is consistent with the broader policy framework of the *San Francisco General Plan*, particularly its transportation element. The CWTP includes the following goals relevant to land use:

- Support economic vitality by maintaining local and regional accessibility to key employment, cultural, recreation, and community activity centers, investing in the multi-modal network to ensure efficient movement of people and goods.
- Support community vitality by supporting good land use planning, improving neighborhood access, and enhancing neighborhood livability, particularly through promotion of pedestrian activity to support neighborhood commercial activity.

The CWTP forecasts that the share of trips made by transit in the Van Ness Avenue corridor will decline in the future unless measures are taken to increase its competitiveness relative to autos, and it identifies the northwestern quadrant of San Francisco as a major gap in the City's rapid transit network. The plan identifies the Van Ness Avenue corridor as a prioritized project area for improving the regional transportation network.

4.1.2 | Environmental Consequences

The project build alternatives would affect land use similarly; therefore, they are addressed together, and differences in environmental consequences between them are noted in the discussion.

4.1.2.1 | CONSISTENCY WITH EXISTING AND PLANNED LAND USE

This section analyzes the consistency of the proposed Van Ness Avenue BRT Project with existing and future planned land use.

No Build Alternative

Under the No Build Alternative, no changes or adverse effects to existing or proposed land uses would occur. Implementation and construction of the transportation and streetscape improvements proposed under the No Build Alternative would occur within the existing transportation ROW, with no additional ROW required.

Existing and proposed land use plans and development trends are supportive of transit use, as summarized in Section 4.1.1.3. Existing land uses in the corridor would remain under the No Build Alternative, and they would benefit from improved transit service and enhanced urban design features. Under the No Build Alternative, future transit service in the Van Ness Avenue corridor would be improved over the existing condition, benefiting adjacent land uses; however, less benefit would be achieved in comparison to the build alternatives because the No Build Alternative would support to a lesser extent the transit-dependent, high-density, mixed-use infill development planned for the Van Ness Avenue corridor. The No Build Alternative would provide reduced benefit to existing and planned land use and its associated transit demand in comparison to the build alternatives.

The 2004 Countywide Transportation Plan forecasts that the share of trips made by transit in the Van Ness Avenue corridor will decline in the future unless measures are taken to increase its competitiveness relative to autos.

DEFINITION

RIGHT-OF-WAY (ROW): The designated area that lies between private property lines (i.e., building face to building face) fronting the street.

Build Alternatives

Implementation of the build alternatives would occur within the existing transportation ROW, with no additional ROW required. Proposed BRT station platforms would not require ROW acquisition, nor would proposed lighting and streetscape improvements.

Existing and proposed land use plans and development trends are supportive of transit use, as summarized in Sections 4.1.1.1 and 4.1.1.3, respectively. The proposed project would introduce rapid transit to the corridor, providing improved support for the substantial high-density, mixed-use, transit-dependent land uses in the Van Ness Avenue corridor. The project build alternatives would benefit surrounding land uses by providing improved and quicker access to and from the high-density residential neighborhoods in the vicinity of Van Ness Avenue, and the commercial uses that serve as one of the City's major shopping areas. The build alternatives would provide improved transit service to the major activity centers in the corridor and would serve the proposed CPMC Cathedral Hill Campus. The urban design elements of the proposed build alternatives would also support the existing and planned commercial and civic land uses that front Van Ness Avenue.

No changes or adverse effects to existing or proposed land uses would be required or expected to occur under the proposed build alternatives, including the LPA with or without the Vallejo Northbound Station Variant.

4.1.2.2 | CONSISTENCY WITH REGIONAL AND LOCAL PLANNING GOALS AND POLICIES

This section analyzes the consistency of the proposed Van Ness Avenue BRT Project with applicable local and regional planning policies.

No Build Alternative

The No Build Alternative would support local planning goals to encourage development that efficiently coordinates land use with transit service; however, less benefit would be achieved in comparison with the build alternatives because the No Build Alternative would not accommodate to the same extent the development trends and projected travel demand for the corridor.

Although the No Build Alternative would support local and regional transportation planning goals in the City's General Plan and CWTP by providing improved transit, it would not fulfill policies in these plans to fill a major gap in the City's rapid transit network. Moreover, the No Build Alternative would not support the goal in the *Van Ness Area Plan* to reduce conflicts between transit vehicles and other moving and parked cars because the No Build Alternative would not provide a dedicated transit lane.

The No Build Alternative would support planning goals to promote pedestrian activity and the design objectives of the *San Francisco Better Streets Plan*; however, it would achieve less benefit to the pedestrian environment than the build alternatives because it would not provide curb bulbs and transit waiting areas buffered from auto and pedestrian traffic. Although existing medians would be maintained, pedestrian crossings would not be improved to the same extent as under the build alternatives because pedestrian visibility and reduced crossing of traffic lanes offered by curb bulbs would not be achieved.

The No Build Alternative is consistent with the improved streetscape and pedestrian improvements, and planned transit-served development goals specified in applicable planning documents; however, these goals and policies would not be realized to the same extent as under the build alternatives because the No Build Alternative does not provide the reliability benefit of a dedicated transit lane and superior improvements to the pedestrian environment. The No Build Alternative is consistent with the CWTP's goal to enhance and improve transit ridership, but it does not achieve goals in the plan to develop a citywide network of rapid bus.

Build Alternatives

The build alternatives are generally consistent with regional and local transportation planning goals in the City's General Plan and CWTP to fill a major gap in the City's rapid transit network. The proposed BRT would support general plan objectives to maintain local and regional accessibility to key employment and community activity centers provided in the Civic Center vicinity, as well as the major shopping corridor along Van Ness Avenue. Moreover, the build alternatives would support the goal in the *Van Ness Area Plan* to reduce conflicts between transit vehicles and other moving and parked cars with provision of a dedicated BRT lane; however, Build Alternative 2 would achieve less benefit from a dedicated lane in comparison to Alternatives 3 and 4 (including the LPA, with or without the Vallejo Northbound Station Variant), because buses under Build Alternative 2 would have conflicts with right-turning vehicles, parallel parking vehicles, and illegally parked vehicles.

KEY FINDING

No changes or adverse effects to existing or proposed land uses would be required or expected to occur under the proposed build alternatives.

The No Build Alternative would provide lesser benefit to existing and planned land uses and their associated transit demand than the build alternatives.

The build alternatives are consistent with planning goals to encourage development that efficiently coordinates land use with transit service. The build alternatives are consistent with policies in the *Van Ness Area Plan* to maximize housing units and infill development because this is transit-oriented development. As discussed in Section 4.1.2.1, land use plans for the Van Ness Avenue corridor are supportive of transit use, and the proposed build alternatives would provide high-level rapid transit service that would accommodate the development trends and projected travel demand for the corridor.

Lastly, the build alternatives are consistent with planning goals to promote pedestrian activity and streetscape design objectives of the *Van Ness Area Plan* and *San Francisco Better Streets Plan*. The build alternatives would provide landscaping and streetlights of uniform architectural style throughout the corridor to provide a consistent sidewalk aesthetic supporting Van Ness Area Plan streetscape policies. The project does not include landscaping and streetscape features north of Lombard Street, so policies to create a visual gateway between Bay Street and the Municipal Pier would not be supported; however, the proposed build alternatives would not conflict with future plans under this policy.

The proposed build alternatives would provide curb bulbs, or extensions of the sidewalk, at most intersections. Curb bulbs are intended to reduce pedestrian crossing distances, increase pedestrian visibility, and create pedestrian-friendly designated waiting areas at intersections. Introduction of curb bulbs is consistent with design objectives of the *San Francisco Better Streets Plan*. The LPA would provide a minimum 6-foot-wide pedestrian refuge on Van Ness Avenue at all signalized intersections, which is also consistent with the design objectives of the *San Francisco Better Streets Plan*.

It is anticipated that the Van Ness Avenue BRT Project would require a General Plan Referral before consideration by the Board of Supervisors for proposed changes to official grades or sidewalk and street widths. The Planning Commission and the Board of Supervisors may consider amending the General Plan as part of a future, comprehensive General Plan Update to incorporate specific mention of the Van Ness Avenue BRT Project as providing rapid transit on Van Ness Avenue.

In addition to curb bulbs, Build Alternative 2 would extend sidewalks to serve as station platforms. At station locations, approximately 5 feet of the existing sidewalk would be utilized for aesthetic treatments, such as a landscaped planter, that provide a buffer between waiting bus patrons and pedestrian traffic along the sidewalk. Any change in sidewalk width requires a General Plan Referral from the San Francisco Planning Department. Build Alternatives 3 and 4 would maintain existing sidewalk widths, consistent with *Van Ness Area Plan* policies.

Build Alternative 2 would increase the amount of landscaped median on Van Ness Avenue at locations where existing left-turn pockets would be removed. However, Build Alternative 3 would change the configuration of the median, splitting it into two smaller landscaped

medians. Build Alternative 4 and the LPA (with or without the Vallejo Northbound Station Variant) would also remove some existing landscape that includes mature trees, as discussed in Section 4.4, Visual/Aesthetics. Reduction of the median would require a General Plan Referral from the San Francisco Planning Department.

Although General Plan Referrals would be required, the proposed project would be consistent with overall planning goals to improve the pedestrian environment by providing safe waiting areas buffered from auto and pedestrian traffic with attractive landscape and uniform, pedestrian-scale lighting.

4.1.3 | Avoidance, Minimization, and/or Mitigation Measures

No avoidance, minimization, or mitigation measures are required. Per established City procedures, a General Plan Referral would be required from the City Planning Department to permit any change in existing sidewalk width, as anticipated under Build Alternative 2. The SFMTA would prepare the General Plan Referral for approval by the San Francisco Planning Department and the Planning Commission.

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4.2 Community Impacts

This section analyzes existing and projected study area social conditions in terms of population characteristics such as income and ethnicity; household size and composition; employment and labor force; community/neighborhood characteristics, including public services and facilities; and economic and business characteristics.

The LPA included in this Final EIS/EIR is a refinement of the center-running alternatives with limited left turns (Build Alternatives 3 and 4 with Design Option B), as described in Chapters 2 and 10. For most analysis areas as part of this chapter, the LPA, with or without the Vallejo Northbound Station Variant, has impacts similar to Build Alternatives 3 and 4 with Design Option B. The LPA, with or without the Vallejo Northbound Station Variant, has slightly different results for parking gains and losses, as shown in this subsection. However, the overall community impact findings with the LPA are consistent with the findings for Build Alternatives 3 and 4 with Design Option B, as presented in this subsection.

4.2.1 | Community Character and Cohesion

4.2.1.1 | AFFECTED ENVIRONMENT

Demographic Characteristics

Demographic characteristics of the affected environment are derived from the 2000 U.S. Census and the *ABAG Projections 2007: Forecasts for the San Francisco Bay Area to the Year 2035*. Fifty-two (52) census tract block groups constitute the study area and were used for demographic characterization, as shown in Figure 4.2-1.

Population, Housing, and Employment Growth

Existing and projected population, housing, and employment growth trends within the study area and the City and County of San Francisco are described below and shown in Table 4.2-1.

Table 4.2-1: Population, Employment, and Housing Projections; 2000-2035

	POPULATION				
	2000	2015	2025	2035	% CHANGE '00-35
Total Study Area	78,347	91,943	98,101	105,125	34
City and County of San Francisco	776,733	823,800	888,400	956,800	23
	HOUSING (HOUSEHOLDS)				
	2000	2015	2025	2035	% CHANGE '00-35
Total Study Area	44,381	52,431	54,079	56,589	28
City and County of San Francisco	329,700	357,810	377,050	396,310	20
	EMPLOYMENT (JOBS)				
	2000	2015	2025	2035	% CHANGE '00-35
Total Study Area	94,776	104,757	120,793	136,751	44
City and County of San Francisco	642,500	636,840	733,020	832,860	30

Source: U.S. Census Bureau, 2000; 2007 ABAG Projections.

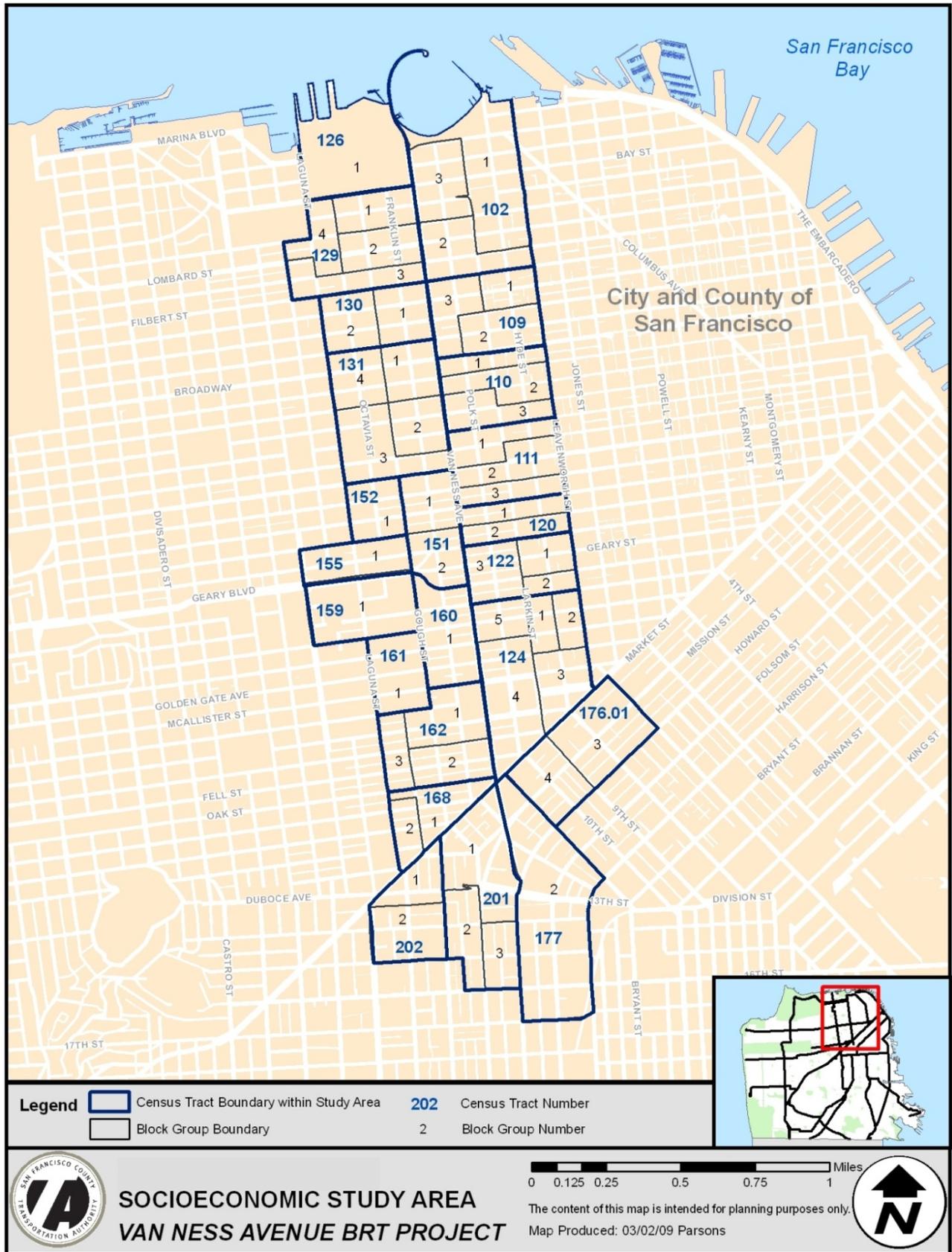


Figure 4.2-1: Socioeconomic Study Area

Population. Between 2000 and 2035, the population in the study area is projected to increase approximately 34 percent, from 78,347 to 105,125 persons. The City and County of San Francisco is anticipated to grow from 776,733 to 956,800 persons, which is an increase of approximately 23 percent.

Housing (Households). Between 2000 and 2035, the total number of households in the study area is expected to increase by approximately 28 percent, while the number of households in the City and County of San Francisco is expected to increase by 20 percent.

Employment (Jobs). Employment in the study area is anticipated to increase by 44 percent between 2000 and 2035. The total number of jobs in the City and County of San Francisco is projected to grow by 30 percent.

Ethnic Composition

The ethnicity profile of the study area population is derived from 2000 U.S. Census data. The racial categories used are White, Black or African American, American Indian and Alaska Native, Asian, Native Hawaiian and Other Pacific Islander, Some Other Race/Two or More Races, and Hispanic. For this analysis, persons of Hispanic origin were categorized separately and were not included in other ethnic categories.

As shown in Table 4.2-2, there is greater ethnic diversity in the City and County of San Francisco compared to the study area. For this analysis, racial and ethnic minority groups are defined as being comprised of people categorized as Hispanic or a race other than white in 2000 U.S. Census data. Overall, approximately 45 percent of all study area residents are members of minority groups. Approximately 24 percent of the population in the study area is Asian and 13 percent is Hispanic. Nearly 56 percent of the population in the City and County of San Francisco are members of minority groups, of which the Asian and Hispanic populations contribute approximately 31 and 14 percent, respectively.

For this analysis, racial and ethnic minority groups are defined as being comprised of people categorized as Hispanic or a race other than White in 2000 U.S. Census data.



45 percent of all study area residents are members of minority groups, as defined by this analysis: 24 percent are Asian and 13 percent Hispanic.

Table 4.2-2: Racial and Ethnic Composition

	TOTAL PERSONS		WHITE		BLACK OR AFRICAN AMERICAN		AMERICAN INDIAN/ALASKA NATIVE	
		%		%		%		%
Study Area	78,347		42,612	54	3,829	5	281	0
City and County of San Francisco	776,733		338,909	44	58,791	8	2,020	0
	ASIAN		NATIVE HAWAIIAN/OTHER PACIFIC ISLANDER		SOME OTHER RACE/TWO OR MORE		HISPANIC	
		%		%		%		%
Study Area	18,895	24	183	0	2,755	3.5	9,792	13
City and County of San Francisco	238,173	31	3,602	1	25,734	3.3	109,504	14

Source: 2000 U.S. Census Data.

Household Size and Composition

Household characteristics in the study area and in the City and County of San Francisco are shown in Table 4.2-3. According to 2000 U.S. Census data, the total number of households in the study area was 44,381, with approximately 1.8 persons per household. The total number of households within the City and County of San Francisco was 329,700, with approximately 2.3 persons per household.

Table 4.2-3: Household Characteristics

STUDY AREA	NUMBER OF HOUSEHOLDS	AVERAGE HOUSEHOLD SIZE	TOTAL NUMBER OF FAMILIES
Total Study Area	44,381	1.8	11,516
City and County of San Francisco	329,700	2.3	145,186

Source: 2000 U.S. Census Data.

Household Income

In 2000 the median household income for the study area was \$43,162, and no Census block groups within the study area had a median income that was below the Department of Health and Human Service poverty guideline. In the City and County of San Francisco, the median household income was \$55,221. (See Section 4.14, Environmental Justice, for further information about income and race within the study area.)

Households without Automobiles

Transit-dependent populations are defined as households without automobiles. These individuals rely on public transportation services for access to employment opportunities, school, social/recreation functions, medical appointments, and mobility in general. Table 4.2-4 shows the representation of transit-dependent populations in the project study area based on 2000 U.S. Census data. Approximately 48 percent of the households in the study area are without a private automobile compared to approximately 29 percent in the City and County of San Francisco as a whole.

Table 4.2-4: 2000 Transit-Dependent Populations

STUDY AREA	TOTAL HOUSEHOLDS	HOUSEHOLDS WITHOUT PRIVATE TRANSPORT	% OF HOUSEHOLDS WITHOUT PRIVATE TRANSPORT
Total Study Area	44,381	21,064	48
City and County of San Francisco	329,700	94,178	29

Source: 2000 U.S. Census Data.

Community and Neighborhood Characteristics

The project corridor extends through portions of multiple neighborhoods in the planning subareas of the City and County of San Francisco. Planning areas and neighborhoods in the project vicinity are described below from south to north and are defined based on the SFGate Neighborhood Guide to the City of San Francisco.

South of Market. The South of Market planning area is bounded by Market Street, the San Francisco Bay, Townsend Street, and US 101. Only the western side of this planning area (Western SoMa) lies immediately adjacent to the Van Ness Avenue corridor. Neighborhoods within the planning area are diverse and characterized by warehouses, auto repair shops, nightclubs, residential hotels, art spaces, loft apartments, furniture showrooms, condominiums, and some software and technology companies.

Hayes Valley/Lower Haight. The Hayes Valley/Lower Haight neighborhood extends between McAllister Street, Market Street/Duboce Avenue, Gough Street, and Webster Street and Divisadero Street. A variety of boutiques and high-end restaurants are located within this neighborhood.

Western Addition. The Western Addition neighborhood is situated between Van Ness Avenue, Golden Gate Park, the Upper and Lower Haight, and Pacific Heights. The Western

In 2000, the median household income for the study area was \$43,162,



Approximately 48 percent of the households in the study area are without a private automobile compared to approximately 29 percent in the City and County of San Francisco as a whole.

Addition neighborhood, particularly the Fillmore District, has served as a population base and cultural center for San Francisco's African American community.

Civic Center. The Civic Center planning area is located along Van Ness Avenue, north of its intersection with Market Street. The Civic Center area is the primary center of government and civic institutions within the city. In addition, several cultural centers are located within the planning area, including museums, theaters, and opera houses. One of San Francisco's lowest income neighborhoods, the Tenderloin, is located within the Civic Center area.

Lower Pacific Heights. The Lower Pacific Heights neighborhood is located between California Street, Geary Street, Presidio Avenue, and Van Ness Avenue. Historically, this area was considered part of the Western Addition.

Pacific Heights. The Pacific Heights neighborhood extends from Presidio Avenue to Van Ness Avenue and from California Street to Broadway. Many of the residents in this affluent neighborhood are young urban professionals. Most of the neighborhood's boutiques and restaurants are located along Fillmore Street, south of Pacific Avenue. Other businesses in Pacific Heights are located on California and Divisadero streets, as well as on Van Ness Avenue. The California Pacific Medical Center (CPMC) and the consulates of several countries are also situated within Pacific Heights.

Nob Hill and Russian Hill. The affluent Nob Hill and Russian Hill neighborhoods are located between Bay Street, Van Ness Avenue, Taylor Street, and Pine Street.

Marina/Cow Hollow. The Marina District is one of the northern districts of San Francisco. The district is bounded by Van Ness Avenue, Lyon Street, and the Presidio, and by US 101/ Lombard Street. Lombard Street is lined with motels, retail businesses, restaurants, and residential units. The Cow Hollow neighborhood is located within the Marina District. Union Street is the major shopping thoroughfare within the Cow Hollow neighborhood.

4.2.1.2 | ENVIRONMENTAL CONSEQUENCES

Community cohesion is defined as the degree to which residents have a sense of belonging to their neighborhood or experience attachment to community groups and institutions as a result of continued association over time. The proposed project potentially would have a positive impact on community cohesion because overall it would improve pedestrian conditions, namely the ease of crossing Van Ness Avenue and its cross streets. The proposed BRT facility would provide improved transit access to activity centers along the corridor, such as the Civic Center and AMC Theatres. Because the proposed BRT project would be constructed along an existing transportation route, the communities and neighborhoods adjacent to the corridor would not experience a disruption in cohesion. Moreover, no property displacements or relocations would occur as a result of the proposed project. Therefore, the proposed project would not result in a substantial physical or psychological barrier that would divide, disrupt, or isolate neighborhoods, individuals, or community activity centers.

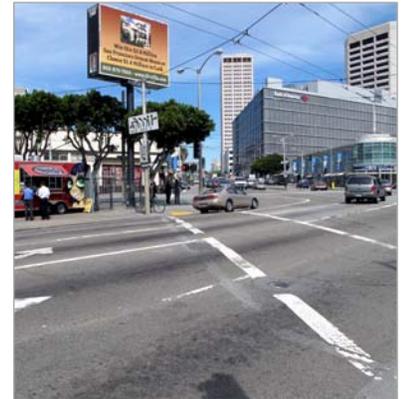
4.2.1.3 | AVOIDANCE, MINIMIZATION, AND/OR MITIGATION MEASURES

The communities and neighborhoods in the immediate vicinity of the proposed project would not experience a disruption in cohesion; therefore, no related mitigation measures are required.

4.2.2 | Public Services and Community Facilities

4.2.2.1 | AFFECTED ENVIRONMENT

Public services and community facilities located within the study area, including police and fire, schools and universities, cultural facilities, hospital and medical, parks and recreational facilities, and houses of worship are listed in Tables 4.2-5 and 4.2-6 and are shown in Figures 4.2-2 and 4.2-3.



The project corridor extends through portions of neighborhoods as diverse as the auto shops and taco trucks on South Van Ness (above) to the boutiques of Hayes Valley (below) and Cow Hollow.



KEY FINDING

The proposed project potentially would have a positive impact on community cohesion because overall it would improve pedestrian conditions and transit access. There would be no property displacements or relocations.

Schools and Universities

Six primary schools and one secondary public school are within the study area. Public schools are within the jurisdiction of the San Francisco Unified School District. Other educational facilities located within the study area include six private and two charter/alternative schools.

Libraries

Two branches of the San Francisco Public Library are within the study area. These libraries include the Main Branch Library and the Golden Gate Valley Branch Library. No other library branches are located within the study area.

Police and Fire

Police protection and traffic enforcement in the study area are provided by the San Francisco Police Department and the San Francisco Sheriff's Department. Fire protection services are provided by the San Francisco Fire Department (SFFD). Emergency medical services are provided by the San Francisco Department of Public Health. There are two fire stations and no police stations located within the study area.

Hospital and Medical Facilities

The Saint Francis Memorial Hospital is located within the study area. The CPMC is planning a campus on Van Ness Avenue between Geary and Post streets, referred to as the CPMC Project (see Section 2.6).

Post Offices

One branch of the United States Post Office is located within the study area. There are no other post offices within the study area.

Cultural Facilities

Several cultural facilities are within the study area. These facilities include the Asian Art Museum, Mexican Museum, and the California Crafts Museum. Exhibit halls include the Veterans Building and the Brooks Exhibit Hall. Performance venues within the study area include the Davies Symphony Hall, the War Memorial Opera House, and the San Francisco Opera House.

San Francisco City Hall provides direct access to City services, including the City Attorney's Office, Department of Public Works, Mayor's Office of Neighborhood Services, County Clerk, and the General Services Agency.

Houses of Worship

There are many houses of worship of various denominations within the study area. These facilities, which serve as community focal points, are listed in Table 4.2-5 and shown in Figure 4.2-2.



Public services and community facilities are often located close together. The Tenderloin School and the old San Francisco Federal Building (above) are within two blocks of the Asian Art Museum. (below).



Table 4.2-5: Public and Community Facilities

ID	NAME	LOCATION	ID	NAME	LOCATION
EDUCATIONAL FACILITIES (SCHOOLS AND LIBRARIES)					
SCHOOLS					
1	Sarah Dix Hamlin School	2129 Vallejo St.	9	St. Brigid School	2250 Franklin St.
2	Rosa Parks Elementary School	1501 O' Farrell St.	10	Spring Valley Elementary	1451 Jackson St.
3	Binet Montessori School	1715 Octavia St.	11	Sacred Heart Cathedral Prep.	1055 Ellis St.
4	Galileo High	1055 Bay St.	12	Swett (John) Elementary	727 Golden Gate Ave
5	Sherman Elementary	1651 Union St.	13	Life Learning Academy Charter	220 Golden Gate Ave.
6	Montessori House Of Children	1187 Franklin St.	14	Chinese American Intl School	150 Oak St.
7	Redding Elementary	1421 Pine St.	15	Marshall Elementary	1575 15Th St.
8	Tenderloin Elementary	627 Turk St.			
LIBRARIES					
29	Golden Gate Valley Branch Library	1801 Green St.	30	San Francisco Public Library	100 Larkin St.
EMERGENCY SERVICES (POLICE / FIRE STATIONS AND HOSPITALS)					
FIRE STATIONS			HOSPITALS		
16	Fire Department Station #3	1067 Post St.	18	Saint Francis Memorial Hospital	900 Hyde St.
17	Fire Department Station #41	1325 Leavenworth St.	49	California Pacific Medical Center	1255 Post St.
POST OFFICES					
32	United States Post Office	450 Golden Gate Ave.			
CULTURAL FACILITIES					
19	Mexican Museum	Building D, Fort Mason Center	24	Asian Art Museum of San Francisco	200 Larkin St.
20	California Crafts Museum	550 Sutter St.	25	San Francisco Opera House	199 Grove St.
21	Museum of Ophthalmology	655 Beach St.	26	Veterans Building	401 Van Ness Ave.
22	National Maritime Museum	2905 Hyde St.	27	War Memorial Opera House	301 Van Ness Ave.
23	Davies Symphony Hall	201 Van Ness Ave.	28	Brooks Exhibit Hall	99 Grove St.
31	San Francisco City Hall	1 Dr. Carlton B. Goodlet Pl.			
HOUSES OF WORSHIP					
33	Chinese Community Church	931 Larkin St.	41	First Church of Christ Scientist	1700 Franklin St.
34	Fort Mason Chapel	Upper Fort Mason	42	First Unitarian Church	1187 Franklin St.
35	Holy Trinity Russian Orthodox Cathedral	1520 Green St.	43	Hamilton Square Baptist Church	1212 Geary Blvd.
36	Norwegian Seaman's Church	2454 Hyde St.	44	Old First Presbyterian Church	1751 Sacramento St.
37	Saint Marks Lutheran Church	1111 O'Farrell St.	45	Saint Lukes Episcopal Church	1755 Clay St.
38	Buddhist Church of San Francisco	1881 Pine St.	46	Saint Marys Cathedral	1111 Gough St.
39	First Chinese Southern Baptist Church	1255 Hyde St.	47	Trinity Episcopal Church	1668 Bush St.
40	Advent of Christ the King Church	261 Fell St.	48	Templo Calvario	1419 Howard St.

Source: Parsons, 2009.

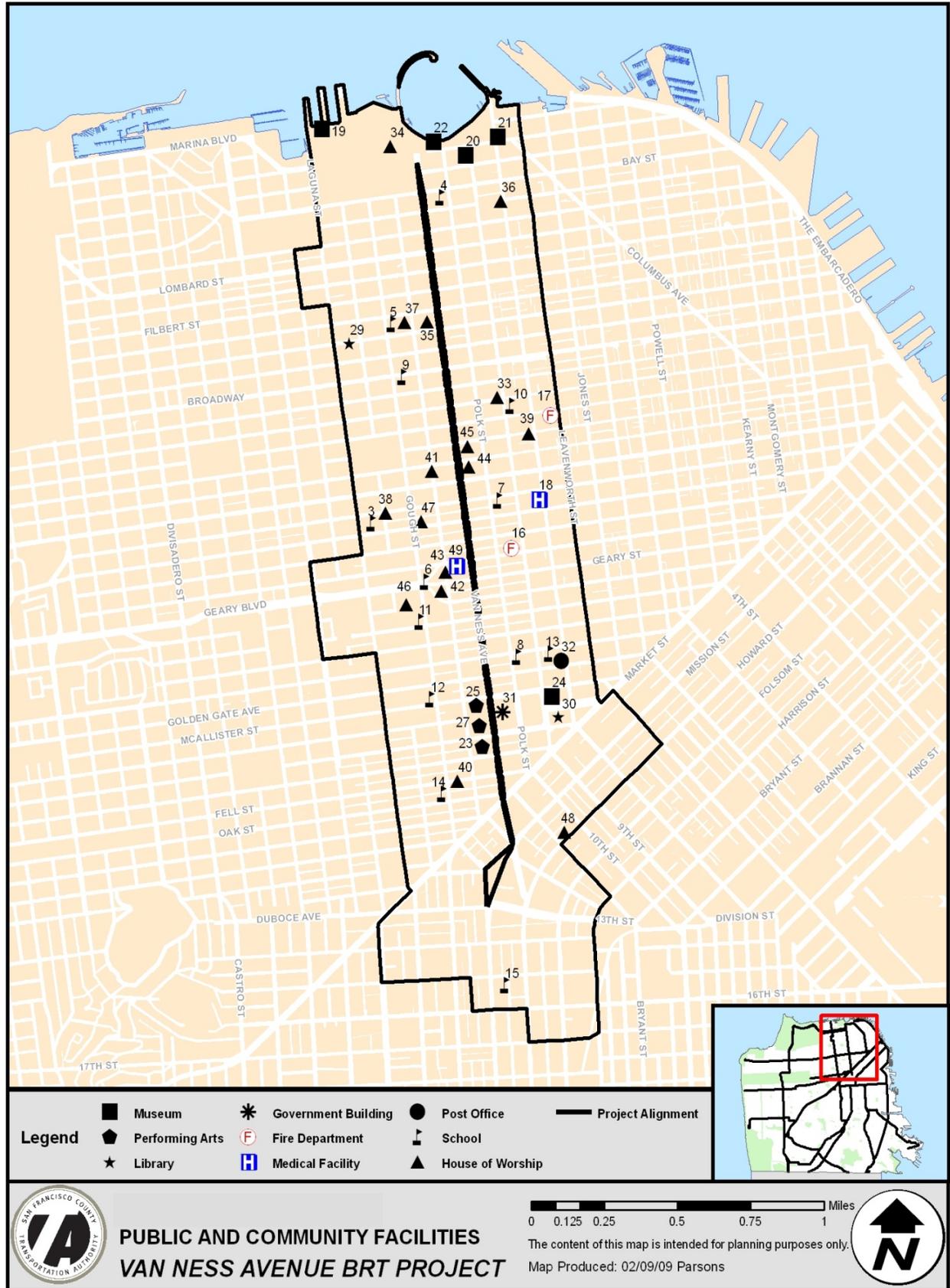


Figure 4.2-2: Public and Community Facilities

Parks and Recreation Facilities

As listed in Table 4.2-6 and shown in Figure 4.2-3, there are ten parks, five recreational facilities, and five other public spaces within the study area.

Table 4.2-6: Park and Recreation Facilities

ID	NAME	LOCATION
1	Joseph Conrad Memorial Park	Beach Street & Columbus Avenue
2	Russian Hill Park	Bay & Hyde Streets
3	Alice Marble Tennis Courts	Lombard & Hyde Streets
4	Mini-Park – Page & Laguna	Page & Laguna Streets
5	Mini-Park – Green & Hyde	Green & Hyde Streets
6	Tenderloin Playground	Ellis & Leavenworth Streets
7	Mini-Park – Turk & Hyde	Turk and Hyde Streets
8	U.N. Plaza	Market & McAllister Streets
9	Allyne Park	Green & Gough Streets
10	Lafayette Park	Sacramento & Gough Streets
11	Jefferson Square	Turk & Gough Streets
12	Hayward Playground	Golden Gate Avenue & Gough Street
13	Mini-Park – Washington Street	Washington & Hyde Streets
14	Helen Wills Playground	Broadway & Larkin Street
15	Sergeant J. Macaulay Park	O'Farrell & Larkin Streets
16	Civic Center Plaza	Grove & Larkin Streets
17	Fort Mason	Bay Street & Van Ness Avenue
18	Peace Plaza	Geary Boulevard & Buchanan Street
19	San Francisco Maritime National Historical Park	Beach Street
20	Strauss Playground	14th & Valencia Streets

Source: Parsons, 2009.

4.2.2.2 | ENVIRONMENTAL CONSEQUENCES

Improved transit access to public services and community facilities would occur as a result of the build alternatives, including the LPA. Inclusion of the Vallejo Northbound Station Variant would further enhance transit access. This enhanced accessibility within the study area would benefit the community and public facilities identified in Tables 4.2-5 and 4.2-6 and shown in Figures 4.2-2 and 4.2-3. Impacts during the construction phase are described in Section 4.15.2, Construction Community Impacts.

4.2.2.3 | AVOIDANCE, MINIMIZATION, AND/OR MITIGATION MEASURES

Because there would be no adverse effects on community facilities, no mitigation measures are proposed. Avoidance and minimization measures to be implemented during the construction phase are described in Section 4.15.2, Construction Community Impacts.

KEY FINDING

There would be no adverse effects on community facilities. Improved access to public services and community facilities would occur as a result of the build alternatives, benefitting those services and facilities.

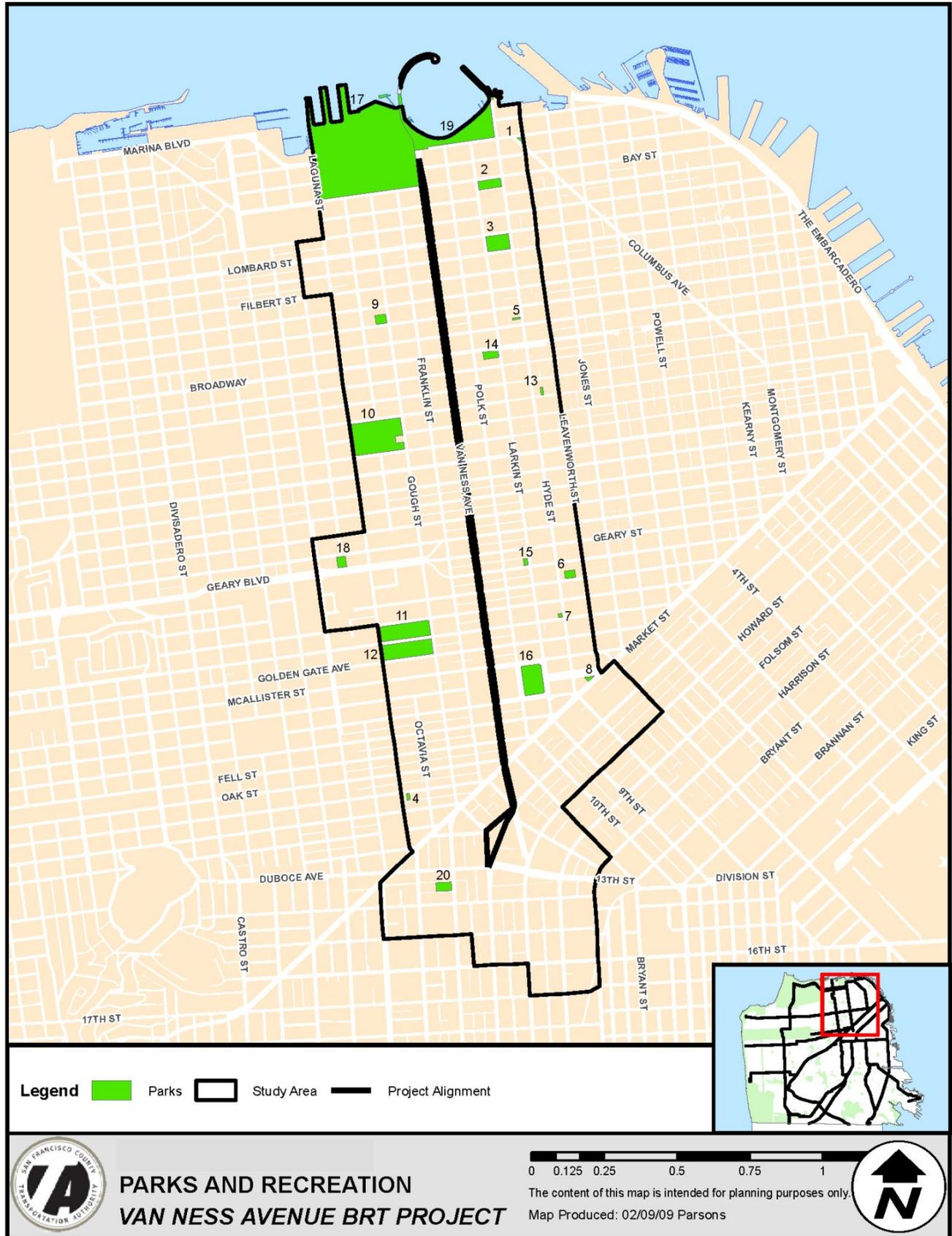


Figure 4.2-3: Parks and Recreation

4.2.3 | Relocations

There would be no residential or business relocations as a result of the proposed project.

4.2.4 | Economic and Business Environment

This section evaluates potential adverse effects of the proposed project on business and commercial districts in the corridor.

4.2.4.1 | AFFECTED ENVIRONMENT

The Van Ness Avenue corridor, along with side and parallel streets, supports a wide range of businesses, cultural arts, religious organizations, and institutions. Retail, entertainment, and tourist activities are distributed throughout the corridor, with larger hotels concentrated along Van Ness Avenue near Geary and California streets. Many business associations are intermixed throughout the corridor that extend to side and parallel streets, notably the Hayes Valley Merchants Association, Polk Street Merchants Association, and South of Market Business Association.

Government and institutional employment accounts for more than 50 percent of the jobs located along this corridor, with most of the employment concentrated in the Civic Center area. Cultural and performing arts organizations also provide employment opportunities in the vicinity of the Civic Center. Eighty (80) percent of the jobs east of Van Ness Avenue are in the retail and office sector. Large-sale retail activities, such as automobile dealerships, home furnishings, and electronic sales, are located along Van Ness Avenue primarily between Broadway Street and the Civic Center. Neighborhood-serving retail stores are located along Van Ness Avenue north of Broadway Street and are clustered along adjacent commercial streets along much of the corridor.

Government and institutional employment accounts for more than 50 percent of the jobs located along the corridor. 80 percent of the jobs east of Van Ness Avenue are in the retail and office sector.

Labor Force Characteristics

An estimated 48,892 civilians, age 16 and older, were in the study area labor force, according to the 2000 U.S. Census information. Of this total, 46,622 persons were employed and 2,270 were unemployed. As shown in Table 4.2-7, professional, scientific, management, administrative, and waste management occupations represented 24 percent of the labor force in the study area, followed by the arts, entertainment, recreation, accommodation, and food services occupations representing 13 percent of the labor force. Approximately 12 percent of the labor force works in the finance, insurance, real estate, and rental and leasing sectors.

Table 4.2-7: Labor Force by Occupation – 2000 (Civilians Age 16+)

	STUDY AREA		CITY AND COUNTY OF SAN FRANCISCO	
	Count	Percentage	Count	Percentage
Agriculture, forestry, fishing and hunting, and mining	125	0%	825	0%
Construction	1,210	3%	14,961	4%
Manufacturing	2,512	5%	28,228	7%
Wholesale trade	1,048	2%	10,954	3%
Retail trade	4,804	10%	43,935	10%
Transportation and warehousing, and utilities	1,379	3%	19,111	4%
Information	4,022	9%	30,000	7%
Finance, insurance, real estate, and rental and leasing	5,616	12%	43,479	10%

Table 4.2-7: Labor Force by Occupation – 2000 (Civilians Age 16+)

	STUDY AREA		CITY AND COUNTY OF SAN FRANCISCO	
Professional, scientific, management, administrative, and waste management	11,170	24%	82,573	19%
Educational, health, and social services	5,267	44%	69,461	16%
Arts, entertainment, recreation, accommodation, and food services	6,190	13%	48,079	11%
Other services (except public administration)	2,107	5%	21,995	5%
Public administration	1,172	3%	14,222	3%
Employed labor force	46,622	95%	427,823	95%
Unemployed labor force	2,270	5%	20,609	5%
Total Labor Force	48,892		448,432	

Occupational patterns in the City and County of San Francisco are slightly different. Similar to the trend in the study area, the highest percentage (approximately 19 percent) of the labor force works in the professional, scientific, management, administrative, and waste management sector. Approximately 16 percent of the labor force works in the educational, health, and social services sector.

4.2.4.2 | ENVIRONMENTAL CONSEQUENCES

In general, the proposed Van Ness Avenue BRT project would not adversely affect the regional or local economy. The BRT service proposed under the build alternatives would improve transit access to jobs and commercial uses in the Van Ness Avenue corridor, which is likely to benefit the local economy. No business acquisitions or relocations would be required under the build alternatives, including the LPA; therefore, no associated loss of tax revenue would be recognized in the study area jurisdictions.

Beneficial Effects of the Proposed BRT Project

Improved transit services and higher transit ridership that would occur with implementation of any of the build alternatives, including the LPA, would provide greater support for increased business activity in the study area.

Improved transit services and higher transit ridership that would occur with implementation of any of the build alternatives, including the LPA, would provide greater support for increased business activity in the study area. There would be benefits to corridor retail, service, restaurant, and entertainment businesses from larger numbers of people using transit to access commercial areas and cultural and entertainment facilities, as well as from larger numbers of people moving through business and commercial areas on BRT buses and becoming familiar with the businesses, shopping, and entertainment opportunities available along the BRT route. Improved transit access with the proposed project would also provide greater benefits for the hospitals and medical centers in the corridor through improved transit services for patients, visitors, and employees. Similarly, the proposed build alternatives would provide benefits for office businesses, government centers, and educational institutions within the study area through improved transit services for workers, students, and visitors.

The BRT transit improvements would also enhance the image and desirability of commercial areas along the corridor and promote a more pedestrian-oriented environment. The proposed project would provide new BRT stations, a more consistent landscape theme along medians, and pedestrian safety improvements under each build alternative, which would enhance the image of the corridor. The benefits of enhanced desirability and image would generally apply to commercial areas and activity centers throughout the study area; and increased accessibility would be focused in the vicinity of BRT stations where there would be increased foot traffic.

Effects from Traffic and Local Circulation

The proposed project would affect local traffic circulation due to vehicular lane reductions and turning restrictions. As discussed in Section 3.3, the build alternatives would improve delays at some intersections and cause impacts at up to two intersections, depending on alternative (see Table 3.3-17) in year 2015. These delays are forecast during the PM peak period; the project effects on traffic circulation would be less at other times of the day and night when shopping, eating out, entertainment, and other commercial activities often occur. Overall, impacts from local vehicular traffic congestion at certain intersections along the Van Ness Avenue corridor are not anticipated to substantially affect local businesses within the project area.

Delays are forecast during the PM peak period; the project effects on traffic circulation would be less at other times of the day and night when shopping, eating out, entertainment, and other commercial activities often occur.

Effects from On-Street Parking Removal

The project build alternatives, including the LPA, would require the permanent removal of some on-street parking along parts of the corridor, as described in Section 3.5, Parking. This section considers whether the required removal of on-street parking could potentially have adverse effects on adjacent businesses by identifying locations where:

- All or much of the parking is removed along a particular block face; and
- Where colored parking spaces would be removed and could not be replaced along the same or an adjacent block face.

As explained in Section 3.5, street parking would generally be maintained throughout Van Ness Avenue depending on alternative, ranging from a gain of 3 percent under Build Alternative 4 with Design Option B, to a loss of 23 percent under the LPA, with or without the Vallejo Northbound Station Variant.⁶⁵ The build alternatives, including the LPA, would not require changes in parking on adjacent streets or in parking lots that serve the area. Nonetheless, depending on the project alternative, there are some locations where much or all of the parking along a particular block face would be removed, as shown in Table 4.2-8.

Overall, under each build alternative, including the LPA, parking spaces would be gained in the Civic Center area. The loss of parking along Van Ness Avenue that would occur mid-corridor in the high-density, mixed-use commercial/residential area would be similar among the proposed build alternatives. SFMTA would give priority to retaining on-street colored parking spaces.

Overall, under each build alternative, including the LPA (with or without the Vallejo Northbound Station Variant), parking spaces would be gained in the Civic Center area, which would offset the loss of parking listed in Table 4.2-8 for this segment. The loss of parking along Van Ness Avenue would not affect vehicular accessibility to the Civic Center uses with implementation of any of the build alternatives, including the LPA, (the drop-off zones provided along Van Ness Avenue would be retained under any alternative). The loss of parking along Van Ness Avenue that would occur mid-corridor in the high-density, mixed-use commercial/residential area would be similar among the build alternatives, including the LPA (with or without the Vallejo Northbound Station Variant), although more concentrated parking removal on certain blocks would occur under Build Alternatives 3, 4, and the LPA (with or without the Vallejo Northbound Station Variant); whereas parking removal would be more evenly distributed throughout this segment under Build Alternative 2. In the northern portion of the corridor, the adjacent land uses are predominantly multi-unit residential with neighborhood-serving commercial properties. On-street parking would be entirely removed on one or more sides of Van Ness Avenue on three of the six blocks in this segment of the corridor, under the LPA (with or without the Vallejo Northbound Station Variant). Table 4.2-8 provides the percentage of change in total parking spaces in each of these segments and identifies the blocks of Van Ness Avenue where street parking would be almost entirely removed on one or more sides of Van Ness Avenue.

⁶⁵ The LPA would provide fewer spaces than any of the other alternatives. This is due in part to a more refined analysis of parking changes prepared for the LPA than for the build alternatives, which considered the following factors that were not part of the analysis in the Draft EIS/EIR: updated existing conditions, longer curb bulbs per the Caltrans Highway Design Manual May 2012 update, wider BRT lanes per MTA requirements set forth in 2012, and current more refined adherence to ADA design requirements such as provision of curb ramps behind handicapped spaces (which largely are not present in existing conditions). Thus the parking analysis for the LPA is a more refined analysis than that presented for the build alternatives. A sensitivity analysis taking into account the aforementioned factors was performed, indicating that applying the methodology used for the LPA to the build alternatives would result in up to 32 additional spaces removed for the build alternatives, meaning that Build Alternative 3 would result in the same amount of parking loss as the LPA.

Table 4.2-8: Blocks of Van Ness Avenue where Substantial Parking would be Removed

VAN NESS AVENUE SEGMENT	NUMBER OF TOTAL PARKING SPACES REMOVED (COLORED AND GENERAL SPACES) ¹	NET PERCENTAGE OF PARKING REMOVED ²
Market Street to Golden Gate Avenue (Civic Center) ³	<ul style="list-style-type: none"> • Removal of all 6 spaces on the west side of Van Ness Avenue between Market and Fell streets under Build Alternative 3 with Design Option B. • Removal of all 6 spaces on the east side of Van Ness Avenue between Market and Fell streets under Build Alternative 3. Removal of 10 out of 11 spaces on the west side of Van Ness Avenue between Fell and Hayes streets under Build Alternative 3 without Design Option B; and removal of 9 of 11 spaces on this same block under Build Alternative 4 without Design Option B. Eleven (11) spaces would be added to the east side of this block under Build Alternative 4 and 13 spaces would be added under Build Alternative 3 to offset the loss of parking on this block. • Removal of 8 out of 9 spaces on the east west side of Van Ness Avenue from Fulton to McAllister streets under Build Alternative 3. • Removal of 10 out of 12 spaces on the west side of Van Ness Avenue from McAllister Street to Golden Gate Avenue under the LPA. 	<ul style="list-style-type: none"> • Build Alternative 2 would result in a 15% increase (+12 spaces) in parking spaces. • Build Alternative 3 would result in a 3% reduction (-3 spaces) in parking spaces. • Build Alternative 3 with Design Option B would result in a 2% increase (+2 spaces) in parking spaces. • Build Alternative 4 would result in a 27% increase (+22 spaces) in parking spaces. • Build Alternative 4 with Design Option B would result in a 31% increase (+25 spaces) in parking spaces. • LPA, with or without the Vallejo Northbound Station Variant, would result in a 13% increase (+11 spaces) in parking spaces.
Golden Gate Avenue to Broadway Street (High-Density, Mixed-Use Commercial/Residential) ⁴	<ul style="list-style-type: none"> • Removal of 9 out of 11 spaces on the west side of Van Ness Avenue between Golden Gate Avenue and Turk Street under Build Alternative 3 without Design Option B; and removal of 9 of 10 spaces on this same block under Build Alternative 4 without Design Option B. • Removal of 6 out of 8 spaces on the east side of Van Ness Avenue between Turk and Eddy streets under the LPA. • Removal of all 5 spaces on the west side of Van Ness Avenue between O'Farrell and Geary streets under Build Alternative 3 and the LPA. • Removal of all 8 spaces on the west side of Van Ness Avenue between O'Farrell and Geary streets under Build Alternative 4, with or without Design Option B. Three spaces would be gained on the east side of this block of Van Ness Avenue to partially offset the loss of parking on the west side. • Removal of all 5 spaces on the east side of Van Ness Avenue between O'Farrell and Geary streets under Build Alternative 3. • Removal of 4 out of 5 spaces on the west side of Van Ness Avenue between Post and Sutter streets under Build Alternative 3. • Removal of 4 out of 5 spaces on the east side of Van Ness Avenue between Sutter and Bush streets under Build Alternative 2. • Removal of 4 out of 5 spaces on the east side of Van Ness Avenue between Sutter and Bush streets, and removal of 8 out of 9 spaces on the west side of this block under the LPA. • Removal of all 10 spaces on the west side and 8 out of 10 spaces on the east side of Van Ness Avenue between Bush and Pine streets under Build Alternative 4 without Design Option B. 	<ul style="list-style-type: none"> • Build Alternative 2 would result in a 17% reduction (-42 spaces) in parking spaces. • Build Alternative 3 would result in a 22% reduction (-54 spaces) in parking spaces. • Build Alternative 3 with Design Option B would result in a 9% reduction (-21 spaces) in parking spaces. • Build Alternative 4 would result in a 15% reduction (-37 spaces) in parking spaces. • Build Alternative 4 with Design Option B would result in a 1% increase (+2 spaces) in parking spaces. • LPA, with or without the Vallejo Northbound Station Variant, would result in a 22% reduction (-53 spaces) in parking spaces.

Table 4.2-8: Blocks of Van Ness Avenue where Substantial Parking would be Removed

VAN NESS AVENUE SEGMENT	NUMBER OF TOTAL PARKING SPACES REMOVED (COLORED AND GENERAL SPACES) ¹	NET PERCENTAGE OF PARKING REMOVED ²
	<ul style="list-style-type: none"> Removal of 10 out of 11 spaces on the east side of Van Ness Avenue between Sacramento and Clay streets, and removal of 4 out of 5 spaces on the west side of this block under the LPA. Removal of all 5 spaces on the east side of Van Ness Avenue between Jackson and Pacific streets under Build Alternative 3, with or without Design Option B. Removal of 4 out of 5 spaces on the east side of Van Ness Avenue between Jackson and Pacific streets, and removal of 8 out 9 spaces on the west side of this block under the LPA. Removal of 7 out of 11 spaces on the east side of Van Ness Avenue between Pacific and Broadway streets under the LPA. Two spaces will be gained on the west side of this block to partially offset the loss of parking on the east side. 	
Broadway to Lombard streets (Multi-Family Residential with Neighborhood-Commercial)	<ul style="list-style-type: none"> Removal of all spaces on the east (9 spaces) and west sides (9 spaces) of Van Ness Avenue between Broadway and Vallejo streets under Build Alternatives 3 and 4, with or without Design Option B, and the LPA. Five parking spaces (4 under the LPA) would be gained on the west side of Van Ness Avenue one block south (Washington to Jackson Street) to partially offset the loss of parking on this adjacent block. Removal of all 9 spaces along the west side of Van Ness Avenue from Vallejo to Green streets and all 8 spaces along the east side of this block under Build Alternative 3 and the LPA. Removal of all 9 spaces along the east side of Van Ness Avenue between Green and Union streets under Build Alternatives 3 and 4, both without Design Option B. Removal of 6 out of 9 spaces along the east side of Van Ness Avenue between Green and Union streets under the LPA. Removal of all 8 spaces along the west side of Van Ness Avenue between Greenwich and Lombard streets under the LPA. 	<ul style="list-style-type: none"> Build Alternative 2 would result in a 3% reduction (-3 spaces) in parking spaces. Build Alternative 3 would result in a 40% reduction (-41 spaces) in parking spaces. Build Alternative 3 with Design Option B would result in a 12% reduction (-12 spaces) in parking spaces. Build Alternative 4 would result in a 24% reduction (-22 spaces) in parking spaces. Build Alternative 4 with Design Option B would result in a 14% reduction (-14 spaces) in parking spaces. LPA would result in a 51% reduction (-52 spaces) in parking spaces. LPA with the Vallejo Northbound Station Variant would result in a 51% reduction (-51 spaces) in parking spaces.

¹ Blocks of Van Ness Avenue where street parking would be almost entirely removed on one or more sides of Van Ness Avenue.

² Net percentage of parking removed is presented for the total number of parking, including colored spaces and general parking spaces.

³ The addition of parking spaces on the blocks of Van Ness Avenue between Fell and Hayes, and Hayes and Grove, would offset the loss of parking in the Civic Center area that would occur under Build Alternatives 3 and 4; therefore loss of parking along Van Ness Avenue would not impact the Civic Center with implementation of any of the build alternatives.

⁴ In this segment of the corridor, there is a high percentage of colored spaces (i.e., green [short-term parking], white [passenger loading], yellow [truck loading], and blue [disabled parking]). In keeping with SFMTA's policy to make retention of colored spaces a priority, there would be a proportionately higher percentage of general on-street parking spaces displaced in this segment of the corridor.

As stated in Section 3.5.2, SFMTA would give priority to retaining on-street colored parking spaces (i.e., green [short-term parking], white [passenger loading], yellow [truck loading], and blue [disabled parking]). As part of the project design, in any cases of conflicting needs for color zones, SFMTA would work to build consensus among fronting business owners and determine the best allocation of colored spaces to suit the needs of these establishments. Field surveys were conducted in January 2011 and October 2012 to identify the specific commercial and residential properties affected and the feasibility of providing replacement on-street colored parking spaces as part of project design (Parsons, 2011, SFCTA, 2013). Based on the survey, it was confirmed that in most cases colored spaces would be able to be retained on the same street block or on adjacent blocks. Passenger and truck loading zones could be provided on the same side of the street, where feasible, so that crossing a street for loading would not be needed; however, specific locations were identified where provision of replacement colored spaces on an adjoining block may not be feasible or where an affected business may have special needs requiring immediately adjacent parking, such as passenger loading zones that serve elderly or infirmed people or truck loading zones that support delivery of large commercial goods. Potentially significant colored parking zone impacts on the area's adjacent uses are identified in Table 4.2-9.

Table 4.2-9: Adverse Colored-Zone Parking Impacts

VAN NESS AVENUE BLOCK	POTENTIAL COLORED SPACE PARKING IMPACTS ¹
Golden Gate Avenue – Turk Street (west side)	<ul style="list-style-type: none"> • One out of three passenger loading spaces serving the Opera Plaza would be removed under Build Alternative 3 without Design Option B. • Two out of three passenger loading spaces serving the Opera Plaza would be removed under Build Alternative 4 without Design Option B.
O'Farrell Street – Geary Street (west side)	<ul style="list-style-type: none"> • The two passenger loading spaces serving The Avenue assisted-living residential facility² would be removed under Build Alternative 4, both with or without Design Option B. • The three passenger loading spaces serving The Chron media studio would be displaced under Build Alternative 4, both with or without Design Option B.
O'Farrell Street – Geary Street (east side)	<ul style="list-style-type: none"> • The two passenger loading spaces serving the Opal Hotel would be displaced under the LPA. These spaces could be replaced on Geary Street or Alice B. Toklas alley.
Sutter Street to Bush Street (east side)	<ul style="list-style-type: none"> • The one green short-term parking space and the two truck loading spaces that serve a sports bar would be displaced under the LPA. These spaces could be replaced along Fern alley.
Sutter Street to Bush Street (west side)	<ul style="list-style-type: none"> • The five green short-term parking spaces that serve the Chevrolet dealership, an Antique store, and BevMo would be removed under the LPA; however, none of these businesses currently pay for these spaces.
Bush Street – Pine Street (west side)	<ul style="list-style-type: none"> • The two truck loading spaces that serve the Mattress Discount Store would be displaced under Build Alternative 4 without Design Option B. • The one passenger loading space that serves The Inverness residential property would be displaced under Build Alternative 4 without Design Option B.
Sacramento Street to Clay Street (east side)	<ul style="list-style-type: none"> • The one passenger loading space that serves the St Luke's Episcopal Church would be displaced under the LPA.
Broadway Street – Vallejo Street (west side)	<ul style="list-style-type: none"> • The three passenger loading spaces that serve the Academy of Art University (shuttle stop) and a dental office would be displaced under Build Alternatives 3 and 4, both with or without Design Option B. • The three passenger loading spaces that serve the Academy of Art University (shuttle stop) and a dental office would be displaced under the LPA.

Table 4.2-9: Adverse Colored-Zone Parking Impacts

VAN NESS AVENUE BLOCK	POTENTIAL COLORED SPACE PARKING IMPACTS ¹
Vallejo Street to Green Street (west side)	<ul style="list-style-type: none"> The one short-term green parking space that serves the mini-mart and the three passenger loading spaces that serve a Swiss restaurant and a chiropractor's office would be displaced under the LPA.
Greenwich Street to Lombard Street (west side)	<ul style="list-style-type: none"> The one short term parking space that serves dry cleaners and the four passenger loading spaces that serve the Comfort Inn By the Bay hotel would be displaced under the LPA. The loading spaces could be relocated to Lombard Street.

¹ Colored parking spaces include green (short-term parking), white (passenger loading), yellow (truck loading), and blue (disabled parking).

² Under the LPA, with or without the Vallejo Northbound Station Variant, all white colored parking spaces would be retained in front of The Avenue assisted living facility.

4.2.5 | Avoidance, Minimization, and/or Mitigation Measures

As described above, the BRT build alternatives, including the LPA (with or without the Vallejo Northbound Station Variant), could have adverse effects on commercial and residential properties resulting from the displacement of on-street parking. A detailed analysis of project-related impacts to parking and circulation, and measures to mitigate these impacts are addressed in Chapter 3, Transportation Analysis. Additional measures to minimize economic impacts on properties along Van Ness Avenue from parking removal include the following:

M-CI-IM-1⁶⁶: SFMTA will coordinate with all businesses that would be affected by removal of colored parking spaces, including short-term parking, to confirm the need for truck and/or passenger loading spaces and to identify appropriate replacement parking locations to minimize the impacts to these businesses.

M-CI-IM-2⁵⁷: SFMTA will apply parking management tools as needed to offset any substantial impacts from the loss of on-street parking, including adjustment of residential parking permits in the residential community north of Broadway Street, or SFpark, which is a package of real-time tools to manage parking occupancy and turnover through pricing (appropriate in areas of high-density commercial uses that rely on high parking turnover).

⁶⁶ M-CI-IM-1 and M-CI-IM-2 constitute a mitigation measure under NEPA and an improvement measure under CEQA.

KEY FINDINGS

The proposed BRT build alternatives, including the LPA, could have adverse effects on commercial and residential properties resulting from the displacement of on-street parking. Two mitigation measures are proposed to minimize the potential impacts.

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4.3 Growth

This chapter examines whether the proposed project would induce substantial population growth in an area, either directly (e.g., by proposing new homes and businesses) or indirectly (e.g., through extension of roads or other infrastructure) at a level in excess of what is projected for the Bay Area and for San Francisco, and result in changes in patterns of land use, population density, or growth rate. Increased development and population growth in an area are dependent on a variety of factors, including employment opportunities, land use controls and availability of developable land, and availability of infrastructure, including utilities.

The LPA included in this Final EIS/EIR is a refinement of the center-running alternatives with limited left turns (Build Alternatives 3 and 4 with Design Option B), as described in Chapters 2 and 10. The environmental consequences related to growth under the LPA, with or without the Vallejo Northbound Station Variant, are identified as part of the analysis presented for the build alternatives in this chapter. There would be no difference in such impacts under the LPA compared with the impacts described for the build alternatives in this subsection.

4.3.1 | Affected Environment

The Van Ness Avenue corridor is a built out, urban environment with developed infrastructure and utilities. There are no major vacant parcels available for development in the project area, although some parcels have been identified as having the potential for reuse or redevelopment as high-density mixed-use (ABAG, 2007). Such planned projects are listed in Table 4.1-1, Major Approved and Active Projects in the Study Area. As summarized in Section 4.1.1.1, Development Trends, growth and development trends in the Van Ness Avenue corridor and vicinity support high-density, transit-supportive redevelopment and infill in the project area.

The Van Ness Avenue corridor supports the largest concentration of housing of any of the City's major transit corridors. Based on the 2000 U.S. Census and the 2007 ABAG projections used in the adopted Regional Transportation Plan: Transportation 2035, the City is expected to gain 66,610 new households, which is a 20 percent increase, between 2000 and 2035. The Van Ness Avenue BRT study area is expected to see an increase in the number of households by 12,208, which is a 28 percent increase, during the same period.

At the same time, the Van Ness Avenue corridor supports a wide range of businesses, institutions, cultural arts, and religious organizations anchored by the Civic Center area. The Van Ness Avenue corridor serves as a designated City "Major Commercial Area." Land use plans for the corridor, which are discussed in detail in Chapter 4.1, Land Use, envision high-density mixed-use development. The Van Ness Avenue corridor is designated part of a PDA by ABAG and MTC. Regional transportation and land use planning documents call for future growth to occur in PDAs because they contain transit and infill development opportunity areas and are within existing communities.

4.3.2 | Environmental Consequences

Transportation projects are potentially population-growth inducing when they extend transportation and infrastructure service to the edge of an urban area, reducing travel times and improving access between employment opportunities and vacant or underdeveloped land to the extent that the travel time savings and enhanced accessibility outweigh other factors affecting locational decisions. A significant impact would occur if the project would directly or indirectly induce substantial population growth in an area.

DEFINITION

PRIORITY DEVELOPMENT AREA (PDA): Locally identified, infill development opportunity areas within existing communities. They are generally areas of at least 100 acres where there is local commitment to developing more housing, along with amenities and services to meet the day-to-day needs of residents in a pedestrian-friendly environment served by transit.

The project corridor is a built-out, urban environment with sufficient infrastructure and utilities, and existing bus transit service. The No Build Alternative and proposed build alternatives (including the LPA, with or without the Vallejo Northbound Station Variant) would improve reliability and introduce travel time savings for transit patrons, but not to an extent that would influence land use development patterns and population densities at a level in excess of what is projected for the Bay Area and San Francisco.

While operation of the proposed build alternatives (including the LPA, with or without the Vallejo Northbound Station Variant), and to a lesser extent the No Build Alternative, would improve transit service and access to jobs and housing, they would not induce population growth at a level in excess of what is projected for the Bay Area and San Francisco. Implementation of the build alternatives (including the LPA) is not expected to generate substantial new development, but it would better accommodate existing and planned residential and commercial growth. The proposed build alternatives (including the LPA) would support the additional or higher-density development planned in the vicinity of stations and would in general accommodate the transit needs envisioned for growth planned in the Van Ness Avenue corridor and vicinity. Furthermore, the proposed build alternatives (including the LPA, with or without the Vallejo Northbound Station Variant), and to a lesser extent the No Build Alternative, would be generally consistent with San Francisco’s “Transit First” policy, as well as regional government policies aimed at improving transportation access to job centers and recreational opportunities like those offered by the Civic Center and Fort Mason.

The construction phase of the proposed build alternatives (including the LPA, with or without the Vallejo Northbound Station Variant) would also not influence population growth projected for the Bay Area and San Francisco. It is reasonable to expect that local workers would support construction of the proposed project, not workers moving into the area. Population growth within the City and region would not change as a result of project construction; therefore, implementation of the proposed project is not anticipated to result in growth-related impacts.

KEY FINDING

Implementation of the proposed build alternatives (including the LPA) is not anticipated to directly or indirectly induce population growth at a level in excess of what is projected for the Bay Area and for San Francisco; therefore, the project would not cause significant growth impacts.

4.3.3 | Avoidance, Minimization, and/or Mitigation Measures

Construction and operation of the proposed build alternatives (including the LPA, with or without the Vallejo Northbound Station Variant) would not lead to unplanned growth in the Van Ness Avenue corridor or larger region; therefore, it would not result in growth-related impacts. On the contrary, all of the build alternatives (including the LPA, with or without the Vallejo Northbound Station Variant), and the No Build Alternative to a lesser extent, would support planned growth and the planning goals of the City; therefore, avoidance, minimization, or mitigation measures are not required.

4.4 Aesthetics/Visual Resources

This section summarizes the regulatory setting; affected environment; environmental consequences; and measures to avoid, mitigate, or compensate for long-term, permanent impacts to visual resources in the Van Ness Avenue corridor because of the proposed project. Construction-phase impacts and avoidance measures are presented in Section 4.15.3. Key documents reviewed in support of this study include the *Van Ness Avenue Corridor Initial Land Use and Urban Design Needs Assessment* (City of San Francisco, 2004); *Van Ness Avenue Bus Rapid Transit Overhead Contact System Support Poles/Streetlights Conceptual Engineering Report* (SFDPW, 2009); *Historic Resources Inventory and Evaluation Report for the Van Ness Avenue Bus Rapid Transit Project* (JRP, 2009); Finding of Effect for the Van Ness Avenue Bus Rapid Transit Project (Parsons, 2013c); *San Francisco Better Streets Plan* (City of San Francisco, 2010); and *San Francisco General Plan* (City of San Francisco, 1990). Other supporting studies include a tree survey completed in 2009 and a tree removal and planting opportunity evaluation completed in 2012 by a certified arborist (BMS Design Group, 2009 and 2013).

The LPA included in this Final EIS/EIR is a refinement of the center-running alternatives with limited left turns (Build Alternatives 3 and 4 with Design Option B), as described in Chapters 2 and 10. The environmental consequences related to visual resources under the LPA are identified as part of the analysis presented for the build alternatives in this chapter. Because the LPA configuration is a variation of the configurations analyzed for the center-running alternatives in the Draft EIS/EIR, the LPA has different results for the total tree removal impacts and replanting opportunities presented for the build alternatives. However, the overall impact findings with the LPA (with or without the Vallejo Northbound Station Variant) are consistent with the findings for Build Alternatives 3 and 4, as presented in this subsection.

4.4.1 | Regulatory Setting

A review of scenic/visual resource plans and policies applicable to development of BRT in the Van Ness Avenue corridor and relevant regulatory bodies and approvals follows.

4.4.1.1 | SCENIC/VISUAL RESOURCE PLANS AND POLICIES

This section provides a review of scenic/visual resource plans and policies applicable to development of BRT in the Van Ness Avenue corridor.

San Francisco General Plan, Urban Design Element (City of San Francisco, 1990)

Land use planning goals and policies are guided by the San Francisco General Plan. The Urban Design Element of the San Francisco General Plan concerns the physical character and order of the city, and the relationship between people and their environment (City of San Francisco, 1990).⁶⁷

Policies supportive of the aforementioned major urban design objectives that are relevant to a transportation project, such as the proposed project, are listed below:

- Policy 1.1: Recognize and project major views in the city, with particular attention to those of open space and water.
- Policy 1.5: Emphasize the special nature of each district through distinctive landscaping and other features.

The Urban Design Element of the San Francisco General Plan concerns the physical character and order of the city, and the relationship between people and their environment.

⁶⁷ The Urban Design Element of the San Francisco General Plan was amended December 7, 2010, to incorporate reference to and elements of the Final Better Streets Plan adopted in December 2010.

- Policy 1.6: Make centers of activity more prominent through design of street features and by other means.
- Policy 1.7: Recognize the natural boundaries of districts and promote connections between districts.
- Policy 1.8: Increase the visibility of major destination areas and other points for orientation
- Policy 1.9: Increase the clarity of routes for travelers.
- Policy 1.10: Indicate the purposes of streets by adopting and implementing the Better Streets Plan, which identifies a hierarchy of street types and appropriate streetscape elements for each street type.
- Policy 2.4: Preserve notable landmarks and areas of historic, architectural, or aesthetic value, and promote the preservation of other buildings and features that provide continuity with past development.
- Policy 2.6: Respect the character of older development nearby in the design of new buildings.
- Policy 4.3: Provide adequate lighting in public areas.

San Francisco General Plan, Van Ness Area Plan (City of San Francisco, 1995)

The information provided in the San Francisco General Plan Urban Design Element is made more precise in individual area plans that cover designated geographic areas of the city. The plan is intended to promote Van Ness Avenue as the city's most prominent north-south boulevard, lined with high-density mixed-use development and including design features that support a transit-served pedestrian promenade. The Van Ness Area Plan identifies the following objectives and corresponding policies that pertain to aesthetics and the visual environment:

- Policy 3.1: Create a tree-lined and landscaped median strip within the Van Ness Avenue street space and plant rows of trees in the sidewalk space.
- Policy 5.4: Preserve existing view corridors.
- Policy 8.5: Maintain existing sidewalk widths.
- Policy 8.6: Incorporate uniform sidewalk paving material, color, pattern, and texture throughout the length of Van Ness Avenue. Sidewalk and median strip paving materials should be concrete, light grey-tone in color, with a plain, brushed surface texture, except for a darker grey 12-inch curbside trim, which should add richness in color and texture to the Avenue.
- Policy 8.7: Trim sidewalk curbs with hydraulically pressed, precut 4-inch-square stone paving blocks to a horizontal depth of 12 inches. Replace median pavements with grey-tone interlocking paving blocks. The stone pavers should be of a complementary medium grey-tone color (e.g., Hanover Prest Paving R.D. No. 4).
- Policy 8.8: Assure a uniform architectural style, character, and color in the design of streetlights and poles.
- Painting all of the light poles along Van Ness Avenue a blue and gold color scheme, similar to that of the Civic Center light poles, would contribute to this special identity. If feasible, existing streetlight poles should be maintained and enhanced to contribute to the special identity of the Avenue. The angle and color of illumination on existing and new streetlights should be designed to minimize glare to nearby residential uses. Lighting should not damage adjacent landscape plantings and should provide safe and attractive lighting for pedestrians.
- Policy 8.9: Provide attractive street furniture at convenient locations and intervals throughout the length of the street. New bus shelters or replacement shelters should be placed between the trees along the tree line of the sidewalk. Benches should be attached to the ground and located between the trees along the tree line of the sidewalk adjacent to bus stops.
- Policy 9.12: Unify the design of trash bins, benches, news racks, street lighting fixtures, sidewalk surface treatment, canopies, awnings, and bus shelters throughout the length of the street.
- Policy 11.4: Encourage architectural integration of new structures with adjacent Significant and Contributory Buildings.

The Van Ness Area Plan is intended to promote Van Ness Avenue as the city's most prominent north-south boulevard, lined with high-density mixed-use development and including design features that support a transit-served pedestrian promenade.

The Civic Center Area Plan (1989)

The Civic Center Area Plan outlines a series of policies to guide development in and around City Hall and the surrounding government offices and cultural performing arts facilities. The plan provides a comprehensive program of street and pedestrian improvements in the area intended to reinforce the identity of the Civic Center using common design elements such as sidewalk and street paving, lighting fixtures, landscaping, and street furniture. The plan calls for the use of color and texture of materials throughout the area to reinforce the overall unity and formalism of the Civic Center. The plan is oriented to guide new development; however, the following policy relates to aesthetics of streetscape:

- Policy 1.4: Provide a sense of identity and cohesiveness through unifying street and Plaza design treatments.

San Francisco General Plan, Market and Octavia Area Plan (City of San Francisco, 2007)

The Market and Octavia Area Plan calls for new residential development centered on transit and provides land use, urban design, and transportation policies to support development. Policies regarding aesthetics that are relevant to the proposed project include:

- Policy 4.3.3: Mark the intersections of Market Street with Van Ness Avenue...with streetscape elements that celebrate their particular significance. The designs for these principal intersections should include streetscape elements such as special light fixtures, gateways, and public art pieces that emphasize and celebrate the special significance of each intersection.

The Van Ness Avenue intersection will be provided with pedestrian-oriented additions on the north side and major improvements on the south, associated with the introduction of the Van Ness Avenue Transitway⁶⁸ described in this plan. The intersection should be designed with prominent streetscape elements that signify the crossing of two important streets. This will break up the width of the street into three separate sections, thereby humanizing it and providing pedestrian refuges for people crossing Van Ness Avenue. Widened sidewalks can do the same at the corners, as can extended streetcar platforms on Market Street.

- Policy 1.2.5: Mark the intersection of Van Ness Avenue and Market Street as a visual landmark.

Although this policy is primarily concerned with form and height of buildings, it nonetheless speaks to the City's interest in the visual context of this intersection.

San Francisco Better Streets Plan (2010)

The San Francisco Better Streets Plan provides a comprehensive set of guidelines to improve San Francisco's streetscapes to make them universally accessible to all, more attractive, safe, and comfortable. The plan calls for a comfortable pedestrian realm with significant pedestrian amenities and public spaces that include curb ramps, marked crosswalks, pedestrian signals, corner bulbs/extensions, street trees, tree grates, sidewalk planters, stormwater controls, pedestrian lighting, special paving, and site furnishings. The San Francisco Better Streets Plan explains that streetscapes should be designed to encompass a wide range of features and amenities; however, this does not mean that projects should contain all potential elements or not be built at all—rather, it suggests coordination of streetscape-related projects to make improvements simultaneously and look for opportunities to build additional low-cost elements into existing capital projects. The San Francisco Better Streets Plan was adopted by the San Francisco Board of Supervisors in December 2010. All public and private projects that

The Civic Center Area Plan outlines a series of policies to guide development in and around City Hall and the surrounding government offices and cultural performing arts facilities.

The Market and Octavia Area Plan calls for new residential development centered on transit and provides land use, urban design, and transportation policies to support development.

The San Francisco Better Streets Plan provides a comprehensive set of guidelines to improve San Francisco's streetscapes to make them universally accessible to all, more attractive, safe, and comfortable.

⁶⁸ The Van Ness Avenue Transitway described in the Market and Octavia Area Plan is referring to the Van Ness Avenue BRT Project (City of San Francisco, 2007).

propose changes to any public ROW are required to be consistent with the principles and guidelines for streetscape and pedestrian elements and overall streetscape design found in the Better Streets Plan. (S.F. Admin. Code Chapter 98.) The plan requires that permits be filed with the appropriate agency if any modifications to streetscape are anticipated as part of the project (City of San Francisco, 2013). A separate permit and approval process has not been developed by the City for the San Francisco Better Streets Plan. The plan has been adopted, and compliance with the plan design objectives will be considered through the existing permits and approval processes that apply to any project that would modify the streetscape.

The following policies of the San Francisco Better Streets Plan relate directly to aesthetics and are applicable to the proposed project:

- Policy 1.2: Provide distinctive design treatments for streets with important citywide functions. The following policy guidelines apply:
 - On streets identified as “Important to the City Pattern,” use consistent rows of single species street trees; distinctive, consistent street lighting and site furnishings; special signage; and public art;
 - On streets that are identified as priority pedestrian corridors or zones, provide enhanced pedestrian amenities, facilities, and signage;
 - Define special locations, such as civic or commercial centers, entries to major open spaces, or community facilities, with special streetscape treatments.
- Policy 2.1: Design streets with comfortable spaces for casual interaction and gathering. The following policy guideline applies:
 - Create new spaces for social interaction, such as wide street furnishing zones, corner or mid-block bulb-outs, and the like.
- Policy 7.3: Design transit waiting areas for comfort, accessibility, and ease of use. The following policy guideline applies:
 - Improve existing transit waiting areas to improve attractiveness and remove barriers.
- Policy 7.6: Create convenient, safe pedestrian conditions at transfer waiting areas and transfer points.
 - Create clear wayfinding and directionality at transit transfer points.
- Policy 10.1: Maximize opportunities for street trees and other plantings. The following policy guideline applies:
 - Locate street trees first in available locations before laying out other street furnishings.
 - Allow tree plantings as near to corners for visibility of pedestrians, signs, and signals in order to slow traffic and visually narrow the street and intersection.
 - Allow trees and plantings to be as near as practicable to utilities and other objects in the ROW while still maintaining appropriate clearances.
- Policy 10.3: Provide an orderly and efficient streetscape environment that minimizes visual clutter. The following policy guideline applies:
 - Minimize the number of traffic signs, streetlight, catenary, traffic signal, and other utility poles, and share poles wherever feasible.
- Policy 10.5: Ensure adequate light levels and quality for pedestrians and other sidewalk users; minimize light trespass and glare to adjacent buildings.
 - Select palette of streetlight poles based on criteria including aesthetics, light quality and color, long-term maintenance, and energy efficiency.
 - Emphasize lighting for pedestrians and include pedestrian lighting in street improvement projects as appropriate
- Policy 10.7: Include and integrate public art improvements into street improvement projects.
- Policy 10.8: Balance desired design treatments with the ability to provide adequate maintenance.

4.4.1.2 | RELEVANT REGULATORY BODIES AND APPROVALS

San Francisco Planning Department and Commission

As described above, land use planning goals and policies are guided by the San Francisco General Plan and subarea plans. General Plan Amendments and General Plan Referrals are processes used by the City Planning Department to ensure a project is consistent with the San Francisco General Plan. Modifications to sidewalks and street grade require a General Plan Referral to determine consistency with the General Plan, and if a General Plan Amendment is needed. The Planning Department also assists the Historic Preservation Commission (HPC) in carrying out the requirements of Planning Code Article 10 related to review and approval of Certificates of Appropriateness, which is described in greater detail below as part of the HPC responsibilities.

San Francisco Arts Commission

The San Francisco Arts Commission approves the design of all public structures. The Civic Design Review Committee is a body within the San Francisco Arts Commission that is typically responsible for reviewing and approving the architectural design of structures on City property. Their review is required for any structure or landscaping on or over City property, including transit structures such as station platforms, bus shelters and station canopies, landscaped medians, and planters.

The San Francisco Arts Commission defers to the San Francisco HPC for review and approval of the design of structures located in a historic district.

San Francisco Historic Preservation Commission

Per Planning Code Sections 1005 and 1006, a Certificate of Appropriateness is required from the HPC for projects located within a designated historic district, such as the San Francisco Civic Center. To obtain a certificate of appropriateness, the HPC determines, among other considerations, whether the proposed project complies with the Secretary of the Interior's Standards for the Treatment of Historic Properties and other applicable guidelines, local interpretation, and bulletins. For property in historic districts, the HPC considers whether any changes will be compatible with the character of the historic district as described in the designating ordinance. In the case of property not already being compatible with the character of the district, reasonable efforts shall be made to produce compatibility and, in no event, shall there be a greater deviation from compatibility. This process involves a staff report presented at the HPC hearing, including a Planning Department recommendation for approval, disapproval, or approval with conditions of the Certificate of Appropriateness. The design, architectural style, arrangement, texture, materials, and color of project features are considered. Typically, the Architectural Review Committee of the HPC provides early direction and comments on projects submitted to them for review by the Commission during the design review process. The Architectural Review Committee's written comments and direction are advisory only and not considered binding.

City Hall Preservation Advisory Commission

The City Hall Preservation Advisory Commission advises the San Francisco Mayor, Board of Supervisors, Planning Commission, City Administrator, and the HPC on budgetary issues and matters relating to the operation, maintenance, repair, preservation, and public awareness of the San Francisco City Hall. The Advisory Commission reviews the design of project structures within the Civic Center Historic District adjacent to City Hall, and advises the San Francisco HPC on Certificate of Appropriateness approvals. The Advisory Commission's involvement with the Certificate of Appropriateness is advisory, and their approval is not required.

4.4.2 | Affected Environment

4.4.2.1 | PREVIOUS STUDIES

A Van Ness Corridor Initial Land Use and Urban Design Needs Assessment funded by a grant from Caltrans for community planning of the Van Ness Avenue and Taraval Street Corridors was completed by the City Planning Department in 2004. This assessment evaluated the pedestrian experience along Van Ness Avenue and concluded that, although Van Ness Avenue is functional as an automobile corridor, it lacks many of the basic amenities necessary to make it an attractive space for pedestrian use. The assessment found the placement of tree plantings, lighting, and street furniture to be discontinuous and disorganized. The assessment found that the large automobile traffic volumes and lack of pedestrian amenities and urban design features contribute to a setting that discourages pedestrians from using Van Ness Avenue longer than is necessary. The report concluded that the wide sidewalks, roadway median, and land uses of Van Ness Avenue hold the potential for it to become one of the City's grand boulevards. The report recommends the following urban design improvements to support a transformation of Van Ness Avenue into a more pedestrian-friendly, aesthetically pleasing environment:

- Continuous street tree plantings
- Transit shelter improvements
- Comprehensive street furniture
- Comprehensive street lighting

The report concludes that the historic elements to Van Ness Avenue's design, including light standards, signage, and interspersed tree plantings, can be integrated into a contemporary design that improves pedestrian amenities and emphasizes the avenue's role as a grand thoroughfare.

4.4.2.2 | VIEWSHED

The viewshed for the proposed project consists of the project corridor along Van Ness Avenue and its adjacent land uses, in addition to distant areas with views of and from the project area. Essentially, the project viewshed consists of the actual area in which project features would be visible. All project features would be located within the Van Ness Avenue roadway and sidewalk.

The project viewshed consists of urban landscape that varies in land use, topography, and character throughout the project limits. Some of the project area is relatively flat, while some is gently sloped. The changing slope along Van Ness Avenue provides differing viewsheds and offers scenic vistas at some locations. At the same time, the neighboring hills and ridges of Nob Hill, Russian Hill, and Cathedral Hill provide scenic views that include Van Ness Avenue. The width of the avenue and dominant visual elements of the corridor, such as City Hall, are easily identified from not only these hilltops, but also the distant hilltops of Twin Peaks and Potrero Hill, and from downtown skyscrapers.

4.4.2.3 | VIEWER GROUPS

Viewers of project features can be categorized in the following viewer groups:

- Pedestrians – Pedestrians walking to/from and along Van Ness Avenue within the project limits, or on other streets that offer views of the project area.
- Cyclists – Cyclists riding to/from and along Van Ness Avenue within the project limits, or on other streets that offer views of the project area.
- Transit Patrons – Bus patrons waiting at bus stops and traveling on buses through the project area.
- Motorists – Automobile and truck drivers and passengers traveling through the project area, or on other streets that offer views of the project area.

DEFINITION

VIEWSHED: An area of land, water, or other environmental element that is visible to the human eye from a fixed vantage point.

The project viewshed consists of the actual area in which project features would be visible, including the project corridor along Van Ness Avenue and its adjacent land uses, the neighboring hills and ridges of Nob Hill, Russian Hill, and Cathedral Hill, and the distant hilltops of Twin Peaks and Potrero Hill, and from downtown skyscrapers.

- Residents – Residents who live along Van Ness Avenue within the project limits or who live in nearby buildings with views of the project area.
- Commuters – Workers who commute to jobs located along Van Ness Avenue within the project limits or to nearby or distant buildings with views of the project area.
- Tourists – Visitors/tourists who have traveled to and through the Van Ness Avenue corridor with the intention of experiencing and viewing the cultural and visual resources of city-wide importance that are focally located within the project limits (i.e., Civic Center, Market Street, Fort Mason). Several hotels offer scenic views that encompass the Van Ness Avenue Corridor.

Sensitive Viewer Groups

Viewers that experience regular, consistent, or extended views of the project corridor are considered sensitive viewer groups because they would be most sensitive to changes in the viewshed. Residents and commuters are sensitive viewer groups for the proposed project because they experience frequent, extended, and consistent views of the project area, and they may experience these views not simply from within buildings, but also as pedestrians, cyclists, motorists, and transit patrons. These viewer groups are part of the local community through which the proposed project passes. Residents and commuters would be most sensitive to changes in the viewshed introduced by the proposed project. Tourists are also a sensitive viewer group because much of their purpose in being present in the Van Ness Avenue corridor is to enjoy the scenic quality of the avenue and/or particular visual resources in the corridor.

4.4.2.4 | VISUAL CHARACTER

The visual character of the project corridor is dense, mixed-use, and urban. The project corridor carries high volumes of transit, pedestrian, and automobile traffic, making it one of the noisier and busier streets in the city. The project corridor also intersects with multiple major thoroughfares, such as Mission, Market, and Geary streets. These roadways and intersections are wide and busy, and there is a thick network of OCS wires above them that is a character-defining feature of the Van Ness Avenue corridor and the identity of San Francisco. There are few vacant parcels in the project vicinity, and the overall Van Ness Avenue corridor is built-out in character.

Van Ness Avenue is one of the widest streets in the city, and it is notably wider than the adjacent streets. The median varies in dimension and composition throughout the corridor. Some blocks of Van Ness Avenue feature a landscaped median with mature trees up to 9 feet in canopy width, while some blocks feature a narrow, concrete median without landscaping or tree plantings. In addition to featuring landscaping and trees, the medians hold traffic signals, signage, and pedestrian refuge areas including nose cones (i.e., thumbnail islands). The sidewalks of Van Ness Avenue meet the San Francisco Better Streets Plan width standards, measuring approximately 16 feet wide throughout the corridor, except in the Civic Center where they are wider, measuring up to 32 feet wide in front of City Hall. Trees of varied species and age are planted along most of the sidewalks. The wide sidewalks and roadway, and landscaped medians are unique features for San Francisco streets, and they create a feeling of prominence about the avenue. Buildings of architectural significance located along Van Ness Avenue further contribute to this feeling of prominence, as described in Section 4.4.2.4 under Significant Buildings and Architecture.

The architecture and infrastructure of Van Ness Avenue dates from historic periods up to the present, modern time. As explained in the Historic Resources Inventory and Evaluation Report (HRIER) prepared for the proposed project, the visual character of Van Ness Avenue reflects its history as a corridor in which “development and infrastructural improvements have occurred largely in a piecemeal manner since it was established in 1858,” and the design and planning of Van Ness Avenue “reflect a myriad of public and private design intents, none of which reflect a sustained or cohesive architectural or engineering

The visual character of Van Ness Avenue reflects its history as a corridor in which development and infrastructural improvements have occurred largely in a piecemeal manner since it was established in 1858.

program” (JRP, 2009). Sidewalk and median trees, news racks, signage, call boxes, garbage receptacles and other street furniture are interspersed in an ad hoc fashion throughout the corridor. The only continuous design element on Van Ness Avenue is the OCS support pole/streetlight system, which lines both sidewalks of the street between Market and North Point streets (City of San Francisco, 2004). Due to this history of development, the architecture, landscaping, and streetscape of Van Ness Avenue and its viewshed vary substantially, giving the project corridor an eclectic feel.

This eclectic feel is present throughout the project corridor, although the overall character of the corridor changes slightly as influenced by land use pattern. The corridor is predominantly lined with multi-story buildings featuring commercial establishments on the ground floor. Images of the Van Ness Avenue corridor are provided in Figure 4.4-1. The visual character of the southern stretch of Van Ness Avenue between South Van Ness and Golden Gate avenues is influenced by two major civic features: the intersection of Market Street and Van Ness Avenue and the San Francisco Civic Center. Firstly, the intersection of Market Street and Van Ness Avenue marks the convergence of two of the city’s most prominent streets. Like Van Ness Avenue, Market Street is one of the widest streets in the city, and it has historically been used for most City parades and ceremonial events, in addition to being the city’s focal commercial center. It serves as the backbone of the City’s regional transit systems and is the busiest pedestrian and cycling street in the city. Secondly, the Civic Center is a major center for civic resources, as well as art and entertainment activities, as discussed in Section 4.4.2.4, Important Visual Elements within Viewshed.

Between Golden Gate Avenue and Broadway Street, Van Ness Avenue supports a mix of commercial and residential uses, and it feels largely commercial and high density in character. This area is the core of the Van Ness Avenue corridor commercial district, which is one of the major commercial districts in the city (City of San Francisco, 2004). Most of the buildings are three or more stories, with the ground floor occupied by commercial establishments. The ground-floor commercial uses in this area are varied and provide an active and visually interesting atmosphere.

The northern end of the project corridor between Broadway and North Point streets is overall residential and lower density in feel. This segment of the corridor predominantly supports multi-family residential apartment buildings and neighborhood-serving commercial establishments. Most buildings are three-story residential buildings, with small-scale businesses occupying the ground floor. Several blocks in this segment exhibit a relatively well-defined pattern of buildings of similar height and character lining the street.

4.4.2.5 | IMPORTANT VISUAL ELEMENTS WITHIN THE VIEWSHED

Civic Center Historic District

The stretch of Van Ness Avenue located between Hayes and Redwood streets is part of the Civic Center Historic District, shown in Figure 4.4-2. This stretch of the Van Ness Avenue corridor supports many civic uses that are housed in buildings of noteworthy architecture that are historic and monumental in character. The Civic Center Historic District is an important visual element in the Van Ness Avenue corridor, offering striking views of high-quality architecture that exemplifies the City Beautiful Movement. The City Beautiful Movement was an urban planning reform movement in the United States that flourished in the 1890s and 1900s with the intent of using beautification and monumental grandeur in cities to create moral and civic virtue among urban populations. The Civic Center is considered by many to have the finest and most complete manifestation of the City Beautiful Movement in the United States.⁶⁹

The Civic Center is considered by many to have the finest and most complete manifestation of the City Beautiful Movement in the United States.

⁶⁹ <http://www.nps.gov/history/nhl/designations/listsofNHLS.htm>. Accessed July 22, 2009.



Figure 4.4-1: Character-Depicting Images of the Van Ness Avenue Corridor

Figure 4.4-2: Civic Center Historic District Map



City Hall is a celebrated example of Beaux-Arts architecture, and it features a dome roof that is 366 feet in diameter and 390 feet tall, making it the fifth largest dome in the world.

One of the most visually striking of these buildings is San Francisco City Hall, which is located on Van Ness Avenue between Grove and McAllister streets. City Hall is visible from many points along the corridor, and the dome of the hall is visible from distant views of the corridor, including many scenic vistas of downtown San Francisco. City Hall is a celebrated example of Beaux-Arts architecture, and it features a dome roof that is 366 feet in diameter and 390 feet tall, making it the fifth largest dome in the world. City Hall's dome is a dominant feature of the city's downtown skyline from several vistas in the city. It is often depicted in postcards, movies, and other media images, and it is a character-defining feature of San Francisco. The rear façade of City Hall faces Van Ness Avenue, across from the San Francisco War Memorial and Performing Arts Center. The San Francisco War Memorial and Performing Arts Center is comprised of a matched pair of buildings – the War Memorial Opera House and the War Memorial Veterans Building. The San Francisco War Memorial and Performing Arts Center is one of the largest performing arts centers in the United States, and its monumental architecture lends a strong, visual presence in the corridor. All of these buildings exhibit noteworthy architecture, both historic and monumental in character. The sidewalks of Van Ness Avenue through this area are wide, ranging up to 32 feet wide in places, and the buildings are generally set well back from the sidewalk behind landscaped planters that surround the building façades. Granite steps lead from the sidewalks to the entrances of City Hall and the Opera House. These features contribute to the feeling that this stretch of Van Ness Avenue is a grand boulevard.

Moreover, streetscape features within the Civic Center Historic District are designed and maintained to provide a cohesive visual quality. Garbage receptacles are painted white like the OCS support poles/streetlights. The bases of the OCS support poles/streetlights are painted gold within the district. Baskets of flowers hang from the poles. Recently installed sidewalk planters surrounded with low iron rod fencing are located curbside along the avenue in front of City Hall. The Van Ness Avenue center median located in front of City Hall and the War Memorial Building, between Grove and Hayes streets, features an approximate 4-foot-tall fence that is designed and painted in civic blue to mimic the ironwork found throughout the Civic Center. A row of consistently planted and uniformly pruned trees lines the planters in front of City Hall. The sidewalk trees consistently spaced

between the OCS support poles/streetlights frame the rear façade of City Hall, contributing to its monumental presence.

The median along Van Ness Avenue between Hayes Street and Golden Gate Avenue is landscaped with red and white flowering shrubs, and it features red-blooming, mature trees. These street blocks feature some of the best-maintained landscaped medians in the project corridor. The well-maintained landscaping and streetscape in this stretch of the corridor, together with remarkable architecture of the civic buildings, makes this area one of the highest quality visual areas within the project corridor.

The pedestrian elements and plazas of the Civic Center are concentrated along Polk, Larkin, and Hyde streets. Van Ness Avenue plays a peripheral role in this monumental assemblage, as shown in Figure 4.4-3 (JRP, 2009). While the landscape and themes and the monumental architecture create a visual cohesiveness and scenic quality to the Civic Center Historic District, the district feels modern; therefore, one gets the feeling of prominence and monument along Van Ness Avenue in the Civic Center Historic District and less the feeling of being in a historic time.

The Civic Center is a major tourist destination due to the scenic experience it offers, in addition to the many cultural events held in the various buildings and plazas that comprise it. It is a major destination in the city for civic purposes, entertainment, tourism, and employment; therefore, all of the major viewer groups described in Section 4.4.2.2 frequent the historic district and would be sensitive to changes in its character and scenic quality.



The rear façade of City Hall faces Van Ness Avenue, across from the San Francisco War Memorial and Performing Arts Center.

Significant Buildings and Architecture

As stated in the City Urban Design Element, Van Ness Avenue is endowed with many attractive buildings, mostly older buildings, which reflect a flavor characteristic of San Francisco's unique architectural style and heritage (City of San Francisco, 1990). Several architecturally distinguished buildings of diverse design and age flank Van Ness Avenue throughout the project corridor. There are some common architectural themes among these buildings, but mostly they vary in style and context and are scattered throughout the corridor.

The City maintains a list of Significant Buildings and Contributory Buildings in Appendices A and B, respectively, of the Van Ness Area Plan. Significant Buildings are buildings identified as contributing to the rich architectural environment of Van Ness Avenue and warrant special consideration in planning. The Area Plan calls for preservation of these buildings (i.e., 32 listed) and for them to serve as a basis for the theme and scale of future, adjacent development. Several of these buildings, in addition to other buildings in the project corridor, are listed in or have been determined eligible for listing in the National Register of Historic Places (NRHP) and California Register of Historical Resources (CRHR), or as a City Landmark (JRP, 2009).

Aside from the Civic Center Historic District described above, the NRHP- and CRHR-listed properties and properties designated as City Landmarks or Significant and Contributory Buildings do not occur cohesively or with visual continuity in the Van Ness Avenue corridor. Most buildings of noteworthy historic architecture are adorned with modern signage, awnings, or other features, and/or they occur within the context of surrounding modern architecture or streetscape.

All of the major viewer groups described in Section 4.4.2.2 experience views of significant buildings in the corridor. Sensitive viewer groups (i.e., residents, commuters, and tourists) would be sensitive to changes in the character and visual quality of these buildings.



Photo 9. Van Ness Avenue in Civic Center Historic District.



Photo 12. Hall of Justice & War Memorial Building on Van Ness Avenue.



Photo 10. City Hall on Van Ness Avenue.



Photo 13. Civic Center lighting standards.



Photo 15. Civic Center Streetscape.



Photo 16. Civic Center signage.



Photo 14. Van Ness Ave/McAllister St. intersection looking south.



Photo 11. Wide sidewalks, planters and sculpture.



Figure 4-4-3: Images of Civic Center Historic District

DEFINITION

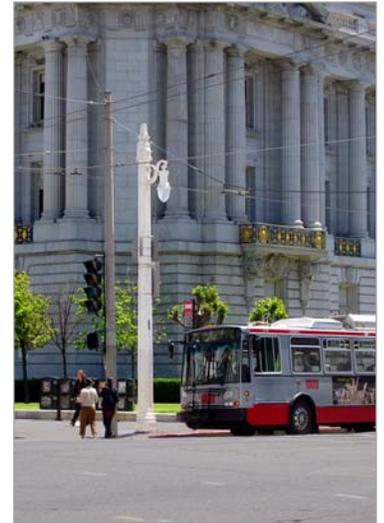
OCS Support Poles/Streetlights

The only continuous streetscape design element on Van Ness Avenue is the OCS support poles/streetlights, which line both sidewalks of the street between Market and North Point streets. Images of the OCS support poles/streetlights are depicted in Figure 4.4-4. The OCS support poles/streetlights are a streetscape feature unique to Van Ness Avenue that contribute to the eclectic visual character of the corridor. These poles were constructed in 1914 as part of the passenger Municipal Rail that was constructed up the median of Van Ness Avenue from Market Street to North Point. The poles served to support the OCS system of wires that ran the electric rail, and today they serve to power the Muni bus system on Van Ness Avenue. The OCS is a character-defining feature of the corridor, and it is associated with the larger identity and character of San Francisco. The poles also support the main lighting system for the corridor. A single teardrop, pendant light hangs from each pole over the roadway. Aside from the occasional modern cobra light pole and lights mounted on buildings, the OCS support poles/streetlights provide the only light for the roadway and sidewalks of Van Ness Avenue. Banners hang from below the pendant lights, and in the Civic Center, flower baskets also hang from the poles. Traffic signals and signage are affixed to many of the poles.

The poles are a slender, square form column of Corinthian classical architectural style that slightly taper with height. The poles reach a height of approximately 25 feet. The poles are concrete, and they are adorned with a decorative, foliated finial and base made of cast iron. The base is square with a modest foliated design (JRP, 2009). The poles are composed of reinforced concrete, and the entire pole is painted a uniform white, including the light fixtures. The teardrop-shaped light fixtures project from the upper portion of the pole, slightly beneath the decorative finial. These light fixtures were not part of the original pole design and were added in 1936 when the poles were moved to accommodate a 12-foot widening of the roadway. While all of the finials are original, the bases are a mixture of original cast iron and replacement fiberglass castings that replicate the original. The fiberglass base replicas are used to replace the damaged, original bases. Many of the poles are damaged, as shown in Figure 4.4-5. In addition to damaged and replaced bases, many of the columns are spalling, show deterioration, and are leaning (City of San Francisco, 2010). In the 1990s, the City began replacing the most damaged poles with modern poles of nondescript design, or adding these modern poles adjacent to the original poles so that the modern poles could carry the load of the OCS (City of San Francisco, 2010). In some places where these modern poles were added, the visual continuity of the original OCS support pole/streetlights, as well as the overall visual setting, is degraded by pole clutter (Figure 4.4-4, Photos 19 and 20).

An assessment of the pole's eligibility for listing on the NRHP and CRHR found that the original network of poles do not appear eligible for listing because their potential historic significance is undermined by a lack of physical integrity (JRP, 2009).⁷⁰ Although the OCS support poles/streetlights are not eligible for listing in the NRHP and CRHR, they are designated as California Office of Historic Preservation (OHP) Historical Resource Status Code 6L, which indicates that they may warrant special consideration in local planning, much like the Significant and Contributory Buildings identified by the City in the Van Ness Area Plan.

OCS: Overhead Contact System. Overhead lines or wires used to transmit electrical energy to trams, trolleybuses or trains at a distance from the energy supply point.



The only continuous streetscape design element on Van Ness Avenue is the OCS support poles/streetlights, which line both sidewalks on the street between Market and North Point streets.

The OCS support poles/streetlights are the only visually notable infrastructural element occurring consistently along Van Ness Avenue that displays design with aesthetic intent.

⁷⁰ The California State Historic Preservation Officer (SHPO) reviewed and concurred with the eligibility findings in a letter dated April 27, 2010.



Figure 4-4-4: Images of OCS Support Poles/Streetlight Network

Figure 4.4-5: Damaged and Leaning OCS Support Pole/Streetlights



Regardless of the historic status of the OCS support poles/streetlights, they represent a streetscape element and visual resource in the Van Ness Avenue corridor and the Civic Center Historic District. The OCS support poles/streetlights are the only visually notable infrastructural element occurring consistently along Van Ness Avenue that displays design with aesthetic intent. As explained above, the OCS support poles/streetlights were built as part of the Municipal Rail, which was constructed to serve the Panama Pacific Exposition in 1915; Van Ness Avenue served as the eastern boundary to the Exposition site. The OCS support pole/streetlight network was designed to visually connect and provide a “ribbon of light” between the Civic Center and the Panama Pacific Exposition (JRP, 2009). This cohesive design intent of the poles/streetlights for the avenue is more noticeable along some blocks of Van Ness Avenue. Today, sidewalk trees, storefront canopies, and modern poles partially block views of the poles and streetlights along many blocks of Van Ness Avenue, and the role of the poles to bring a character-defining design intent to the avenue is diminished. At some locations, the poles are located closer to the street corner, where they have a more prominent presence, such as the southern corners of Van Ness Avenue and Geary Street (Figure 4.4-4, Photo 21). The OCS support poles/streetlights are more visually prominent in the Civic Center Historic District because views of them are less obstructed, and they appear as a more cohesive, linear feature due to the wide sidewalks and setbacks of buildings behind landscaped planters (Figure 4.4-4, Photo 17). The OCS support poles/streetlights within the district have less signage attached to them, and there are fewer modern support poles. For these reasons, they occur as more visually prominent features within the historic district in comparison to the remainder of the corridor, where they stand in greater proximity to adjacent buildings and are more often obstructed by trees, modern signage, and other pole clutter. In Photo 18 (Figure 4.4-4), it is possible to see how the OCS support poles/streetlights are more visually prominent in front of City Hall and then become less prominent farther north along Van Ness Avenue, where they are obstructed by trees, pole clutter, and adjacent buildings.

In addition, within the Civic Center Historic District, the bases of the poles are painted gold to contribute to the visual setting, uniformity, and character of the district. The white-buff color of the poles matches the color scheme of the Civic Center. The trees in front of City Hall have been uniformly pruned to reach approximately 75 percent of the height of the OCS support poles/streetlights. Together, the OCS support poles/streetlights and trees form a cohesive, linear feature that neatly frames City Hall and contributes to the monumental feeling of this location.

At night, the lighting of the teardrop-shaped pendant lights makes the OCS support pole/streetlight network more visually prominent, particularly in the Civic Center area where they are notably less obstructed by trees, signage, and adjacent buildings. The poles present a visual continuity to the multiple street blocks and buildings that comprise the Civic Center. The OCS support poles/streetlights provide nighttime, visual continuity beyond the Civic Center and throughout the project corridor. This visual continuity throughout the Van Ness

Avenue corridor is not nearly as prominent in daytime and is significantly less a character-defining feature for the corridor in daylight. In daylight and without the effects of nighttime lighting, the OCS support poles/streetlights fade into the streetscape, tree canopies, and backdrop of buildings.

The OCS support poles/streetlights are an important component of the viewshed experienced by all major viewer groups described in Section 4.4.2.2, including sensitive viewer groups (i.e., residents, commuters, and tourists); therefore, all viewer groups would be sensitive to changes in the character and visual quality of the OCS support poles/streetlights.



While most blocks of Van Ness Avenue feature a consistent row of sidewalk trees of varied type and maturity, the presence of trees in the median is less consistent throughout the corridor.

Landscaping and Trees

The landscaped medians and tree plantings along Van Ness Avenue contribute to the character and visual quality of the corridor; therefore, they are one of the most important visual features in the corridor. As described in the Van Ness Corridor Initial Land Use and Urban Design Needs Assessment, the Van Ness Avenue corridor lacks a comprehensive landscaping and tree-planting scheme. While most blocks of Van Ness Avenue feature a consistent row of sidewalk trees of varied type and maturity, the presence of trees in the median is less consistent throughout the corridor. Nonetheless, the trees and sporadic, wide medians are character-defining features of the corridor. A description of the varied landscaping and tree planting in the corridor follows.

A tree survey conducted in support of the proposed project identified 416 trees located within the project corridor (BMS Design Group, 2013). Of these trees, 102 trees are located in the median, and 314 trees are located along the sidewalks. The London Plane Tree is the most common sidewalk tree. The Brisbane Box is the most common median tree, comprising 39 percent of median trees. Twenty-eight (27 percent) of the median trees are mature and in good or excellent condition (health), 50 (49 percent) of the median trees are young trees and in good or excellent condition (health), and 24 (24 percent) of the median trees (both mature and young) are in fair or poor condition. Forty-two of the 102 median trees are mature; 60 are young trees. Many of the young trees were planted between 2006 and 2010 as part of the Van Ness Enhancements Project, which was a landscape improvement project completed by SFDPPW. The mature sidewalk and median trees are not consistently spaced; however, most of the young trees have been planted evenly spaced apart and with some design aesthetic intent. Most of the young trees in the median are located along the narrow, concrete stretches of median without other landscaping. Most of the sidewalk trees are planted in tree wells without surrounding landscaping. There are no tree plantings or landscaping at existing bus shelters and stops along Van Ness Avenue. Aside from sidewalk planters and hanging flower baskets along Van Ness Avenue in the Civic Center, there are no landscaped areas except trees in tree wells in the corridor other than the median.

The medians of Van Ness Avenue are of varied dimension and composition throughout the corridor. Some medians are a narrow concrete strip without any plantings, while others have recently planted trees and no other landscaping. Some medians are landscaped with flowering shrubs and some feature mature trees, while others have young trees or no trees. The median in the block of Van Ness Avenue between California and Sacramento streets features large potted plants and no trees. Several landscaped medians feature a grey-colored trim composed of multiple rows of decorative unit pavers (concrete or granite) along the curb. This is consistent with streetscape policies in the Van Ness Area Plan and also helps facilitate ease of access to the plantings for maintenance workers. Multiple street blocks with a landscaped median feature a landscape theme of red, white, and blue flowering shrubs. This landscape theme is most evident in the well-maintained medians located within the Civic Center Historic District. Some of the mature, median trees paired with this shrub landscape theme feature matching red blossoms. The decorative block trim and the red-white-blue flowering shrubs are the only identifiable landscape themes in the project corridor; they are not typically found on consecutive street blocks, with the exception of

within the Civic Center Historic District, where this theme is carried along three consecutive blocks. Images of the varying median configurations and sidewalk tree plantings are depicted in Figure 4.4-6.

Overall, the presence of median trees and landscaping varies throughout the project corridor, and some blocks offer a higher scenic quality. The variation in median width and composition throughout the corridor has a noteworthy effect on the visual quality of each street block. Street blocks featuring a wide, landscaped median with mature trees have a higher visual quality than street blocks without a landscaped median. The blocks of Van Ness Avenue featuring high-quality medians with mature trees that create a picturesque quality are listed in Table 4.4-1.

The landscaping and trees in the Van Ness Avenue corridor have a significant effect on the viewshed experienced by all major viewer groups described in Section 4.4.2.2, including motorists, pedestrians, cyclists, residents, commuters, and tourists. All of these viewer groups, including sensitive viewer groups (i.e., residents, commuters, and tourists) would be sensitive to changes in the scenic quality of landscaping and trees in the corridor.

Most of the scenic vistas are experienced by looking east or west along streets that cross Van Ness Avenue: the Market Street corridor and distant downtown skyscrapers, Nob Hill and the high rises of Union Square, the distant Presidio, and a glimpse of part of the Bay Bridge.

4.4.2.6 | SCENIC VISTAS

As mentioned in Section 4.4.2.1, Viewshed, the topography of the project area allows scenic vistas from the project corridor. Most of the vistas are experienced by looking east or west along streets that cross Van Ness Avenue. In the southern portion of the corridor, views to the east include scenic vistas of the Market Street corridor and distant downtown skyscrapers. Farther north, scenic views of Nob Hill and the high rises of Union Square are visible looking east from cross streets in the corridor. In the northern portion of the corridor, the cross streets of Filbert, Greenwich, and Lombard streets offer scenic, westerly views of the distant Presidio. The intersection of North Point and Van Ness Avenue offers a glimpse of part of the Bay Bridge to the east.

Table 4.4-1: High-Quality Landscaped Medians Featuring Mature Tree Canopies

VAN NESS AVENUE BLOCK	MEDIAN	LANDSCAPING	TREE CANOPY
Hayes – Grove streets	Extends half block; Features decorative block trim	Red-white-blue flowering shrubs	Mature tree canopy; red-blooming trees
Grove – McAllister streets	Three-quarters of block; Features decorative block trim; Blue-gold painted iron rod fence	Red-white-blue flowering shrubs	Mature tree canopy; red-blooming trees
McAllister Street – Golden Gate Avenue	Extends half block; Features decorative block trim	Red-white-blue flowering shrubs	Mature tree canopy
Turk – Eddy streets	Extends full block; Features decorative block trim	Red-white-blue flowering shrubs	Mature tree canopy; red-blooming trees
Ellis – O’Farrell streets	Extends full block; Features decorative block trim	White-flowering shrubs, sporadically planted	Mature tree canopy
Sutter – Bush streets	Extends full block; Features decorative block trim	Red-white-blue flowering shrubs	Mature tree canopy; red-blooming trees
Pine – California streets	Extends full block; Features decorative block trim	Red-white-blue flowering shrubs	Mature tree canopy
Sacramento – Clay streets	Extends full block; Features decorative block trim	White-flowering shrubs	Mature tree canopy
Broadway – Pacific streets	Extends full block	White-flowering shrubs	Mature tree canopy; red-blooming trees
Union – Filbert streets	Extends full block	White-flowering shrubs	Mature tree canopy



Photo 26. Varied tree type in Van Ness Avenue corridor.



Photo 27. Potted plants in landscaped median.



Photo 28. Mature median trees.



Photo 29. Red-flowering shrubs match tree blossoms in high-quality landscaped median.



Photo 31. Young trees in narrow, concrete median.



Photo 30. Civic Center sidewalk planters.

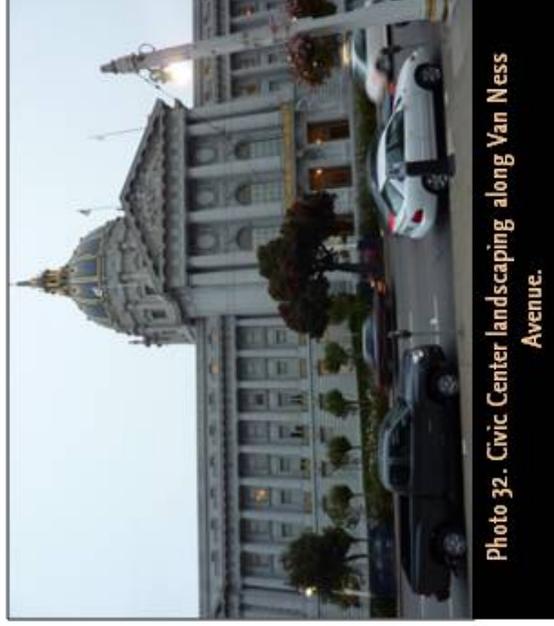


Photo 32. Civic Center landscaping along Van Ness Avenue.



Figure 4.4-6: Landscape and Trees in the Van Ness Avenue Corridor

The changing topography within the project corridor also allows scenic views of the corridor itself. The top of the east-west trending ridgeline that transverses the Van Ness Avenue corridor peaks along Van Ness Avenue approximately between Bush and Washington streets. The top of the south-facing ridgeline provides scenic vistas to the south of the Van Ness Avenue corridor, some of which offer limited views of City Hall. Certain locations provide a limited, scenic glimpse of distant Potrero Hill. The north-facing slope is greater than the south-facing slope and offers greater views. The top of the north-facing ridgeline offers views to the north that include a limited, scenic snapshot of the Bay and Angel Island. Views from the bottom of the slope looking south show a scenic portion of the Van Ness Avenue corridor where there is the largest concentration of mature trees in the median and sidewalks, and in which the tower of St. Brigid Church is a dominant visual feature. Figure 4.4-7 depicts some of these scenic vistas.

4.4.3 | Environmental Consequences

A project may have an adverse impact on aesthetics/visual resources if it would:

- Have a substantial adverse effect on a scenic vista;
- Create a new source of substantial light or glare, which would adversely affect day or nighttime views in the area, or which would substantially impact other people or properties;
- Substantially damage scenic resources including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway; or other features of the built or natural environment that contribute to a scenic public setting; or
- Substantially degrade the existing visual character or quality of the site and its surroundings.

In addition, San Francisco has added a criterion regarding consideration of a proposed project's shadow effects, as evidenced in the San Francisco Planning Department Initial Study Checklist (San Francisco, 2008). The City's Initial Study Checklist states that a project is determined to have a significant shadow effect if it were to result in substantial new shadow on public open space under the jurisdiction of the Recreation and Park Commission during the 1-hour before sunrise to 1-hour before sunset at any time of the year, or if shadows were to obscure direct sunlight on certain downtown sidewalks. The proposed project would not cast new shadows on public open space under the jurisdiction of the Recreation and Park Commission, so this impact criterion is not discussed further.

Moreover, the City and County of San Francisco has established policies and regulations regarding visual resources that are discussed in detail in Sections 4.4.1.1 and 4.4.1.2. The proposed project may adversely affect visual resources if it conflicts with any objectives or policies in one of those applicable plans, including the San Francisco General Plan and San Francisco Better Streets Plan. Lastly, the City Planning Department has identified urban design improvements for Van Ness Avenue in the Van Ness Corridor Initial Land Use and Urban Design Needs Assessment, which the project is intended to support.

4.4.3.1 | ANALYSIS OF KEY VIEWPOINTS

Key viewpoints, as shown in Figures 4.4-8 through 4.4-11, were identified to represent the visual character of the study corridor. The locations described below were selected because they are representative of areas where the project could affect existing visual quality and/or are proximate to important visual resources and sensitive visual receptors. Visual simulations of each build alternative, including the LPA, are presented in Figures 4.4-8 through 4.4-11 to identify changes that would result in the visual environment.

Station and pole designs would be finalized during the final design phase of the proposed project, reflecting comments from the public and other interested parties on the Draft EIS/EIR review.

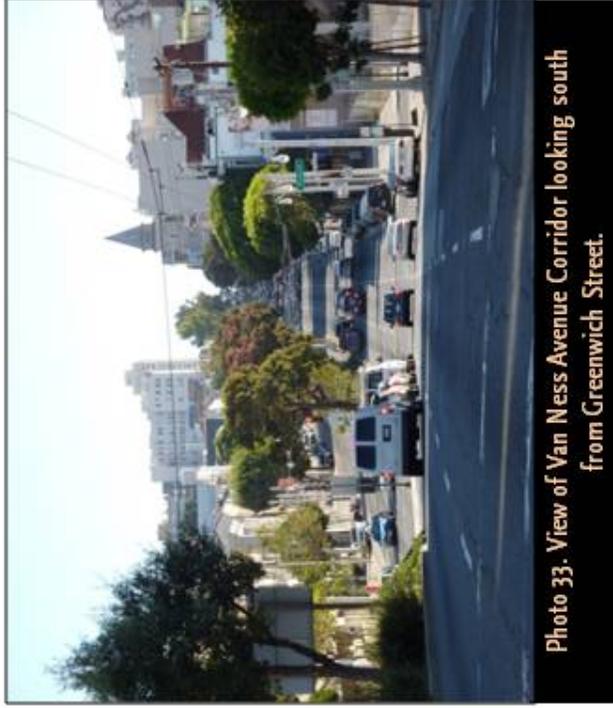


Photo 33. View of Van Ness Avenue Corridor looking south from Greenwich Street.

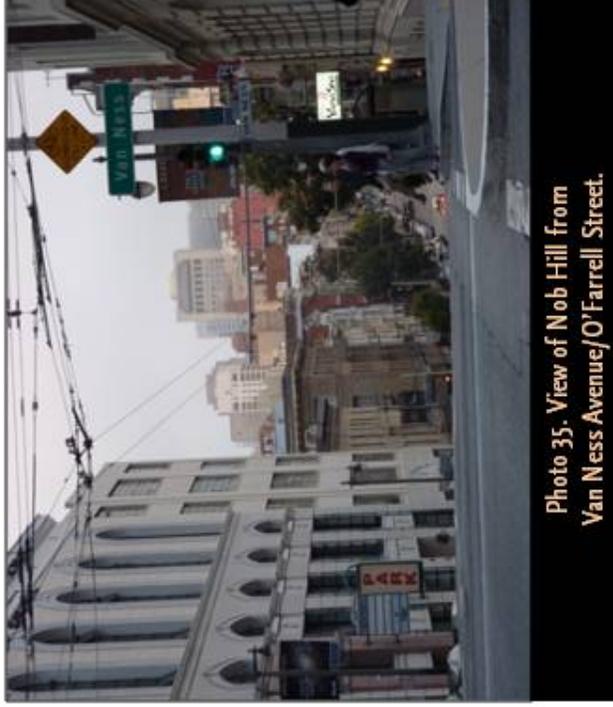


Photo 35. View of Nob Hill from Van Ness Avenue/O'Farrell Street.

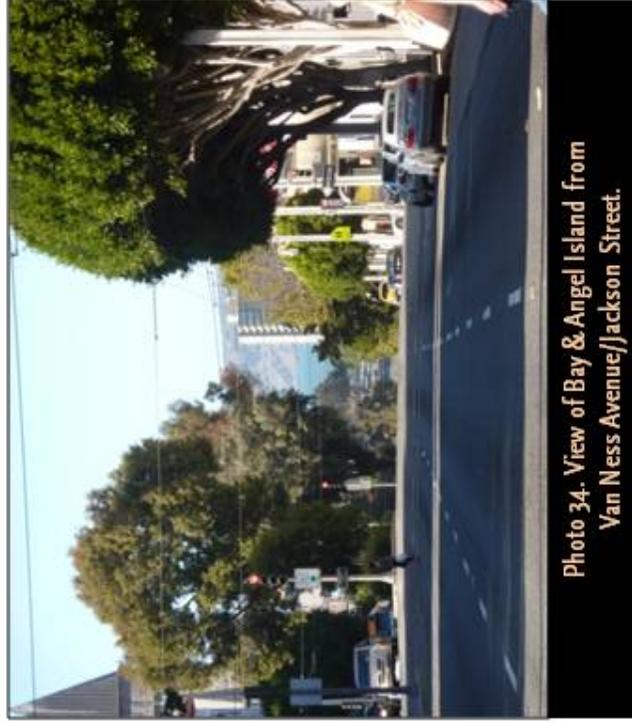


Photo 34. View of Bay & Angel Island from Van Ness Avenue/Jackson Street.

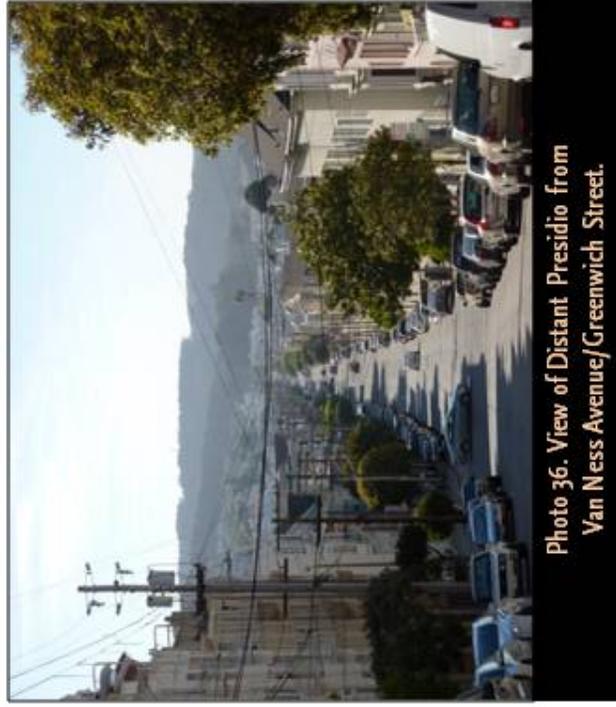


Photo 36. View of Distant Presidio from Van Ness Avenue/Greenwich Street.



Figure 4-4-7: Scenic Vistas Viewed from within the Van Ness Avenue Corridor

The architectural design of the BRT stations and OCS support pole/streetlight network shown in the visual simulations are representative only. Station and pole designs would be determined during the final design phase of the proposed project, reflecting comments from the public, agencies, and other interested parties; therefore, a typical station and OCS support pole/streetlight design is depicted in the simulations presented in Figures 4.4-8 through 4.4-11. The landscape scheme, colored pavement, and tree type would also be determined during the project final design phase; therefore, the landscaping and tree type shown is representative only. The visual simulations depict landscaping and trees at an approximate 5-year maturity.

The No Build Alternative is represented in the existing conditions photograph because with the exception of continued spot replacement of OCS support poles/streetlights and upgrade of traffic signal poles to mast arm poles, no other physical structures would be installed. Moreover, because funding is not yet programmed for the aforementioned features and locations of pole replacement is not confirmed at this time, these features are not simulated.

A description of the key viewpoints follows, from south to north.

Viewpoint 1 – Van Ness Avenue at McAllister Street

Viewpoint 1, depicted in Figures 4.4-8 and 4.4-11, is from the perspective of the northern crosswalk on Van Ness Avenue at the Van Ness Avenue/McAllister Street intersection, looking south. This location is within the Civic Center Historic District. City Hall is visible along the east side of Van Ness Avenue, and the San Francisco War Memorial and Performing Arts Center is visible on the west side of Van Ness Avenue. The California Automobile Association high-rise office building is a dominant visual feature in the distant south of the viewshed. The OCS wires are visible over the roadways and intersection. The OCS support poles/streetlights are visible along the sidewalks of Van Ness Avenue. An existing Muni bus shelter is located at the southeast corner of Van Ness Avenue and McAllister Street. There is a nose cone (i.e., thumbnail island) pedestrian refuge in the far crosswalk and curb bulbs at both corners. The median features mature trees and landscaping. Red-blooming trees match the surrounding landscape of red, white, and blue blooming shrubs. This block of Van Ness Avenue features one of the best-maintained medians, which contributes to a picturesque quality at this location. The dome of City Hall is the dominant visual feature, and this area is characterized by the wide roadway of Van Ness Avenue and the monumental buildings of the Civic Center. This viewpoint features all major types of historic and visually important features found in the Van Ness Avenue corridor, including significant buildings, the Civic Center Historic District, the OCS support pole/streetlights in the area where they are visually prominent, and the highest quality landscaped median. All viewer groups experience this location, including tourist and commuter sensitive viewer groups. There are no immediate residential uses in this area; however, distant high-rise residential buildings offer views of City Hall and the corridor. The well-maintained landscaping and streetscape in this stretch of the corridor, together with remarkable architecture of the civic buildings, makes this area one of the highest quality visual areas within the project corridor; therefore, Viewpoint 1 represents a highly sensitive visual setting.

Visual simulations of Viewpoint 1 depict the proposed BRT features and replacement network of OCS support pole/streetlights. The dedicated transitway is depicted with red-colored pavement. The BRT bus fleet is shown traveling in the transitway. A typical station design is shown, which features a canopy with rooftop solar paneling, wind shields, seating, TVMs, signage/mapping, and garbage receptacles. A blue-and-gold-colored wind turbine, which would capture wind energy as a sustainable energy project feature, is depicted.⁷¹ This turbine would also serve as a wayfinding element that would brand the BRT service and aid



The well-maintained landscaping and streetscape in this stretch of the corridor, together with remarkable architecture of the civic buildings, makes this area one of the highest quality visual areas within the project corridor.

⁷¹ Incorporation of wind turbines into the proposed BRT station design is still under evaluation. The turbines are included in the visual simulations to depict a scenario of the maximum anticipated visual changes that could occur with project implementation.

in marking BRT station locations. A railing is present to separate the station platform from adjacent traffic lanes. A ramp extends from the crosswalk up to the station platform, which sits approximately 10 inches to 12 inches above the street grade (i.e., approximately 6 inches above the sidewalk height). The station platform is approximately 150 feet in length for each build alternative and would range in width between 9 feet and 14 feet, depending on the project alternative (see Chapter 2.2.2, Build Alternatives). The platform for Build Alternative 4 is located within the footprint of the existing landscaped median and is 14 feet wide, whereas the platform for Build Alternatives 2 and 3 and the LPA needs to only accommodate single-direction travel and is approximately 9 feet in width. The station canopy is shown in a blue, silver, and white color scheme. The station canopy is approximately 9 feet to 15 feet above ground surface, and it is 38 feet in length. Under Build Alternative 2, a landscaped planter is incorporated into the BRT station design, which serves to enhance the aesthetics of the station.

The most noteworthy changes to the visual context of Viewpoint 1 result from changes in the transitway and median configuration, changes to the median landscape and trees, introduction of the BRT station (i.e., platform, canopy, solar paneling, and wind turbine), and replacement of the OCS support pole/streetlight network. Noteworthy differences in the visual setting between the build alternatives, including the LPA, are apparent due to the difference in lane and median configuration. Build Alternative 2 features a side-lane transitway adjacent to the curbside parking area. The station platform is on a curb extension from the sidewalk. The parking lane begins just south of the platform. The transitway for Build Alternatives 3 and 4 and the LPA is in the center lanes, as depicted in the simulations. The simulation for Build Alternative 3 shows the side-by-side transit lanes located between two median strips. The strip of median to the west is approximately 9 feet wide and supports the BRT station. The other median strip is narrower, at approximately 4 feet wide.⁷² For the LPA, the station would only be in the NB direction in Viewpoint 1. The transitways would have a painted buffer between them for the length of the platform. This buffer would become a planted median just south of the station as the space between the transit lanes widens. The need to reconfigure the existing median into two median strips requires the removal of all existing median vegetation and trees; therefore, the Build Alternative 3 simulation shows less landscaped area than the existing median, and it shows replacement palm trees on the 9-foot-wide right-side medians. Similarly, the LPA requires removal of most existing median vegetation and trees on blocks with a station; therefore, the Build Alternative 3 simulation shows less landscaped area than the existing median in this simulation. Build Alternative 4 shows a single 14-foot-wide median with transit lanes located along either side of it. Existing median vegetation and trees are preserved, except where the BRT station is located; therefore, the Build Alternative 4 simulation shows the removal of existing landscaping and trees at the station site, and it shows the trees and landscaping south of the station retained but pruned to ensure that tree canopies would not interfere with the clearance requirements of the OCS wires.

Other visual changes under all of the build alternatives, including the LPA, include removal of the existing bus shelters located on the sidewalks of Van Ness Avenue near the southeast and southwest corners of the Van Ness Avenue/McAllister intersection. The traffic signal poles have been replaced with mast arm style signal poles that arch over the traffic lanes. Traffic signals are no longer mounted on the decorative OCS support poles/streetlights. Under Build Alternatives 3 and 4 and the LPA, the parallel OCS wires are shifted from the side lane to be centered over the center-lane transitway. The median features a nose cone pedestrian refuge framing the crosswalk with the median, and the crosswalk is paint-striped to improve visibility.

⁷² Under the LPA, the median strip opposite the station platform varies in width between 3 and 5 feet.

Noteworthy differences in the visual setting between the build alternatives are apparent due to the difference in lane and median configuration.

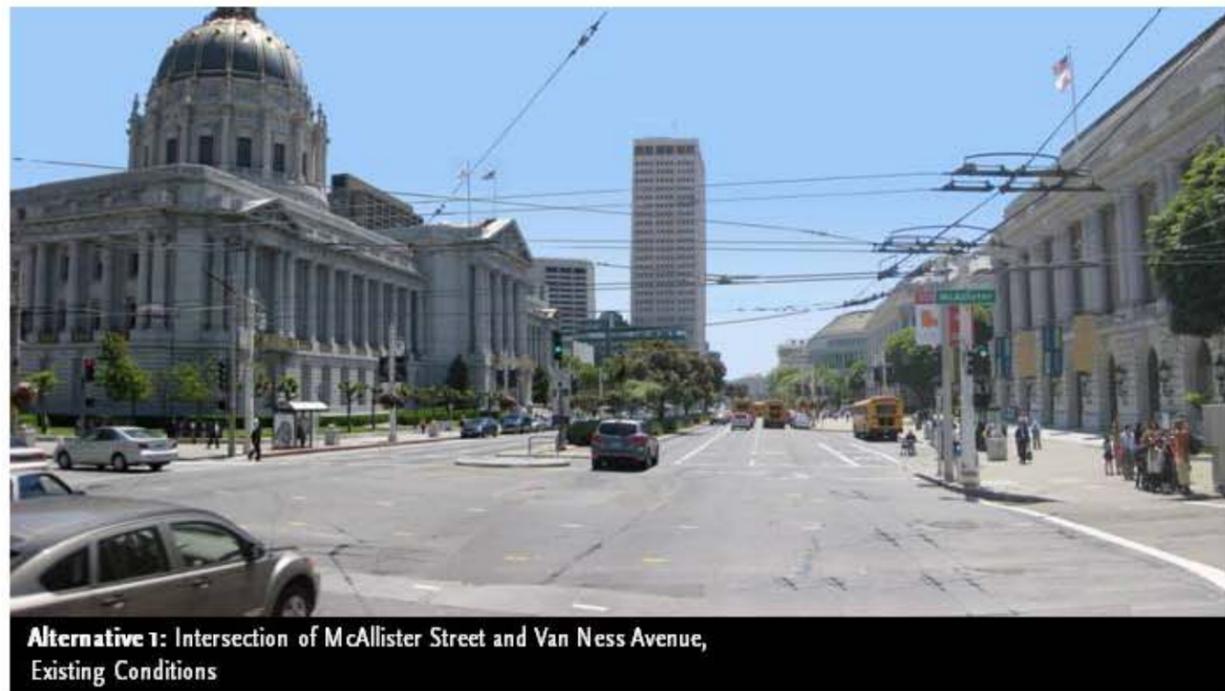


Figure 4.4-8: Viewpoint 1: Visual Simulations of Intersection of McAllister Street and Van Ness Avenue

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The visual simulations for the build alternatives and LPA depict a replacement OCS support pole/streetlight network.⁷³ The proposed replacement pole/lighting network is comprised of modern materials embellished with decorative elements that mimic the architectural style of the original OCS support pole/streetlight network. The poles are approximately 5 feet taller than the original poles, measuring approximately 30 feet in height, because taller poles are needed to carry the OCS load better. Each pole incorporates two light fixtures instead of one fixture like the original poles to bring the corridor up to current roadway and pedestrian lighting standards. One light fixture serves to light the sidewalk, while the other light fixture hangs from an arm fixture extended over the roadway to improve roadway lighting. The replacement poles are round; however, square-shaped bases and finials are added to the poles to be reminiscent of the original square column poles. The bases and finials mimic the original pole bases and finials. Similarly, the replacement poles feature teardrop pendant light fixtures reminiscent of the existing light fixtures. The replacement poles are shown in the same solid, white color as the existing poles. The pole bases are shown painted gold like the existing pole bases within the Civic Center Historic District. The replacement poles include a rack to allow twin banners to be hung, instead of the single banner configuration currently used with the existing poles; therefore, the replacement poles are depicted with twin banners hung from each pole. In recognizing the visual value of the OCS support pole/streetlight network, the replacement OCS support pole/streetlight network displayed in the simulations was developed by SFDPW to create a feasible pole and light design that is reminiscent of the architectural style of the existing OCS support pole/streetlight network.

While the BRT station and transitway proposed under the build alternatives, including the LPA, are features compatible with the Van Ness Avenue corridor, the station canopy, wind turbines, and other features would partially obstruct ground-level views of City Hall and the War Memorial Complex buildings and would introduce modern features that could detract from the visual setting of these buildings. These impacts are addressed in Section 4.4.3.4, Important Visual Elements within Viewshed.

Viewpoint 2 – Van Ness Avenue at Sutter Street

Viewpoint 2, depicted in Figures 4.4-9 and 4.4-11, is from the perspective of the southern crosswalk on Van Ness Avenue at the Van Ness Avenue/Sutter Street intersection, looking north. This location is within the mixed-use commercial/high-density residential segment of the project corridor. The Regency Ballroom, a City-designated Significant Building, is visible on the northeast corner. There is an existing bus shelter at this location. The OCS wires are visible over the roadways and intersection. Although largely obstructed by sidewalk trees, modern poles, and signage, the OCS support poles/streetlights are visible along the sidewalks of Van Ness Avenue. There is a nose cone pedestrian refuge in the far crosswalk and curb bulbs at both corners. The median features mature trees and landscaping, and it is one of the best-maintained landscaped medians in the project corridor. Viewpoint 2 is considered a key viewpoint because it displays a City-designated Significant Building that is also a major performing arts venue, and one of the highest-quality landscaped medians in the project corridor. While the BRT station and transitway proposed under the build alternatives and LPA are features compatible with the Van Ness Avenue corridor, the station canopy and features would partially obstruct ground-level views of the Regency Ballroom. These impacts are addressed in Section 4.4.3.4, Important Visual Elements within Viewshed. All viewer groups experience this location, including tourists and commuter sensitive viewer groups; therefore, Viewpoint 2 represents a sensitive visual setting.

Viewpoint 2 is within the mixed-use commercial/high-density residential segment of the project corridor.

Visual simulations of Viewpoint 2 depict the proposed BRT features and replacement network of OCS support pole/streetlights. The transitway, BRT station, wind turbine, and

⁷³ As noted in Section 1.1, under the no-build scenario, the OCS support poles/streetlights would continue to be replaced with modern, nondescript poles on an as-needed basis, or as a comprehensive replacement project if the needed funding becomes available. For the purposes of the visual simulations, the existing condition is used to represent the OCS support poles/streetlights in the No Build Alternative because pole replacement plans are not confirmed at this time.

lane-median configuration are depicted as described under Viewpoint 1. As in Viewpoint 1, median landscaping is removed to accommodate the BRT station under Build Alternatives 3 and 4 and the LPA, and the existing mature trees have been replaced with planted palm trees on the 9-foot-wide right-side medians under Build Alternative 3. Other visual changes include removal of the existing bus shelter located on the sidewalk in front of the Regency Ballroom, near the northeast corner of Van Ness Avenue and Sutter Street. For Build Alternative 2, the median traffic signal pole has been replaced with a mast arm style signal pole that arches over the traffic lanes. Build Alternatives 3 and 4 and the LPA feature sidewalk mast arm poles. In addition, traffic signals are no longer mounted on the decorative OCS support poles/streetlights, but rather on mast arms extending from the replacement OCS support poles/streetlights. Under Build Alternatives 3 and 4 and the LPA, the parallel OCS wires are shifted from the side lane to be centered over the center-lane transitway. The median features a nose cone pedestrian refuge framing the crosswalk with the median, and the crosswalk is paint-striped to improve visibility. Each of the build alternatives, including the LPA, features curb bulbs and ramps, and a push-button APS pole at the corner of Sutter Street and Van Ness Avenue.

While the proposed BRT station and transitway are features compatible with the Van Ness Avenue corridor, the station canopy and features would partially obstruct ground-level views of the Regency Ballroom, which is a City-designated Significant Building. Moreover, placement of the station may conflict with the symmetrical character-defining style of the building from frontal views of the building.

Viewpoint 3 – Van Ness Avenue at Union Street

Viewpoint 3, depicted in Figures 4.4-10 and 4.4-11, is from the perspective of the southern crosswalk on Van Ness Avenue at the Van Ness Avenue/Union Street intersection, looking north. This location is within the residential segment of the project corridor. As shown in the figure, this area is comprised of lower-density apartment buildings and ground-floor, neighborhood-serving, commercial establishments. Viewpoint 3 is considered a key viewpoint because it represents the residential portion of the corridor, where the residential viewer group would be most sensitive to changes in the visual setting; therefore, Viewpoint 3 represents a sensitive visual setting.

Viewpoint 3 is within the residential segment of the project corridor. The area is comprised of lower-density apartment buildings and ground-floor, neighborhood-serving, commercial establishments.

This location features a wide, landscaped median with mature trees. The sidewalks also feature mature trees that shade portions of the sidewalk. There is an existing bus shelter on the west side of Van Ness Avenue. The OCS wires are visible over the roadways and intersection. Although largely obstructed by sidewalk trees, modern poles, and signage, the OCS support poles/streetlights are visible along the sidewalks of Van Ness Avenue. The increased height of the OCS support pole/streetlight network is more noticeable in this simulation and would likely be more noticeable throughout the northern portion of the corridor where the adjacent buildings are smaller in scale. A City-designated Significant Building (2517 Van Ness Avenue) is located just south of the bus shelter on the west side of Union Street; however, it is shielded by the sidewalk trees and the angle of the viewpoint. This property has a unique, ornate rooftop that is shielded by sidewalk trees. Most of the building façade is shielded by sidewalk trees and a canopy that extends from the door to the curb, and currently this building does not have a strong visual presence. The BRT station and transitway proposed under the build alternatives, including the LPA, would not obstruct views of the character-defining features of this building.

Visual simulations of Viewpoint 3 depict the proposed BRT features and replacement network of OCS support pole/streetlights. The transitway, BRT station, wind turbine, and lane-median configuration are depicted as described under Viewpoint 1. As in Viewpoint 1, median landscaping is removed to accommodate the BRT station under Build Alternatives 3 and 4 and the LPA, and the existing mature trees have been replaced with planted palm trees on the 9-foot-wide right-side medians under Build Alternative 3. The angle of Viewpoint 3 clearly shows the landscaped 4-foot-wide median of Build Alternative 3 and the LPA.

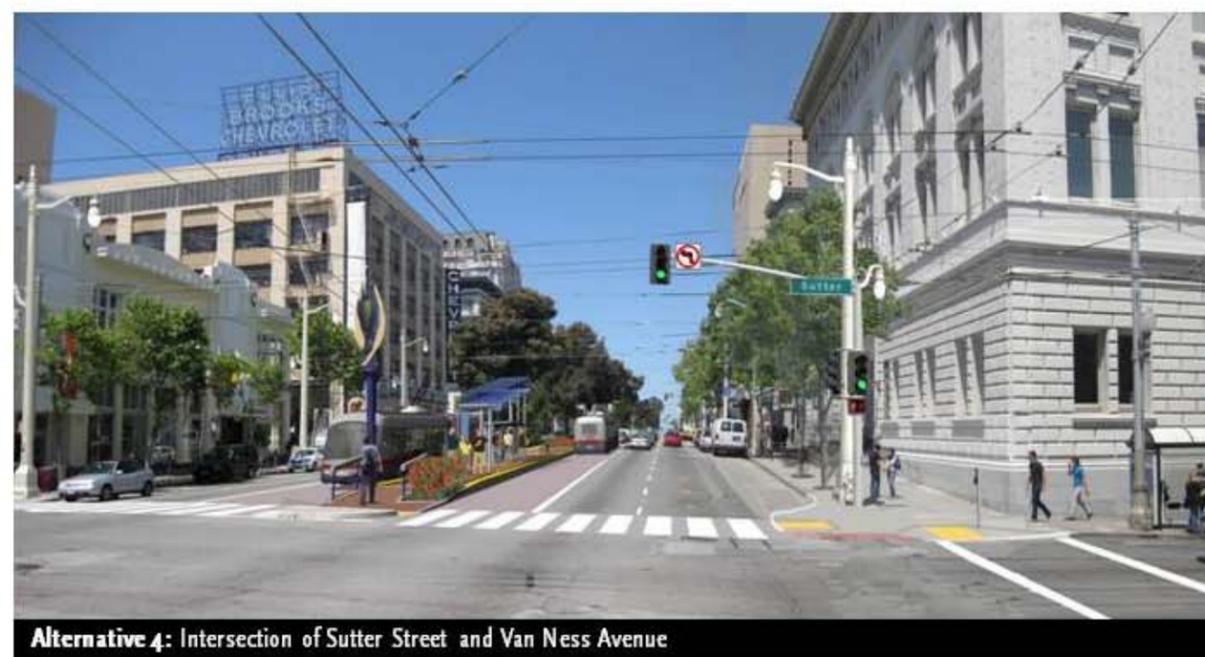
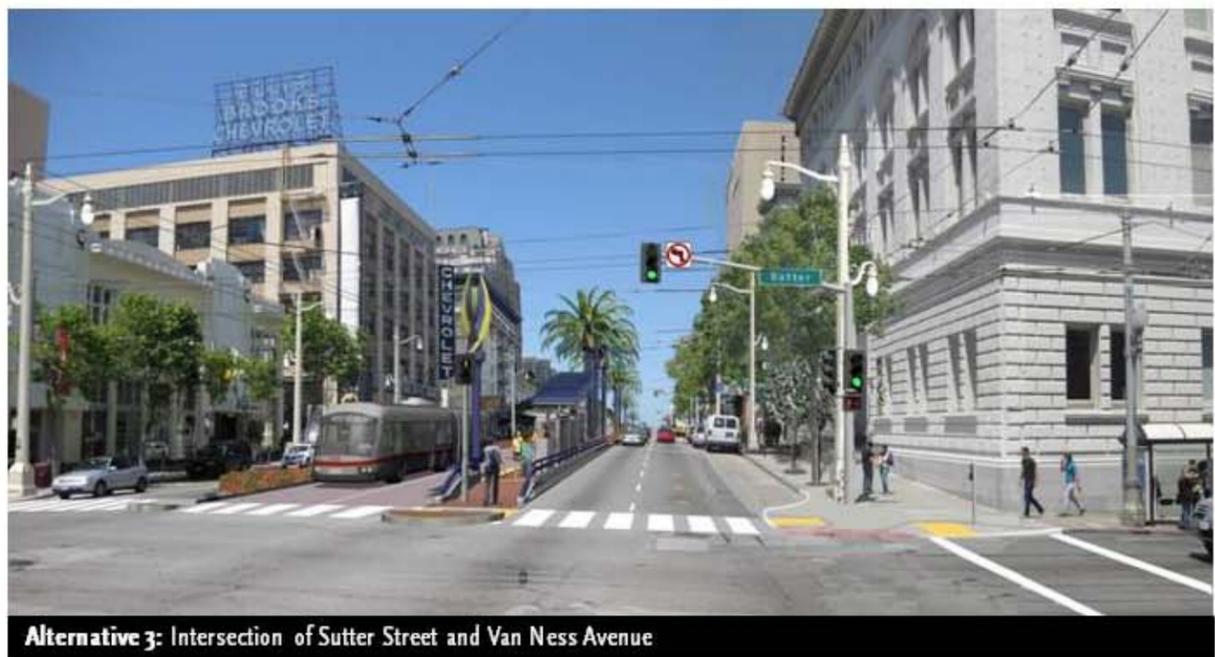
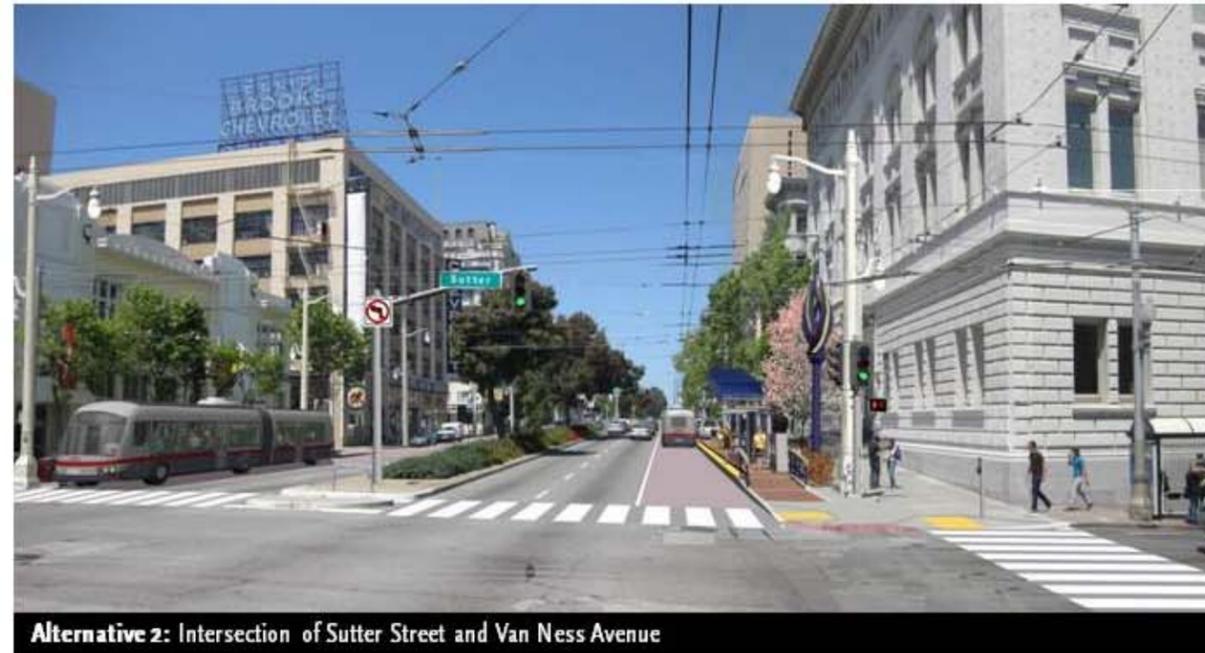
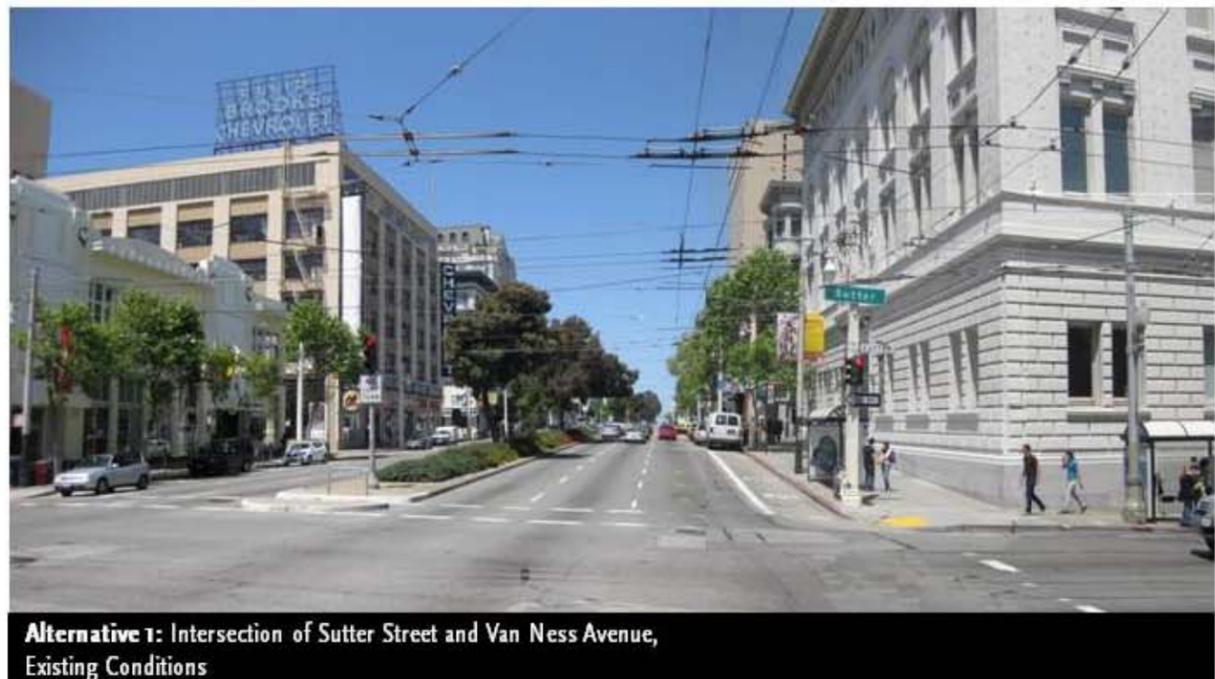


Figure 4.4-9: Viewpoint 2: Visual Simulations of Intersection of Sutter Street and Van Ness Avenue

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Alternative 1: Intersection of Union Street and Van Ness Avenue, Existing Conditions



Alternative 2: Intersection of Union Street and Van Ness Avenue



Alternative 3: Intersection of Union Street and Van Ness Avenue



Alternative 4: Intersection of Union Street and Van Ness Avenue

Figure 4.4-10: Viewpoint 3: Visual Simulations of Intersection of Union Street and Van Ness Avenue

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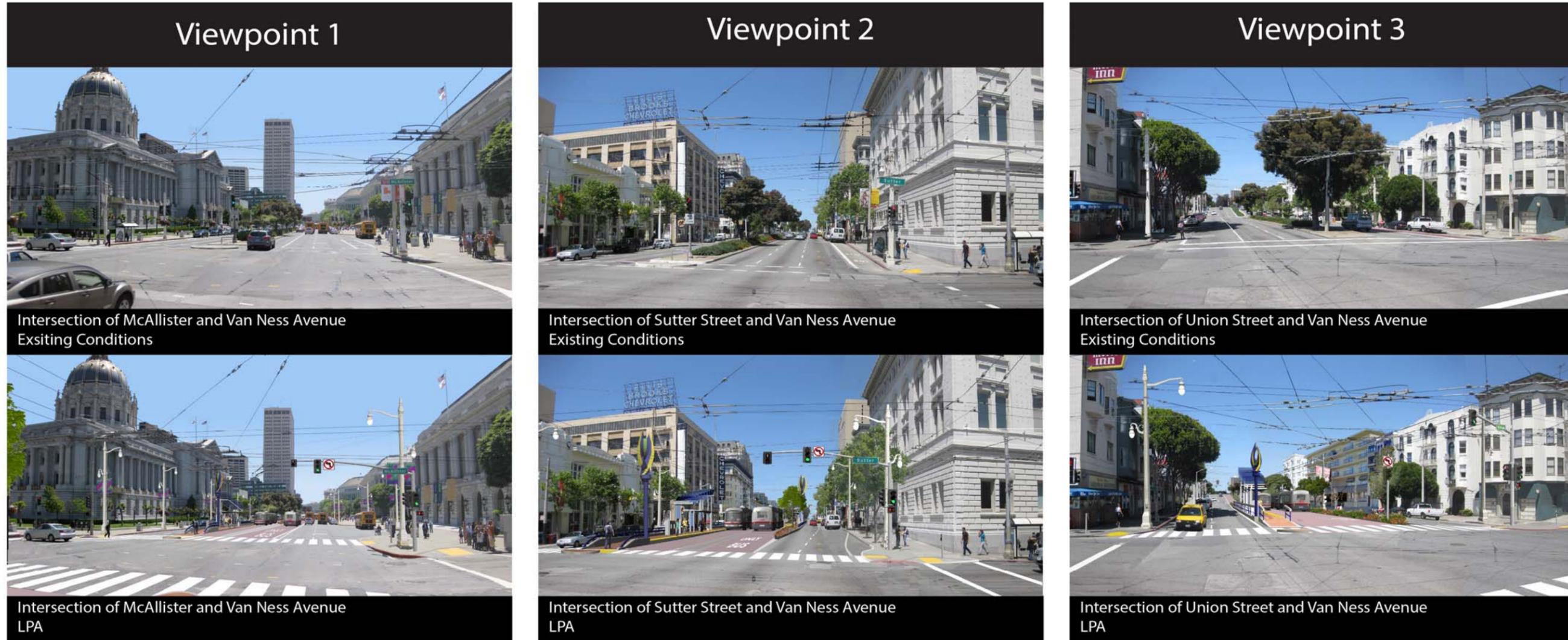


Figure 4.4-11: Viewpoints 1–3: Visual Simulations of the LPA at the Intersections of Van Ness Avenue with McAllister, Sutter, and Union Streets

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Other visual changes include removal of the existing sidewalk bus shelter located on the west side of Van Ness Avenue, near the northwest corner of Van Ness Avenue and Union Street. For Build Alternative 2, the median traffic signal pole has been replaced with a mast arm style signal pole that arches over the traffic lanes. Build Alternatives 3 and 4 and the LPA (with or without the Vallejo Northbound Station Variant) feature sidewalk mast arm poles. In addition, traffic signals are no longer mounted on the decorative OCS support poles/streetlights. Under Build Alternatives 3 and 4 and the LPA (with or without the Vallejo Northbound Station Variant) the parallel OCS wires are shifted from the side lane to be centered over the center-lane transitway. The median features a nose cone pedestrian refuge framing the crosswalk with the median, and the crosswalk is paint-striped to improve visibility. Each of the build alternatives, including the LPA (with or without the Vallejo Northbound Station Variant), features curb bulbs and ramps, and a push-button APS pole at the corner of Union Street and Van Ness Avenue.

4.4.3.2 | SCENIC VISTAS

The proposed project features would be confined to the roadway and sidewalks of Van Ness Avenue and would not obstruct scenic vistas described in Section 4.4.2.5. Existing scenic vistas in the project corridor would not be changed under the No Build Alternative or under any of the build alternatives, including the LPA (with or without the Vallejo Northbound Station Variant). Moreover, incorporation of Center-Lane Alternative Design Option B, eliminating nearly all left turns and left-turn pockets, into the proposed project would not alter scenic vistas; therefore, the proposed project would not have an adverse effect on a scenic vista, and it would not conflict with planning policies described in Section 4.4.1 to protect major views.

4.4.3.3 | LIGHT, GLARE, AND SHADOW

No Build Alternative

Shadow effects would not change under the No Build Alternative, and there would be no impacts. The No Build Alternative would not improve existing lighting; therefore, it would not support the recommendation in the Van Ness Corridor Initial Land Use and Urban Design Needs Assessment to provide comprehensive street lighting for Van Ness Avenue.

Build Alternatives

With the exception of trees planted in the median or at the sites of removed sidewalk bus shelters, the project features proposed under each build alternative, including the LPA (with or without the Vallejo Northbound Station Variant), would not cast substantial shadows. The shadow cast from median trees and BRT station canopies would be minimal, and it would be consistent with the existing visual setting; therefore, no adverse shadow impacts would result under any build alternative, with or without incorporation of the Center-Lane Alternative Design Option B under Build Alternatives 3 and 4, and including the LPA (with or without the Vallejo Northbound Station Variant).

High traffic volumes, including buses on Van Ness Avenue, create sources of light and glare. Operation of the proposed BRT service would not increase light and glare. The replacement OCS support pole/streetlight network would increase lighting over existing conditions to meet current safety lighting standards. Adjacent residences may be sensitive to the replacement street lighting, which would increase nighttime illumination over existing conditions on the sidewalks and roadway. Glare mitigation measure M-AE-1, described in Section 4.4.4, would be required to ensure no adverse impacts to residents.

The build alternatives, including the LPA (with or without the Vallejo Northbound Station Variant), would support the recommendation in the Van Ness Corridor Initial Land Use and Urban Design Needs Assessment to provide comprehensive street lighting for Van Ness Avenue.

KEY FINDING

With the exception of trees planted in the median or at the sites of removed sidewalk bus shelters, the project features proposed under each build alternative, including the LPA, would not cast substantial shadows.

The replacement OCS support pole/streetlight network would increase lighting over existing conditions to meet current safety lighting standards. Adjacent residences may be sensitive to the replacement street lighting.

4.4.3.4 | IMPORTANT VISUAL ELEMENTS WITHIN VIEWSHED

Replacement of the OCS support pole/streetlight network is one of the most noteworthy changes to the visual context at each key viewpoint.

OCS Support Poles/Streetlights

Replacement of the OCS support pole/streetlight network is one of the most noteworthy changes to the visual context at each key viewpoint presented in Section 4.4.3.1. Impacts resulting from changes to the OCS support poles/streetlights network would be experienced by all viewer groups, including sensitive viewer groups (i.e., residents, commuters, and tourists).

No Build Alternative. Though not depicted in the simulations presented in Section 4.4.3.1, under the No Build Alternative, the OCS support poles/streetlights would continue to be replaced with modern, nondescript poles on an as-needed basis, or as a comprehensive replacement project if funding becomes available.⁷⁴ Continued replacement of damaged OCS support poles/streetlights with modern poles of nondescript design would adversely affect this important visual element within the Van Ness Avenue corridor by further degrading the visual continuity and diminishing the character of the pole/streetlight network. In addition, the current practice of inserting supplemental, modern poles adjacent to existing OCS support poles/streetlights creates pole clutter, which also diminishes the character of the original pole/streetlight network and clutters the visual landscape of the corridor; therefore, the No Build Alternative would result in adverse impacts to this visual resource, which would grow in significance with the increased number of replaced poles.

Build Alternatives. The build alternatives, including the LPA (with or without the Vallejo Northbound Station Variant), would result in the replacement of the existing OCS support pole/streetlight network, resulting in potentially adverse impacts to this visual resource. As explained in Section 4.4.2.4, the existing OCS support poles/streetlights are a streetscape feature unique to Van Ness Avenue that contributes to the eclectic visual character of the corridor. The OCS support poles/streetlight network is the only major infrastructural element occurring consistently along Van Ness Avenue that displays design with aesthetic intent; although this intent is diminished by the insertion of nondescript, modern poles into the network, pole clutter, and the visual obstruction of many of the poles by sidewalk trees, roadway signage, and storefront canopies. Nonetheless, the OCS support poles/streetlights appear as a visually important feature in parts of the Van Ness Avenue corridor, including the Civic Center and at certain street corners such as Van Ness Avenue and Geary Street. Removal of this network could result in an adverse impact to an important visual resource, and mitigation would be required to reduce this impact. Mitigation described in Section 4.4.4 would be in the form of a replacement OCS support pole/streetlight network that is compatible with the existing visual setting of the Van Ness Avenue corridor and that achieves the same daytime and nighttime visual continuity throughout the corridor as the existing network provides. The replacement OCS support pole/streetlight network displayed in the simulations (Figures 4.4-8 through 4.4-11) demonstrates that a feasible replacement pole/streetlight network could be compatible with the existing visual setting of the Van Ness Avenue corridor and be reminiscent of the existing network. Consistent with City planning policies, the replacement pole/streetlight network depicted in Figures 4.4-8 through 4.4-11 displays a high-quality design aesthetic that would contribute to a feeling of prominence and grandeur in the Van Ness Avenue corridor, and it would retain a feeling of visual continuity throughout the corridor. The increased height of the replacement poles and the secondary light fixture that would protrude out over the roadway would not be out of scale with the wide roadway and adjacent development along Van Ness Avenue, and it would visually emphasize the network over the existing conditions consistent with City planning policies to promote a feeling of Van Ness Avenue as a grand boulevard.

KEY FINDING

The replacement OCS support pole/streetlight network demonstrates that a feasible replacement pole/streetlight network could be compatible with the existing visual setting of the Van Ness Avenue corridor and be reminiscent of the existing network.

⁷⁴ Approximately 33 of the original 259 OCS support pole/streetlights (13 percent) have been removed or replaced with modern, nondescript poles. Approximately 46 original poles (16 percent) are immediately flanked by a modern replacement pole installed to support OCS wires, streetlights, and/or signage (JRP, 2009).

Moreover, beneficial impacts could result from a replacement OCS support pole/streetlight network. A replacement OCS support pole/streetlight network, featuring an architecturally distinctive pole/streetlight configuration as represented here, would support Policy 8.8 of the Van Ness Area Plan, which calls for a uniform architectural style, character, and color in the design of streetlights and poles. This policy would be better achieved with implementation of a project build alternative than under the No Build Alternative, because replacement modern poles would be removed under the build alternatives, including the LPA (with or without the Vallejo Northbound Station Variant), which would reduce negative visual impacts of pole clutter and would achieve a more unified pole/streetlight network than under the No Build Alternative. Furthermore, a replacement OCS support pole/streetlight network would support Policy 10.3 of the Better Streets Plan to minimize visual clutter and share poles, and Policy 10.5 to provide adequate light levels and quality for pedestrians and other sidewalk users.

Policy 8.8 of the Van Ness Area Plan states that the existing streetlight poles should be maintained and enhanced if feasible to contribute to the special identity of Van Ness Avenue. Policy 8.8 also calls for the light poles to be painted a blue and gold color scheme, similar to that of the Civic Center light standards. Although the poles are depicted white-buff in the visual simulations, this color is only representative and would be decided upon during project final design along with the pole design. Moreover, the pole/streetlight network depicted in Figures 4.4-8 through 4.4-11 is representative only. It was designed by SFDPW to determine and demonstrate that it is feasible to install a pole/streetlight network that retains some of the character-defining features of the existing network, including white/buff-colored, tapered poles with decorative finials and bases from which teardrop-shaped pendant lights hang. This representative replacement OCS support pole/streetlight network was designed to support Policy 8.8 of the Van Ness Area Plan by designing a replacement pole/streetlight network that reflects some of the visual character of the existing network because it is not feasible to maintain the existing network.⁷⁵

Mitigation measure M-AE-2 calls for installing a replacement OCS support pole/streetlight network that will embody the aesthetic character of the existing network, thereby assuring that no significant aesthetic or visual effect will occur. In addition, the architectural style, design, color, and texture of the replacement OCS support pole/streetlight network would be reviewed and approved by the San Francisco Arts Commission, and the portion in the Civic Center Historic District would be reviewed by the HPC and the City Hall Preservation Advisory Committee, and ultimately approved by the HPC. The HPC must approve a Certificate of Appropriateness, as discussed in Section 4.4.1, for all permitted structures in the Civic Center Historic District. .

Implementation of the Center-Lane Alternative Design Option B would not affect proposed OCS support pole/streetlight replacement and related impacts under Build Alternatives 3 and 4, or under the LPA (with or without the Vallejo Northbound Station Variant).

Landscape and Trees

Changes to the existing landscaped median and tree canopy are one of the most noteworthy impacts on the visual setting at each key viewpoint presented in Section 4.4.3.1. As described in Section 4.4.2.4, the landscaped medians and tree plantings along Van Ness Avenue contribute to the visual quality of the corridor, and they are one of the most important visual features in the corridor. All viewer groups, including sensitive viewer groups (i.e., residents, commuters, and tourists) would be sensitive to changes in the character and scenic quality of landscaping and trees in the corridor. Many comments regarding concern for tree loss were

Changes to the existing landscaped median and tree canopy are one of the most noteworthy impacts on the visual setting at each key viewpoint.

⁷⁵ Replacement of the OCS support pole/streetlight network has been on SFMTA's list of desired Capital Improvement Projects since 2003 because the network is deteriorated and unable to carry the OCS load sufficiently; therefore, the City has replaced several damaged poles and inserted modern poles to assist with the OCS load. The BRT system proposed under the build alternatives would require a new pole network to support the OCS load for the new BRT system, and to provide roadway and sidewalk lighting that meets current standards (City of San Francisco, 2009).

submitted by agencies and the public during circulation of the Draft EIS/EIR. For this reason, a more comprehensive Tree Removal Evaluation and Planting Opportunity Analysis was undertaken in fall 2012 to identify the maturity and health of trees in the corridor and thus better understand the impacts of tree removal and the opportunities for preserving trees and the parameters of new tree plantings (BMS Design Group, 2013). This analysis was undertaken for all of the build alternatives, including the LPA, and is discussed in the following subsections. The 2012 survey took into account the following factors that were not taken into account in the 2009 survey, the results of which were presented in the Draft EIS/EIR:

- In October 2012, Caltrans issued a design requirement for the project that new tree plantings must be set back by 35 feet from each intersection. This 35-foot setback must be applied to all new or replacement tree plantings and is not applicable to existing trees. In other words, existing median trees must not be removed to achieve the 35-foot setback. The 35-foot setback reduces the number of replacement trees that can be planted under all of the build alternatives, including the LPA.
- Sidewalk trees that would be removed under Build Alternative 2 were quantified, as well as locations where median trees would have to be removed to accommodate turn pockets.
- The maturity and condition of all median trees, as well as each sidewalk tree that would be removed under build Alternative 2, were evaluated to better understand the biological and aesthetic value of these trees and the impacts that would result from removal of existing trees under each build alternative, including the LPA. This evaluation informed impacts, as well as opportunities, for tree preservation reported in Sections 4.4 and 4.13.
- A 15-foot separation between existing trees to be preserved and new trees to be planted was assumed in determining the number of new trees that could be planted.

A more comprehensive list of potential replacement trees has been developed that takes into consideration the OCS clearance requirement of 5 feet between the OCS wires and all trees, and 5 feet between the top of the OCS wires and a tree canopy. These OCS setbacks require the bottom of a tree canopy to be a minimum of 23 feet from the ground or a tree of any height to have a tree canopy narrower than 11 feet. Thus, existing median trees that the project would not remove might nonetheless have to be removed because they could not survive the pruning that would be required to provide the needed OCS clearance. The OCS clearance also informs the list of potential replacement trees because replacement trees must be able to grow to maturity given the required pruning. Although the removal and replanting of trees provide urban design opportunities that support City planning goals, the preservation of trees is considered of greater value than the value of the aforementioned urban design opportunities. Existing trees are scenic resources; therefore, preservation of trees has been a design priority for each build alternative, including the LPA. The 2009 and 2012 tree surveys and evaluations have supported design efforts to reduce removal of existing trees under each build alternative, including the LPA. In conclusion, while the proposed project would result in the removal of a substantial number of existing trees, efforts were undertaken by the SFCTA, SFMTA and partnering agencies to avoid removal of trees best suited for preservation. The SFCTA, SFMTA, and SFDPW worked closely with Caltrans staff to obtain design exception approvals from Caltrans to allow a reduced tree planting setback and to provide narrower mixed traffic lane widths to increase the size of the median for trees deemed suitable for preservation.

No Build Alternative. No changes to the landscape and tree plantings are anticipated to occur under the No Build Alternative.

Build Alternatives and the LPA. A certified arborist evaluated each median tree on Van Ness Avenue within the project limits for tree health and condition, using a scale of 1 to 5, which is defined in Table 4.4-2 (BMS Design Group, 2013). Sidewalk trees that would be removed under Build Alternative 2 were also evaluated for health/condition. Only Build Alternative 2 would result in the removal of sidewalk trees, at locations adjacent to proposed BRT stations. The center-lane configured alternatives (Build Alternatives 3 and 4), including the

LPA (with or without the Vallejo Northbound Station Variant) would not affect existing sidewalk trees.

Table 4.4-3 shows a breakdown of existing median trees by health/condition that would be removed in each alternative, including the LPA. The Vallejo Northbound Station Variant would not affect tree removal or planting opportunities under the LPA. Mature trees of healthy condition 4 or 5 are considered to be of the greatest biological value and visual quality due to their health, height, and the mature canopies they provide. It would also require a longer period for replacement trees to grow to equivalent size as mitigation for their removal, and replacement trees would have a narrower canopy than many removed trees. Thus, removal of mature, healthy trees is considered of greater impact than removal of young trees or trees in fair or poor health. The project corridor has 28 median trees that are mature and of healthy condition 4 or 5, which represents 27 percent of trees in the corridor.

Table 4.4-2: Tree Health and Condition Rating Scale

RATING	TREE CONDITION/HEALTH
0	Tree is dead.
1	Tree in severe decline, dieback of scaffold branches and/or trunk; most of foliage from epicormics; extensive structural defects that cannot be abated.
2	Tree in decline, epicormic growth, extensive dieback of medium to large branches, significant structural defects that cannot be abated.
3	Tree with moderate vigor, moderate twig and small branch dieback, thinning of crown, poor leaf color, moderate structural defects that might be mitigated with regular care.
4	Tree with slight decline in vigor, small amount of twig dieback, minor structural defects that could be corrected.
5	A healthy, vigorous tree, reasonably free of signs and symptoms of disease, with good structure and form typical of the species.

Table 4.4-3: Removed Trees Summarized by Tree Health and Condition

BUILD ALTERNATIVE ¹	REMOVED TREES ²			
	MATURE TREES CONDITION 4 OR 5	YOUNG TREES CONDITION 4 OR 5	TOTAL TREES CONDITION 4 OR 5	MATURE & YOUNG TREES CONDITION 1-3
Existing Conditions/ No Build Alternative	0	0	0	0
Alternative 2 ³	6	30	36	22
Alternative 3	28	50	78	24
Alternative 4	11	40	51	13
LPA ⁴	23	44	67	23

¹ Implementation of Design Option B would not appreciably change the impacts to landscape and trees under Build Alternatives 3 and 4.

² No sidewalk trees would be impacted under Build Alternatives 3, 4, or the LPA.

³ The existing conditions for Build Alternative 2 differ from those of the other build alternatives and LPA because affected sidewalk trees were evaluated.

⁴ The LPA is a combination and refinement of the center-running alternatives with limited left turns (Build Alternatives 3 and 4 with Design Option B). Incorporation of the Vallejo Northbound Station Variant in the LPA design would not affect tree removal or planting opportunities under the LPA.

Source: Van Ness BRT Tree Removal Evaluation and Planting Opportunity Analysis performed by BMS Design Group (BMS Design Group, 2013).

Table 4.4-4 provides an overview of the anticipated number of trees that would be removed under each build alternative, including the LPA, and the number of replacement and infill trees that could be planted based on the spacing assumptions explained above.⁷⁶ The greatest number of existing trees would be preserved under Build Alternative 2, while it is assumed

⁷⁶ With different assumptions (closer spacing), more trees could be planted. This would be determined during final design, and a conservative scenario is evaluated in this analysis.

that no median trees would be preserved under Build Alternative 3. The total number of sidewalk and median trees that would be preserved under Build Alternative 4 and the LPA fall within the range of that for Build Alternatives 2 and 3. All build alternatives, including the LPA, would result in a substantial net gain of trees in the corridor when new planting opportunities are considered. Each build alternative, including the LPA, would result in new tree plantings at locations of removed sidewalk bus shelters, as feasible. In addition, under each build alternative, including the LPA, trees would be planted in areas of the median where trees do not currently exist, and where existing trees would require removal because they would not survive project construction. Increased sidewalk and median tree plantings over existing conditions would improve the visual setting, becoming more apparent over time as plantings mature, resulting in long-term, beneficial effects. At the same time, however, there would be a plant establishment period of several years for new trees to reach maturity. This would be a period of reduced benefits compared with the benefits offered by mature trees and their canopies. The trade-offs between increased plantings in the corridor and the loss of existing trees is discussed below for each build alternative, including the LPA.

Table 4.4-4: Summary of Anticipated Tree Removal and Planting Opportunities

TREES	EXISTING CONDITIONS/ NO BUILD ALTERNATIVE	BUILD ALTERNATIVE 2	BUILD ALTERNATIVE 3	BUILD ALTERNATIVE 4	LPA
Existing Median Trees	102	N/A	N/A	N/A	N/A
Existing Sidewalk Trees	314				
Removed Median Trees	0	20	102	64	90
Removed Sidewalk Trees	0	38	0	0	0
New Median Trees	0	103	163	113	95
New Sidewalk Trees	0	68	48	48	48
Total Trees	416	529	525	513	469

Note: The health and condition of the trees have been taken into account in this tree survey. Mature trees with canopies that would reach above the 5-foot OCS wire clearance were considered able to be preserved, as were trees with canopies that could be pruned to maintain clearance.

Source: Van Ness BRT Tree Removal Evaluation and Planting Opportunity Analysis (BMS Design Group, 2013).

Build Alternative 2. Minimal changes to existing median landscaping and trees in the Van Ness Avenue corridor would occur under Build Alternative 2. Build Alternative 2 would increase the median width at locations where existing left-turn pockets would be removed, which are indicated in Figure 2-2. This would increase the available median area for landscaping and tree planting, which would be a beneficial impact. A planter with trees and shrubs would be located along the sidewalk side of the BRT station platform to serve as a buffer between bus patrons and sidewalk pedestrians. As feasible, trees would be planted at the sites of removed sidewalk bus shelters, which would improve the visual setting at these locations. Again, Build Alternative 2 would require removal of sidewalk trees at locations adjacent to proposed BRT stations and median trees at locations where filling in left-turn pockets would significantly disturb the roots of those trees. Table 4.4-4 provides the anticipated number of trees that would be removed to accommodate Build Alternative 2, in addition to the number of new trees that would be planted. As indicated in Table 4.4-4, Build Alternative 2 is anticipated to result in the removal of 38 sidewalk trees and 20 median trees. At the same time, Build Alternative 2 is anticipated to increase the number of trees in the project corridor by 113 trees with new median tree plantings at locations where existing left-turn pockets are removed. Build Alternative 2 would not have to adhere to OCS clearance

setbacks at the median in most locations;⁷⁷ therefore, a wider variety of median trees would be available to plant than under the center-lane configured alternatives.

Build Alternative 2 would result in the removal of approximately 6 trees that are mature and of healthy condition 4 or 5. Table 4.4-5 reports the tree removal and planting opportunity under Build Alternative 2 on those blocks featuring high-quality landscaped medians and mature tree canopies identified in Section 4.4.2.5, Table 4.4-1. Overall, Build Alternative 2 would preserve existing median landscaping and tree plantings on all these blocks and would not result in substantial impacts to the landscaping and tree features on the block (McAllister Street to Golden Gate Avenue) where impacts from tree and landscaping removal would be most noticeable. In fact, the infill of an additional 103 trees would provide a noticeable, positive change in the visual setting that would increase over time as tree plantings matured.

The median landscape design plan, including tree type and planting scheme for medians and curbside BRT stations, would require review and approval by the San Francisco Arts Commission, as well as review and approval by the SFDPW as part of their regulation of street excavations and trees. Furthermore, the Board of Supervisors would need to approve changes to sidewalk widths, which would require a determination by the City Planning Department of project consistency with the General Plan.

Table 4.4-5: Alternative 2 – Project Impact on High-Quality Landscaped Medians Featuring Mature Tree Canopies

VAN NESS AVENUE BLOCK	EXISTING TREES	TREE REMOVAL & PLANTING OPPORUNITY	NET TREE GAIN/LOSS
Hayes – Grove streets	2	All existing trees preserved.	0
Grove – McAllister streets	6	All trees preserved and 2 additional trees planted.	+2
McAllister Street – Golden Gate Avenue	6	3 out of 6 existing trees preserved and 6 additional trees planted.	+3
Turk – Eddy streets	4	All trees preserved and 1 additional tree planted.	+1
Ellis – O’Farrell streets	4	All trees preserved and 3 additional trees planted.	+3
Sutter – Bush streets	4	All trees preserved and 2 additional trees planted.	+2
Pine – California streets	4	All trees preserved and 1 additional tree planted.	+1
Sacramento – Clay streets	6	All existing trees preserved and no additional trees planted.	0
Pacific – Broadway streets	5	All existing trees preserved and 1 additional tree planted.	+1
Union – Filbert streets	6	All existing trees preserved and no additional trees planted.	0

Build Alternative 3. Build Alternative 3 would require removal and reconfiguration of existing medians to construct the dual-median, center-lane transitway. This would likely require removal of all existing median trees and landscaping.⁷⁸ The visual impact of this would be most noticeable along the blocks of Van Ness Avenue that feature high-quality landscaped medians with mature trees, and less noticeable on blocks that feature medians without

⁷⁷ Some SFMTA routes and “deadhead” service currently use center-running OCS on certain blocks along Van Ness Avenue within the project study area.

⁷⁸ It may be possible to preserve trees at certain locations in construction of Build Alternative 3; however, a worst-case scenario of removal of all existing trees, as depicted in the visual simulations, is considered for the purposes of visual analysis.

landscaping or mature trees. Table 4.4-6 reports the tree removal and planting opportunity under Build Alternative 3 on those blocks featuring high-quality landscaped medians and mature tree canopies identified in Section 4.4.2.5, Table 4.4-1.

Table 4.4-6: Alternative 3 – Project Impact on High-Quality Landscaped Medians Featuring Mature Tree Canopies

VAN NESS AVENUE BLOCK	EXISTING TREES	TREE REMOVAL & PLANTING OPPORUNITY	NET TREE GAIN/LOSS
Hayes – Grove streets	2	All trees removed and 6 trees planted.	+4
Grove – McAllister streets	6	All trees removed and 17 trees planted.	+11
McAllister Street – Golden Gate Avenue	6	All trees removed and 10 trees planted.	+4
Turk – Eddy streets	4	All trees removed and 10 trees planted.	+6
Ellis – O’Farrell streets	4	All trees removed and 10 trees planted.	+6
Sutter – Bush streets	4	All trees removed and 4 trees planted.	0
Pine – California streets	4	All trees removed and 10 trees planted.	+6
Sacramento – Clay streets	6	All trees removed and 4 trees planted.	-2
Pacific - Broadway streets	5	All trees removed and 10 trees planted.	+5
Union – Filbert streets	6	All trees removed and 3 additional trees planted.	-3

Note: Build Alternative 3 would likely require the removal of all median trees within the project limits. Thus, mature tree canopies and high-quality landscaping in medians would be removed. Replacement tree plantings and landscaping would be implemented on each of these blocks under Build Alternative 3, with and without Design Option B.

The dual median configuration under Build Alternative 3 includes 9-foot-wide and 4-foot-wide parallel medians. New trees would be planted along the 9-foot wide, right-side medians (as shown with palm trees in Figures 4.4-8 through 4.4-10); however, the 4-foot-wide, left-side median would not likely allow for tree planting, but it would allow for landscaping as depicted in Viewpoint 3, Union Street Simulation for Build Alternative 3. Removal of the existing median trees would noticeably degrade the visual environment of the corridor until replacement tree plantings mature. In addition, Build Alternative 3 would require replacement trees that are low growing or with a narrow canopy to avoid conflict with the OCS wires. Some example trees with narrow canopies could be palm trees as shown, or Italian Cypress, Skyrocket Juniper, Hillspire Juniper, and European Hornbeam. A narrower tree canopy would alter the character of the street blocks that currently feature median trees with wide canopies.

Table 4.4-4 provides the anticipated number of trees that would be removed to accommodate Build Alternative 3, in addition to the number of new trees that would be planted. As indicated in Table 4.4-4, Build Alternative 3 would require the removal of 102 median trees and, with replanting, is anticipated to increase the number of trees in the project corridor by 109 trees. The addition of these trees would be a substantial, visual benefit to the corridor once the trees reach maturity. Nonetheless, removal of the existing median trees would noticeably degrade the visual environment of the corridor until replacement plantings mature. Build Alternative 3 would result in the removal of approximately 28 trees that are mature and of healthy condition 4 or 5. Although a greater number of replacement trees would be planted, these would be trees with substantially narrower canopies than the existing trees, which would notably alter the visual character of Van Ness Avenue, especially on the blocks listed in Table 4.4-6. Compared with the other alternatives, Build Alternative 3 would offer the greatest opportunity to achieve urban design goals of a median with a consistent aesthetic; however, the loss of all existing trees would result in the greatest impact among the build alternatives, including the LPA (with or without the Vallejo Northbound Station Variant).

The adverse impact resulting from the removal of all existing median landscaping and trees would be reduced with the implementation of mitigation measures M-AE-3 and M-AE-4 of Section 4.4.4, in the form of a median landscape design plan that is consistent with median design policies in the Van Ness Area Plan, Civic Center Area Plan, and San Francisco Better Streets Plan. These City plans call for consistent rows of single-species median trees to provide a sense of identity and cohesiveness for the corridor. The Van Ness Area Plan also includes paving material and design requirements for medians, including a grey-colored decorative unit paver trim. The 9-foot-wide median configuration proposed under Build Alternative 3 would allow for such a landscape theme containing a consistent row of single-species trees, except on the blocks of Van Ness Avenue between O'Farrell and Geary streets, and Jackson and Pacific streets where the station platforms would extend the length of these blocks and allow for minimal to no landscaping. Currently, these blocks feature medians with minimal or no landscaping and young trees,⁷⁹ so the introduction of the station platform that would extend the length of these blocks (i.e., without trees and with minimal to no landscaping) would not substantially degrade the existing visual setting.

In addition, the consistent median configuration provided by Build Alternative 3 would provide a strong, central axis for visual continuity in the corridor, consistent with urban design policies summarized in Section 4.4.1. The median landscape design plan, including tree type⁸⁰ and planting scheme for medians and BRT stations, would require review and approval by the San Francisco Arts Commission, as well as review and approval by the SFDPW as part of their regulation of street excavations and trees. The median landscape design plan within the Civic Center Historic District must be reviewed and approved by the San Francisco HPC. The City Hall Preservation Advisory Commission would have the opportunity to review the median landscape design plan within the Civic Center Historic District to advise the HPC on their approval action. A Certificate of Appropriateness must be obtained from the HPC for the project landscape plan within the Civic Center Historic District. Incorporation of a median design plan described in mitigation measures M-AE-3 and M-AE-4 of Section 4.4.4, that conforms to the aforementioned policies, would be vetted through this approval process to ensure a high-quality design and mitigation of adverse impacts resulting from the loss of existing trees and landscaping.

Build Alternative 4. Build Alternative 4 would require some reconfiguration of existing medians to construct the single-median, center-lane transitway. Reconfiguration of the median would require removal of some existing trees and landscaping, namely at proposed station locations. This impact would be most noticeable along the blocks of Van Ness Avenue that feature high-quality landscaped medians with mature trees, identified in Section 4.4.2.5, Table 4.4-1. Table 4.4-7 reports the tree removal and planting opportunity under Build Alternative 4 on those blocks featuring high-quality landscaped medians and mature tree canopies. A BRT station would be located on 5 of these 10 street blocks (Grove to McAllister streets, Turk to Eddy streets, Sutter to Bush streets, Sacramento to Clay streets, and Union to Filbert streets), which would require approximately 150 feet of the existing median (i.e., approximately half the block) to be converted to a BRT station platform. Trees and landscaping along the other half of the block would be preserved, although some trees would need to be pruned to provide clearance for the replacement OCS. Overall, Build Alternative 4 would preserve half the trees on 6 of the 10 blocks, preserve all trees on 2 blocks, and would remove all trees on 1 block.

Build Alternative 2 is anticipated to increase the number of trees in the project corridor by 33 trees.

⁷⁹ Except for one mature tree located on a half-block-long section of median between Jackson and Pacific streets.

⁸⁰ Selection of median tree type would consider tree canopy size and maintenance requirements to ensure a 5-foot clear zone between tree canopies and OCS wires.

Table 4.4-7: Alternative 4 – Project Impact on High-Quality Landscaped Medians Featuring Mature Tree Canopies

VAN NESS AVENUE BLOCK	EXISTING TREES	TREE REMOVAL & PLANTING OPPORUNITY	NET TREE GAIN/LOSS
Hayes – Grove streets	2	Removal of existing trees and no new tree plantings.	-2
Grove – McAllister streets	6	4 out of 6 trees preserved and 6 trees planted.	+4
McAllister Street – Golden Gate Avenue	6	3 out of 6 trees preserved and 6 trees planted.	+3
Turk – Eddy streets	4	1 out of 4 trees preserved and 1 tree planted.	-2
Ellis – O’Farrell streets	4	All trees preserved and 3 trees planted.	+3
Sutter – Bush streets	4	2 out of 4 trees preserved and 1 tree planted.	-1
Pine – California streets	4	All trees preserved and 2 trees planted.	+2
Sacramento – Clay streets	6	2 of out 6 trees preserved and no new tree plantings.	-4
Pacific – Broadway streets	5	4 out of 5 trees preserved and 1 tree planted.	0
Union – Filbert streets	6	2 out of 6 trees preserved and no new tree plantings.	-4

Table 4.4-4 provides the anticipated number of trees that would be removed to accommodate Build Alternative 4, in addition to the number of new trees that would be planted. As indicated in Table 4.4-4, Build Alternative 4 would result in the removal of 64 median trees, or approximately 63 percent of median trees in the project corridor. Eleven (11) of the 64 trees are mature and of healthy condition 4 or 5, which represents removal of approximately 39 percent of existing healthy and mature trees in the corridor. This would result in a notable, adverse change in the visual quality of the project corridor until new tree plantings mature.

Build Alternative 4 is anticipated to increase the number of trees in the project corridor by 97 trees with replanting. The addition of these trees would be a substantial, visual benefit to the corridor once the trees reach maturity. Although some existing trees would be removed, incorporation of a median design plan described above for Build Alternative 3 would mitigate impacts resulting from the loss of these trees and landscaping. The design goal in City Planning documents is to provide consistent rows of single-species median trees that would be balanced with the goal of preserving existing trees; thus, new tree plantings would be in-filled around preserved trees. The 14-foot-wide median configuration proposed under Build Alternative 4 would allow for such a landscape theme containing a consistent row of single-species trees, except for the blocks of Van Ness Avenue between O’Farrell and Geary streets, and Jackson and Pacific streets where the station platforms would extend the length of these blocks. Currently, these blocks feature medians with minimal or no landscaping and young trees,⁸¹ so the introduction of the 4-foot-wide landscaped median on these blocks, even without trees, would not substantially degrade the existing visual setting. Build Alternative 4 would increase the width and available landscape area of the median throughout Van Ness Avenue, which would result in beneficial impacts to the visual setting of the project corridor. The larger and consistently provided median would strengthen the visual connectivity and identity of the Van Ness Avenue corridor, consistent with urban design policies; therefore, impacts resulting from the removal of some existing median

Build Alternative 4 is anticipated to increase the number of trees in the project corridor by 97 trees.

⁸¹ Except for one mature tree located on a half-block long section of median between Jackson and Pacific streets.

landscape and trees under Build Alternative 4 would be mitigated with incorporation of a median design plan described for Build Alternative 3 above, as well as mitigation measures M-AE-3 and M-AE-4 in Section 4.4.4.

Implementation of Center-Lane Alternative Design Option B would involve removal of the existing left-turn pockets, which may allow slightly wider medians and slightly greater landscaped area at these locations; therefore, implementation of Center-Lane Alternative Design Option B would not appreciably change the impacts to landscape and trees under Build Alternatives 3 and 4.

LPA. The LPA, as a refinement of Build Alternatives 3 and 4 with Design Option B, would require some reconfiguration of existing medians to construct the single-median, center-lane transitway on blocks without a station and would require nearly complete reconstruction of existing medians on blocks with a station that feature a dual median. Thus, tree removal and planting opportunities for the LPA (with or without the Vallejo Northbound Station Variant) fall within what is described above for Build Alternatives 3 and 4. As under Build Alternative 4, the greatest number of existing trees to be removed under the LPA would be required at station locations. In addition, the LPA would require reconstruction of additional areas north and south of stations to accommodate the transition between dual and single medians at station locations. Thus, the LPA would result in the removal of more trees than Build Alternative 4. As under Build Alternative 4, reconstruction of the existing median to accommodate BRT stations would be most noticeable along the blocks of Van Ness Avenue that feature high-quality landscaped medians with mature trees, as identified in Section 4.4.2.5, Table 4.4-1. Overall, the LPA would preserve all trees on 1 out of the 10 blocks and would remove all trees on 4 blocks. One or more trees would be preserved on the remaining 5 blocks. Table 4.4-8 reports the tree removal and planting opportunity under the LPA on those blocks featuring high-quality landscaped medians and mature tree canopies.

Implementation of Center-Lane Alternative Design Option B would not appreciably change the impacts to landscape and trees under Build Alternatives 3 and 4.

Table 4.4-8: LPA – Project Impact on High-Quality Landscaped Medians Featuring Mature Tree Canopies

VAN NESS AVENUE BLOCK	EXISTING TREES	TREE REMOVAL & PLANTING OPPORUNITY	NET TREE GAIN/LOSS
Hayes – Grove streets	2	All trees preserved and 7 trees planted.	+5
Grove – McAllister streets	6	2 out of 6 trees preserved and 6 trees planted.	+2
McAllister Street – Golden Gate Avenue	6	No existing trees preserved and no trees planted.	-6
Turk – Eddy streets	4	No existing trees preserved and no trees planted.	-4
Ellis – O’Farrell streets	4	2 out of 4 existing trees preserved and 4 trees planted.	+2
Sutter – Bush streets	4	No existing trees preserved and no trees planted.	-4
Pine – California streets	4	1 out of 4 trees preserved and 3 trees planted.	0
Sacramento – Clay streets	6	No trees preserved and no trees planted.	-6
Pacific – Broadway streets	5	No trees preserved and 2 trees planted.	-3
Union – Filbert streets	6	No trees preserved and 1 tree planted.	-5

A BRT station would be located on 6 of these 10 street blocks (Grove to McAllister streets, McAllister to Golden Gate streets, Turk to Eddy streets, Sutter to Bush streets, Sacramento to Clay streets, and Union to Filbert streets), which would require approximately 150 feet of the existing median (i.e., approximately half the block) to be converted to a BRT station platform. Trees and landscaping along the other half of the block would be preserved,

KEY FINDING

There would be no change or adverse impact to Significant Buildings and architecture under the build alternatives, including the LPA; however, the proposed BRT stations would alter the visual setting and views of some of these buildings as experienced by motorists, cyclists, and pedestrians traveling on Van Ness Avenue.

although some trees would have to be pruned to provide clearance for the replacement OCS. In addition, the station platforms would extend the length of the block between O'Farrell and Geary streets, preventing tree planting on this block.

The LPA would require the removal of 90 median trees and is anticipated to increase the number of trees in the project corridor by 53 trees with replanting, as shown in Table 4.4-4. The LPA would result in the removal of approximately 23 trees that are mature and of healthy condition 4 or 5, which is approximately 82 percent of existing healthy and mature median trees in the corridor. This would result in a notable, adverse change in the visual quality of the project corridor until new tree plantings mature.

Impacts resulting from the removal of some existing median landscape and trees under the LPA would be reduced with incorporation of a median design plan described for Build Alternative 3 above, as well as mitigation measures M-AE-3 and M-AE-4 in Section 4.4.4.

Significant Buildings and Architecture

As explained in Section 4.4.2.4, there are several buildings located along Van Ness Avenue in the project corridor that are identified by the City as Significant Buildings and Contributory Buildings for their contribution to the architectural environment of Van Ness Avenue. Most of these exhibit historic period architecture, and they are targeted for preservation and identified as warranting special consideration in planning. Similarly, many of these buildings and others hold historic status with the NRHP, CRHR, and as City Landmarks. These special-status buildings require special consideration in planning.

No Build Alternative. There would be no change or adverse impact to significant buildings and architecture under the No Build Alternative.

Build Alternatives. There would be no change or adverse impact to Significant Buildings and architecture under the build alternatives, including the LPA (with or without the Vallejo Northbound Station Variant); however, the proposed BRT stations would alter the visual setting and views of some of these buildings as experienced by motorists, cyclists, and pedestrians traveling on Van Ness Avenue. At eight locations, a BRT station is proposed in the roadway across from a City-designated Significant Building, City Landmark, or building that is listed or determined eligible for listing in the NRHP and CRHR. These buildings are identified as being contributors to the character of the Van Ness Avenue corridor. Table 4.4-9 lists the thirteen locations where a BRT station is proposed across from a special-status building under the build alternatives.

Under the LPA, BRT stations are proposed adjacent to buildings identified as a City-designated Significant Building, City Landmark, or building that is listed or determined eligible for listing in the NRHP and CRHR at twelve locations, indicated in Table 4.4-9. No such properties are located on the block of Van Ness Avenue between Vallejo and Green streets where the Vallejo Northbound Station Variant is under consideration for inclusion in the LPA design.

Figure 4.4-12 displays the locations and photos of each of the special-status buildings.

Table 4.4-9: Proposed BRT Station Locations and Special-Status Properties

PROPERTY	SPECIAL STATUS	BUILD ALTERNATIVE 2	BUILD ALTERNATIVE 3	BUILD ALTERNATIVE 4	LPA
11-35 Van Ness Avenue (Masonic Temple)	<ul style="list-style-type: none"> Eligible for NRHP listing; Eligible for CRHR listing; San Francisco Significant Building 	SB, curbside Market Street Station	SB and NB center lane Market Street Stations	SB and NB center lane Market Street Station	SB center lane Market Street Station
City Hall (Civic Center)	<ul style="list-style-type: none"> Civic Center Historic District National Historic Landmark; NRHP listed; CRHR listed; San Francisco City Landmark 	NB, curbside McAllister Street Station	SB and NB center lane McAllister Street Stations	SB and NB center lane McAllister Street Station	NB center lane McAllister Street Station
War Memorial Building & Performing Arts Complex (Civic Center)	<ul style="list-style-type: none"> Civic Center Historic District National Historic Landmark; NRHP listed; CRHR listed; San Francisco City Landmark 	SB, curbside McAllister Street Station			
799 Van Ness Avenue (Wallace Estate Co. Garage)	<ul style="list-style-type: none"> Eligible for NRHP listing; Eligible for CRHR listing; San Francisco Significant Building 	SB, curbside Eddy Street Station	SB center lane Eddy Street Station	SB and NB center lane Eddy Street Station	NB center lane Eddy Street Station
1000 Van Ness Avenue (Don Lee Building)	<ul style="list-style-type: none"> San Francisco Significant Building 	N/A – No station proposed in front of this property	SB and NB center lane Geary/O’Farrell Street Stations, which extend the entire length of block	SB and NB center lane Geary/O’Farrell Street Stations, which extend the entire length of block. (Alternative 3 configuration)	SB and NB center lane Geary/O’Farrell Street Stations, which extend the entire length of block.



The inclusion of small wind turbines, such as this one displayed in 2010 in Civic Center, would also be considered for appropriateness, because this tall, modern feature may detract from the adjacent historic period buildings.

Table 4.4-9: Proposed BRT Station Locations and Special-Status Properties

PROPERTY	SPECIAL STATUS	BUILD ALTERNATIVE 2	BUILD ALTERNATIVE 3	BUILD ALTERNATIVE 4	LPA
1050 Van Ness Avenue (Grosvenor Inn/Opal Hotel)	<ul style="list-style-type: none"> San Francisco Significant Building 	NB, curbside Geary/O'Farrell Street Station	SB and NB center lane Geary/O'Farrell Street Stations, which extend the entire length of block	SB and NB center lane Geary/O'Farrell Street Stations, which extend the entire length of block. (Alternative 3 configuration)	SB and NB center lane Geary/O'Farrell Street Stations, which extend the entire length of block.
1300 Van Ness Avenue (Regency Ballroom)	<ul style="list-style-type: none"> San Francisco Significant Building 	NB, curbside Sutter Street Station	NB center lane Sutter Street Station	SB and NB center lane Sutter Street Station	SB center lane Sutter Street Station
1301 Van Ness Avenue (Commercial Showroom)	<ul style="list-style-type: none"> San Francisco Significant Building 	N/A – No station proposed in front of this property	NB center lane Sutter Street Station	SB and NB center lane Sutter Street Station	SB center lane Sutter Street Station
1320 Van Ness Avenue (Scottish Rite Temple)	<ul style="list-style-type: none"> Eligible for NRHP listing 	NB, curbside Sutter Street Station	NB center lane Sutter Street Station	NB center lane Sutter Street Station	SB center lane Sutter Street Station
1699 Van Ness Avenue (Paige Motor Car Co. Building)	<ul style="list-style-type: none"> NRHP listed; CRHR listed; San Francisco Significant Building 	SB, curbside Sacramento Street Station	SB, curbside Sacramento Street Station	SB and NB center lane Sacramento Street Station	N/A – No station proposed in front of this property
1725, 1735, 1745 Van Ness Avenue (Gothic apartments)	<ul style="list-style-type: none"> San Francisco Significant Building 	N/A – No station proposed in front of this property	NB center lane Sacramento Street Station	NB center lane Sacramento Street Station	SB center lane Sacramento Street Station
2000 Van Ness Avenue (Medical Arts Building)	<ul style="list-style-type: none"> San Francisco Significant Building 	N/A – No station proposed in front of this property	NB center lane Jackson Street Station	SB and NB center lane Jackson Street Station	SB center lane Jackson Street Station
2517 Van Ness Avenue (house/Beauty School)	<ul style="list-style-type: none"> San Francisco Significant Building 	SB, curbside Union Street Station	N/A – No station proposed in front of this property	SB and NB center lane Union Street Station	SB center lane Union Street Station



Figure 4.4-12:
 Special Status
 Buildings Located
 Adjacent to
 Proposed BRT
 Stations

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While the BRT stations and transitway proposed under the build alternatives, including the LPA (with or without the Vallejo Northbound Station Variant), are features compatible with the Van Ness Avenue corridor, the station canopy, wind turbines, and other features would partially obstruct ground-level views of adjacent Significant Buildings and would introduce modern features that could detract from the visual setting of these buildings. Because the Van Ness Area Plan calls for Significant Buildings to serve as a basis for the theme and scale of adjacent development, architectural integration of BRT stations with adjacent Significant Buildings would be considered. Modifications of the BRT station design themes through station canopy placement, materials, color, lighting, and texture would be considered to harmonize the BRT stations with the adjacent Significant Buildings as part of the project design. Architectural integration of BRT stations with adjacent Significant Buildings is described in mitigation measure M-AE-5 and M-AE-6 in Section 4.4.4, Civic Center Historic District

No Build Alternative. Under the No Build Alternative, there would be no change or adverse impact to special-status buildings of the Civic Center Historic District. Although to date no OCS support poles/streetlights have been replaced within the historic district, modern poles have been added to the network to help carry the OCS load. The current practice of inserting modern, nondescript poles into the OCS support pole/streetlight network on an as-needed basis would eventually degrade the character of the pole/streetlight network, or the existing OCS support pole/streetlight network would deteriorate to a level that requires comprehensive replacement. It is likely that per Article 10 of the Planning Code that the City would replace the network within the historic district with decorative poles that harmonize with the civic setting to avoid visual impacts within the Civic Center Historic District.

Build Alternatives. As discussed above in Section 4.4.3.4 under the Significant Buildings and Architecture, mitigation measures M-AE-5 and M-AE-6 are required to minimize potential impacts to the visual setting of special-status buildings, including City Hall and the War Memorial and Performing Arts Center. Context-sensitive design of BRT station features would be considered, including modifications of the BRT station design themes through station canopy placement, materials, color, lighting, and texture. With oversight from the San Francisco HPC and City Hall Preservation Advisory Commission, station design would be considered to harmonize the BRT stations with the adjacent City Hall and the War Memorial and Performing Arts Center. The inclusion of wind turbines, as currently envisioned, would also be considered for appropriateness, because this tall, modern feature may detract from the adjacent historic period buildings. The proposed landscaping, BRT stations, and replacement OCS support pole/streetlight network would be reviewed for consistency with the existing and proposed streetscape and lighting design themes in the Civic Center as noted in mitigation measures M-AE-2 through M-AE-5 in Section 4.4.4.

The simulations presented in Figures 4.4-8 and 4.4-11 demonstrate that the character of the Civic Center Historic District would not be significantly changed by any of the build alternatives, including the LPA.⁸² Build Alternative 3 and the LPA would create the greatest visual change due largely to the removal of existing trees and landscaping. The simulation for Build Alternative 3 shows palm trees, which have a notably different appearance than the existing median trees, as the replacement median tree type. In addition, the presence of two side-by-side stations at this location under Build Alternative 3 and the LPA carries a more dominant visual presence than the more common single station per block configuration.⁸³ Considering these changes in the visual environment, they are compatible with the existing eclectic streetscape features and contemporary character of the Van Ness Avenue corridor, and they would not change the character of the larger Civic Center. Given the size and scale of City Hall and the War Memorial and Performing Arts Center, the proposed BRT station

⁸² The Vallejo Northbound Station Variant is located on the block of Van Ness Avenue between Vallejo to Green streets, which is outside the Civic Center Historic District.

⁸³ Two side-by-side station platforms are proposed at the Market Street, McAllister Street, Geary/O'Farrell Street, and Jackson Street stations under Build Alternative 3; and at the Geary/O'Farrell Street station under Build Alternative 4 and the LPA.

KEY FINDINGS

The simulations presented in Figure 4.4-8 demonstrate that the character of the Civic Center Historic District would not be significantly changed by any of the proposed build alternatives.

While the proposed changes associated with the build alternatives, including the LPA, would result in a slight alteration in the visual setting of Van Ness Avenue, they would not constitute a substantial change or adverse effect to the feeling or atmosphere in the Civic Center Historic District.

would be largely inconsequential to the overall monumental size of these civic structures and their respective prominent architectural features.

As shown in the visual simulations (Figures 4.4-8 and 4.4-11), the replacement OCS support pole/streetlight network would be an architectural design compatible with the Civic Center Historic District, and the taller OCS support pole/streetlight network would not be out of scale or character with the setting of the Civic Center. The proposed replacement OCS support pole/streetlight network would achieve the same daytime and nighttime visual continuity throughout the corridor as the existing network provides; therefore, while the proposed changes associated with the build alternatives, including the LPA, would result in a slight alteration in the visual setting of Van Ness Avenue, they would not constitute a substantial change or adverse effect to the feeling or atmosphere in the Civic Center Historic District.

4.4.3.5 | VISUAL CHARACTER

No Build Alternative

No substantial changes to the character of the Van Ness Avenue corridor would occur under the No Build Alternative. With the exception of continued spot replacement of OCS support poles/streetlights and upgrade of traffic signal poles to mast arm poles, no other physical structures would be installed under the No Build Alternative. The mast arm traffic signals do not seem out of place, and they remain in character with the existing Van Ness Avenue corridor. Visual changes resulting from spot replacement of OCS support poles/streetlights and associated mitigation are discussed in Section 4.4.3.4. No substantial changes or adverse impacts to the character of the project corridor would occur under the No Build Alternative.

Build Alternatives

The build alternatives, including the LPA, would alter the visual setting with the introduction of BRT features and the replacement OCS support pole/streetlight network as discussed above; however, these changes would not substantially change or impact the character of the Van Ness Avenue corridor because the proposed BRT features are consistent with the urban, contemporary visual setting of Van Ness Avenue, and the introduced features would not substantially degrade the surrounding visual environment for any viewer group. The removal of existing median trees under Build Alternatives 3 and 4 and the LPA would noticeably degrade the visual environment of the corridor. Although Build Alternative 3 would offer the greatest opportunity to achieve urban design goals of a median with a consistent aesthetic with all new tree plantings and landscape, the loss of all existing trees would result in the greatest impact among the build alternatives, including the LPA. This would result in a notable, adverse change in the visual quality of the project corridor until new tree plantings mature. Impacts resulting from the removal of existing median landscape and trees under each build alternative, including the LPA, would be reduced with incorporation of a median design plan described in mitigation measures M-AE-3 and M-AE-4 in Section 4.4.4. Increased sidewalk and median tree plantings over existing conditions would improve the visual setting, as plantings mature, resulting in long-term, beneficial effects.

The proposed project would improve the feel of the Van Ness Avenue corridor with regard to the pedestrian environment by improving sidewalk lighting, installing curb bulbs, and generally widening the median to reduce crossing distances at intersections. The proposed transit and streetscape improvements would support recommendations in the Van Ness Corridor Initial Land Use and Urban Design Needs Assessment to make Van Ness Avenue an attractive space for pedestrian use and would support City policies to promote Van Ness Avenue as a prominent boulevard.

KEY FINDINGS

The build alternatives would not substantially impact the visual character of the Van Ness Avenue corridor because the proposed BRT features are consistent with the urban, contemporary visual setting.

The removal of existing median trees would degrade the visual environment only until replacement plantings matured.

The project would improve the pedestrian environment by improving sidewalk lighting, installing curb bulbs, and generally widening the median to reduce crossing distances, making Van Ness Avenue an attractive space for pedestrian use.

4.4.4 | Avoidance, Minimization, and/or Mitigation Measures

Avoidance, minimization, and mitigation measures are recommended to address the potential adverse visual impacts to the Van Ness Avenue corridor that could result from implementation of the proposed project. With implementation of the following mitigation measures, the visual impacts of this project under any build alternative, including the LPA (with or without the Vallejo Northbound Station Variant), would be reduced and would not result in a substantial change in overall visual quality for the area:

M-AE-1: Design sidewalk lighting to minimize glare and nighttime light intrusion on adjacent residential properties and other properties that would be sensitive to increased sidewalk lighting.

M-AE-2: Design and install a replacement OCS support pole/streetlight network that (1) retains the aesthetic function of the existing network as a consistent infrastructural element along Van Ness Avenue, (2) assures a uniform architectural style, character and color throughout the corridor that is compatible with the existing visual setting and (3) retains the architectural style of the original OCS support pole/streetlight network. Within the Civic Center Historic District, design the OCS support pole/streetlight network to comply with the Secretary of Interior's Standards for the Treatment of Historic Properties and be compatible with the character of the historic district as described in the Civic Center Historic District designating ordinance as called for by the San Francisco Planning Code.

M-AE-3: To the extent that the project alters sidewalk and median landscaping, design and implement a project landscape design plan, including tree type and planting scheme for median BRT stations and sidewalk plantings that replaces removed landscaping and re-establishes high-quality landscaped medians and a tree-lined corridor. To the extent feasible, use single species street trees and overall design that provides a sense of identity and cohesiveness for the corridor. Place new trees close to corners, if feasible, for visibility. The project landscape design plan will require review and approval by the San Francisco Arts Commission, as well as review and approval by the SFDPW as part of their permitting of work in the street ROW, which ensures consistency with the San Francisco Better Streets Plan. The median landscape design plan within the Civic Center Historic District will be reviewed by the San Francisco HPC and the City Hall Preservation Advisory Commission. A Certificate of Appropriateness must be obtained from the HPC for the landscape plans within the Civic Center Historic District.

M-AE-4: Design and install landscaped medians so that median design promotes a unified, visual concept for the Van Ness Avenue corridor consistent with policies in the Van Ness Area Plan, Civic Center Area Plan, and San Francisco Better Streets Plan. This design goal for a unified, visual concept will be balanced with the goal of preserving existing trees; thus, new tree plantings would be in-filled around preserved trees.

M-AE-5: Design and install a project BRT station and transitway design plan (including station canopies, wind turbines, and other features) that is consistent with applicable City design policies in the San Francisco General Plan and San Francisco Better Streets Plan; and for project features located in the Civic Center Historic District, apply the Secretary of Interior's Standards for the Treatment of Historic Properties, Planning Code Article 10, Appendix J pertaining to the Civic Center Historic District, and other applicable guidelines, local interpretations and bulletins concerning historic resources.

Review and approval processes supporting this measure include: (1) The San Francisco Art Commission approval of the station and transitway design plan as part of its review of public structures; (2) The SFDPW approval of the station and transitway design plan as part of its permitting of work in the street ROW, which it will include review for consistency with the San Francisco Better Streets Plan; (3) the HPC approval of the portion of the station and transitway design plan located within the Civic Center Historic District as part of

granting a Certificate of Appropriateness; and (4) the City Hall Preservation Advisory Commission and City Planning Department advise on design to HPC.

M-AE-6: Context-sensitive design of BRT station features will be balanced with the project objective to provide a branded, cohesive identity for the proposed BRT service. The following design objectives that support planning policies described in Section 4.4.1 will be incorporated in the BRT station design and landscaping plans:

- Architectural integration of BRT stations with adjacent Significant and Contributory Buildings through station canopy placement, materials, color, lighting, and texture, as well as the presence of modern solar paneling and wind turbine features to harmonize project features with adjacent Significant and Contributory Buildings.
- Integration of BRT stations and landscaping with existing and proposed streetscape design themes within the Civic Center Historic District, in conformance with the Secretary of Interior's Standards for the Treatment of Historic Properties and compatible with the character of the historic district as described in the Civic Center Historic District designating ordinance as called for by the San Francisco Planning Code.
- Marking the intersection of Van Ness Avenue and Market Street as a visual landmark and gateway to the city in design of the Market Street BRT station.

4.5 Cultural Resources

The information in this section is largely derived from the Van Ness Avenue BRT *Historic Property Survey* (HPS) (Parsons, 2010a), which incorporates the following documents: an *Archaeological and Native American Cultural Resources Sensitivity Assessment*, prepared by Far Western Anthropological Research Group, Inc. (Byrd, et al., 2013) a *Historic Resources Inventory and Evaluation Report* (HRIER), prepared by JRP Historic Consulting (Bunse and Allen, 2009), and the Finding of Effect prepared by Parsons (Parsons, 2013c). These documents are on file with SFCTA.

The LPA included in this Final EIS/EIR is a refinement of the center-running alternatives with limited left turns (Build Alternatives 3 and 4 with Design Option B), as described in Chapters 2 and 10. The same APE for the build alternatives applies to the LPA, with or without the Vallejo Northbound Station Variant. The LPA configuration of BRT stations is a variation of the configurations analyzed for the center-running alternatives in the Draft EIS/EIR. Those differences are noted in this chapter and are discussed in detail in Chapter 10; however, the overall impact findings with the LPA, with or without the Vallejo Northbound Station Variant, are consistent with the findings for Build Alternatives 3 and 4, as presented in this subsection.

4.5.1 Regulatory Setting

Cultural resources encompass archaeological, historic, architectural, and traditional properties. An overview of the federal, state, and local regulations and policies relevant to cultural resources follows.

The National Historic Preservation Act of 1966 (NHPA), as amended, established the Advisory Council on Historic Preservation (ACHP) and set forth national policies and procedures regarding historic properties, defined as any prehistoric or historic district, site, building, structure or object included in, or eligible for inclusion in the National Register of Historic Places (National Register or NRHP). Section 106 of the Act requires federal agencies to take into account the effects of their actions on historic properties. The goal of Section 106, as outlined in the regulations promulgated by the ACHP at Title 36 CFR Part 800, is to identify historic properties that could be affected by a project, assess the project's potential effects to such properties, and seek ways to avoid, minimize, or mitigate any adverse effects to historic properties.

Just as a federal law works to recognize and protect historical properties, at the state level historical resources are considered under CEQA, as well as California Public Resources Code (PRC) Section 5024.1, which established the California Register of Historical Resources (California Register or CRHR). The evaluation criteria of the CRHR closely mirror those of the NRHP. The CRHR also encompasses properties listed in or eligible for listing in the NRHP, as well as California Historical Landmarks numbered 770 or higher. The CRHR also includes locally designated city or county landmarks under a local preservation ordinance when the designation criteria are consistent with California Register criteria.

The City and County of San Francisco maintain a comprehensive list of its locally designated individual city landmarks and historic districts.⁸⁴ The boundaries of San Francisco's locally designated historic districts do not necessarily correspond with NRHP and CRHR historic

Just as the NHPA works to recognize and protect historical properties, at the state level historical resources are considered under CEQA, as well as California Public Resources Code.

⁸⁴ Landmarks can be buildings, sites, or landscape features. Districts are defined generally as an area of multiple historic resources that are contextually united. A list of individual landmarks and descriptions of each historic district can be found in Article 10 of the Municipal Planning Code. There are 11 historic districts in San Francisco: Jackson Square, Webster Street, Northeast Waterfront, Alamo Square, Liberty-Hill, Telegraph Hill, Blackstone Court, South End, Civic Center, Bush Street-Cottage Row, and Dogpatch.

district boundaries because somewhat different standards and guidelines are used in their nomination submittal, and it holds true for the Civic Center Historic District. As a result, an important distinction often has to be made between the federal and state-designated cultural resources and historic preservation regulations and those of local governments such as San Francisco. The San Francisco Historic Preservation Commission makes recommendations to the Board of Supervisors on the designation of landmark buildings, historic districts, and significant buildings, as well as any construction, alteration, or demolition that would affect listed sites and resources.

Federal regulations require integration of the environmental review process with related federal and state cultural resources and other environmental laws. This section of the EIS/EIR satisfies the requirements for NEPA, as amended (42 United States Code [U.S.C.] 4321-43470); CEQA, as amended (PRC Section 21000 *et seq.*), and its implementing regulations (CCR 14 Section 15000 *et seq.*); and Section 106 of the NHPA (36 CFR 800).

The first step in complying with these various laws is the identification of cultural resources and evaluation of their significance based on the criteria of the above legislation and their guidelines (see Section 4.5.4.1). In large part, the Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation (46 FR 44716.44740) provide the relevant standards by which these identification and evaluation activities are carried out by professionals possessing qualifications in their respective disciplines.

4.5.2 | Archaeological Resources

4.5.2.1 | AFFECTED ENVIRONMENT

Archaeological APE

DEFINITION

AREA OF POTENTIAL EFFECTS (APE): Generally defined as the maximum geographic area or areas both horizontally and vertically within which a proposed project may cause changes in the character or use of historic properties.

The archaeological evaluation begins with the delineation of the Area of Potential Effects (APE). The APE is generally defined as the maximum geographic area or areas both horizontally and vertically within which a proposed project (referred to as an “undertaking” in Section 106 regulations) may cause changes in the character or use of historic properties, should any such properties be present. The California SHPO reviewed and concurred with the adequacy of the APE delineated for the project alternatives on May 10, 2010 (see Appendix D for the APE exhibit maps and Appendix C for the SHPO concurrence letter).

The archaeological APE boundary includes areas of the proposed project that would include reconfiguration and reconstruction of the existing pavement structural section, curb bulb and other sidewalk improvements, station platform improvements, potential relocation of disabled person parking areas and associated curb ramps, replacement of the existing OCS support poles/streetlights and associated trenching, potential utility relocations, and onsite construction staging areas. The archaeological APE nominally follows the back of sidewalk (i.e., ROW line) on Van Ness Avenue throughout the project limits, but it extends an additional 50 feet on certain cross streets where a potential need to provide replacement disabled person parking has been identified. Approximate areas and depths of anticipated construction activities requiring earthwork are provided in Table 4.5-1. As shown, traffic signal poles would require the deepest excavation, up to 16 feet below ground surface (bgs) in an approximate 3-foot-diameter area. Additional deep excavations would include removal and replacement of the existing OCS support poles/streetlights and relocation of a sewer pipeline running under the street for the center-running alternative alignments and/or station platform locations (see Table 4.5-1). Remaining earthwork would occur within 5.5 feet bgs.

Table 4.5-1: Anticipated Construction Areas and Excavation Depths

CONSTRUCTION ITEM	AREA	DEPTH (FT)
OCS Support Pole Replacement	3-foot-diameter excavation area, within sidewalk; located throughout project limits.	11.0
OCS Conduit Trench	2-foot-wide trench, within sidewalk; located throughout project limits.	3.0
Sewer Pipeline Relocation	6-foot-wide trench, within street; replace or relocate portion underneath BRT lanes under Build Alternative 3; replace or relocate portion underneath platform areas proposed under Build Alternative 4.	11.5
Traffic Signal Poles	3-foot-diameter excavation area, located at intersections throughout project limits.	16.0
Controller Cabinets	2.5-foot by 4-foot excavation area, located within the sidewalk at intersections throughout project limits.	3.0
Curb Bulbs and Sidewalk Reconstruction	Approximately 30 feet of full-width sidewalk disturbance area, located at intersections throughout project limits (varies by project alternative).	1.5
Pavement Rehabilitation	Curb-to-curb rehabilitation or resurfacing under each project alternative.	0.7
Pavement Reconstruction	Spot improvements as needed to travel lanes and parking lanes to remedy failed pavement areas.	1.5
New Pavement	22-foot-wide area within median throughout project limits, under Build Alternative 3.	1.5
Station Platform	6-foot- to 14-foot-wide by 150-foot-long area at platforms, platform locations vary by project alternative.	1.0
Station Canopy Foundation	2.5-foot-diameter excavation area at platforms, platform locations vary by project alternative.	5.0

Known Archaeological Resources In or Adjacent to the APE

The *Archaeological and Native American Cultural Resources Sensitivity Assessment* (Byrd, et al., 2013) provides a summary of archaeological research in the APE; a discussion of the prehistoric and historical archaeological resources background of the study area; a description and listing of all known prehistoric and historical resources within a 0.25-mile radius of the APE; identification of anticipated property types that may be present within the study area; and a discussion of expected prehistoric and historical archaeological resources in the APE. Several methods were used to collect and analyze this information. To identify known prehistoric and historical resources included within the California Historical Resources Information System (CHRIS), a records search was conducted with the Northwest Information Center, located at Sonoma State University, on January 15, 2009, with follow-up contacts made on April 3 and May 7, 2009. The records search provided the mapped locations and descriptions of all recorded archaeological sites, as well as reports describing past archaeological research in the study area. The Office of Major Environmental Analysis in the City of San Francisco Planning Department was consulted in March 2009, and their list of project reports was examined. On November 24, 2008, the California Native American Heritage Commission (NAHC) responded to a request that they conduct a search of their Sacred Lands file for known cultural sites within or near the APE, indicating their records showed none. No areas of Native American concern were identified by those individuals on the contact list of Native Americans provided by the NAHC.

The California Native American Heritage Commission (NAHC) Sacred Lands file shows no cultural sites within or near the APE. No areas of Native American concern were identified by those individuals on the contact list of Native Americans provided by the NAHC.

Fifteen (15) previously recorded cultural resources have been identified within the area covered by the records search. Eight of these resources are located outside of the project APE. The seven remaining resources either abut or fall directly within the Van Ness Avenue BRT APE. They all date to the historic-era and include the Fort Mason Bateria (gun battery) National Register District; a trash scatter (900 Van Ness Avenue); and three historic features (two railway line remnants and an artifact feature), two isolated artifacts (a key and a bottle), and evidence of historic infrastructure elements underlying modern Van Ness Avenue. Of these, only Fort Mason has been formally recorded.

The seven previously recorded cultural resources within or abutting the APE date to the historic-era and include the Fort Mason Bateria (gun battery) National Register District; a trash scatter (900 Van Ness Avenue); and three historic features (two railway line remnants and an artifact feature), two isolated artifacts (a key and a bottle), and remnants of historic 19th century cable car lines underneath Van Ness Avenue.

The Fort Mason Historic District abuts the northwest edge of the project APE. First developed by the Spanish in 1797 as a small gun emplacement, the fort flourished during the 19th century as a U.S. military base. Although listed largely for its structural elements, the fort contains subsurface archaeological remains, including earthquake debris and privies (i.e., outhouse remains).

The archaeological remains found at 900 Van Ness Avenue are not well understood. The feature is described as a scatter of brick rubble and artifacts dating from the mid 1870s to the early 20th century, based on artifact manufacture dates; no stratigraphic (i.e., rock/soil layer) descriptions or historic context were provided. None of the remains were evaluated as important.

Remains located under Van Ness Avenue were identified during two archaeological construction monitoring projects conducted as part of the Van Ness Avenue Pedestrian Safety Improvements Project between Fell and Sacramento streets. The structural remnants of two of the original late 19th century cable car lines – the Ferries & Cliff House line at the Sacramento Street intersection with Van Ness Avenue and the Sutter Street main line at the Sutter Street intersection with Van Ness Avenue – were evaluated as potentially eligible for listing in the National Register.

Mission San Francisco de Asis (popularly called Mission Dolores) is located at 3321 Sixteenth Street, almost 0.6-mile from the southern end of the project. While the church was the centerpiece of the mission, the larger cultural landscape at one time contained features extending beyond the church, as discussed further below.

There are no previously known or recorded prehistoric archaeological sites located within or adjacent to the APE.

There are no previously known or recorded prehistoric archaeological sites located within or adjacent to the APE.

Identifying Prehistoric Archaeological Resource Sensitivity

The project APE is completely covered by urban development, and previously unidentified archaeological resources would only be encountered during subsurface excavation and not by means of a field survey. Prehistoric sites may exist within the project APE at the historic-era ground surface (prior to the establishment of Van Ness Avenue in 1858) and buried by artificial fill, as well as deeply buried below the historic ground surface by natural sedimentation. A sensitivity assessment was conducted to determine the potential for buried cultural resources in the APE, taking into account factors affecting past human use or occupation of earlier landforms in this part of San Francisco, combined with analysis of those factors that affected preservation of remains (i.e., erosion or burial). On the San Francisco Peninsula, most known prehistoric archaeological sites occur near past or present water sources, most often along the margins of the bay or ocean, or near freshwater lagoons, streams, or springs. Former surface or buried archaeological sites are not randomly distributed throughout the Bay Area landscape but rather occur in specific environmental settings. The 1857-59 U.S. Coast Geodetic Survey map of this area indicates that Van Ness Avenue had not been established by this time, and much of the surrounding area remained undeveloped. The project environs were largely comprised of vegetated and barren soil and gently rolling hills and sand dunes. Sources of freshwater depicted to be near the APE included Mission Creek and tributaries in the southern segment, in addition to a small ephemeral drainage from Russian and Nob Hill that crossed the APE between Vallejo and

Green streets closer to the northern portion. This drainage fed a series of small freshwater lagoons, including a marsh extending east to the APE near Francisco Street.

Overlaying the Van Ness Avenue BRT project corridor onto geologic maps provides a basis for assessing the potential for encountering deeply buried archaeological deposits/sites. The geologic deposits in the project area have varying potentials for prehistoric sites due to their difference in age and character. The prehistoric archaeological potential can be conceptualized as: (1) sites buried deeply below the historic ground surface by natural sediments, and (2) sites within the 1850s ground surface buried by late 19th and 20th century material.

Early to Late Pleistocene soils found underneath Van Ness Avenue between Chestnut Street and Union Street were deposited prior to known human occupation of the region and have a very low potential for deeply buried archaeological deposits. This also includes the small portion of bedrock underlying Lombard Street. Given the previous freshwater lagoons and a marsh near the northern area of the APE, small pockets of artificial fill generally correspond with lowlands from the historic era. The fill has a very low potential to contain intact material, but it may overlie intact prehistoric deposits, as evidenced by three previously recorded prehistoric archaeological sites in this area (SFR-29, -30, and -31; none within 0.25-mile of the APE). The presence of past freshwater suggests a moderate to high potential for prehistoric archaeological deposits underlying the artificial fill. Dune sand underlying the northern portion of the project area between Chestnut Street and North Point Street, in addition to the central portion of the project area, has some potential to contain buried archaeological deposits. Given the proximity of the previous sand dune in the northern area to freshwater lagoons and bay resources, and the presence of previously recorded prehistoric archaeological sites in this area, these dunes are considered to have a high potential for deeply buried sites. Conversely, given the lack of a known water source in the central portion of the APE, these underlying dunes probably have a low potential for prehistoric archaeological sites. The southernmost portion of the APE closer to Mission Creek is estimated to have a moderate to high potential for deeply buried prehistoric sites.

With respect to prehistoric archaeological sites on the 1850s surface, as shown in Table 4.5-2, the sensitivity assessment concluded: (1) the northern third of the project APE – from north of Pacific Avenue onward – is highly sensitivity; (2) the longest, central portion – from north of Pacific Avenue to McAllister Street – is of low sensitivity; and (3) the small segment south of McAllister Street is of moderate to high sensitivity.

Table 4.5-2: Prehistoric Archaeological Site Sensitivity within the APE

PROJECT SEGMENT	1850 GROUND SURFACE	DEEPLY BURIED
Northern APE limit to Chestnut Street	High sensitivity potential	High sensitivity potential
Chestnut Street to Pacific Avenue	High sensitivity potential	Very low sensitivity potential
Pacific Avenue to McAllister Street	Low sensitivity potential	Low sensitivity potential
McAllister Street to southern APE limit	Moderate to high sensitivity potential	Moderal to high sensitivity potential

It is likely that any intact prehistoric site discovered in these contexts would be eligible for the National Register because few prehistoric sites have been documented on the northern San Francisco Peninsula. The impact that the Van Ness Avenue BRT Project might have on these resources is discussed in Section 4.5.4.4 of this document.

Identifying Historical Archaeological Resources Sensitivity

Historic archaeological resources or sites may be defined as places where remnants of a past culture are present and where those remnants survive in a physical context that allows for their interpretation. The physical evidence, or archaeological remains, usually takes the form of artifacts (e.g., fragments of glass, ceramic pipes), features (e.g., remnants of walls), or ecological evidence (e.g., pollens representing plants that were in the area when the activities occurred).

For potential historical archaeological sites located in and adjacent to the APE, the sensitivity assessment was based on reviewing historic maps, historic-period documents, prior archaeological investigations in San Francisco Bay urban settings, and cultural resources reports, including the HRIER prepared for this project (Bunse and Allen, 2009). The potential for historical archaeological sites was determined to be as follows:

It is unlikely that any remains of the Spanish and Mexican Era survive in the project area.

Spanish and Mexican Era Remains. It is unlikely that any remains of this earliest historic era in San Francisco survive in the project area. Given the rare and valuable nature of these resources, however, two areas of possible occurrence have been identified: el Bateria de San Jose (later the site of Fort Mason) adjacent to the northernmost portion of the project area; and Mission San Francisco de Asis (Mission Dolores), near the southernmost extent. The minimal nature of the Bateria de San Jose construction and the activities surrounding it make it highly unlikely that remains are present under Van Ness Avenue. The church of Mission San Francisco de Asis is situated 0.6-mile from the southern end of the project area. The church is all that remains of a large agricultural and industrial center. With the church generally at the center, the edge of this complex would lie east of the southern project area terminus. Historic features associated with the mission included water systems (i.e., aqueducts, reservoirs, water cisterns) and agricultural facilities (i.e., gardens, corrals, and threshing floors) that extended into the surrounding countryside. It is possible, although not likely, that remains related to the mission may be encountered in the southern portion of the project area.

Prior excavations along portions of Van Ness Avenue have encountered evidence of the city's former infrastructure: lead pipes and brick cisterns from the earliest water systems; fragments of ceramic sewer pipes; gas pipes; and the remains of cable car infrastructure.

City Infrastructure. Prior excavations along portions of Van Ness Avenue have encountered evidence of the city's former infrastructure. These include lead pipes and brick cisterns from the earliest water systems, likely dating back to 1886. Fragments of ceramic sewer pipes may indicate the location and nature of these early sanitary facilities, and gas pipes are evidence of urban amenities brought to the western portion of the city. These may occur along any portion of the project area. Remains of cable car infrastructure have been identified in Van Ness Avenue at two intersections of cross streets where the cable cars once operated: at Sacramento Street, a former line was encountered on both sides of the street at a depth of 2 feet to 3 feet to 5.5 feet, and at Sutter Street, cable car remains were encountered approximately 2 feet bgs. Both features included concrete troughs associated with carrying the underground cable, as well as bracing and other support devices to stabilize the mechanism. These remains were previously determined eligible for listing in the National Register. Because cable car technology was first invented in San Francisco in 1873 and has since been recognized as a National Historic Landmark (NHL), any historical evidence should be carefully studied.

Building Remains. In general, foundations of buildings have a limited potential to provide important data on past events beyond documenting the locations and types of previous buildings on a site. Remains of mercantile structures may reflect localized architectural influences or innovative design elements in response to San Francisco's unique environment. Within the project area, numerous basements of stores and other commercial buildings fronting Van Ness Avenue between California and Market streets have been documented as originally extending some 8 feet beyond the current street edge.

Artifact Deposits. Individual or small clusters of artifacts, unless they are extraordinary, do not qualify as "significant" for their data potential under either the National Register or California Register. Eligible artifact features are those that have sufficient magnitude to warrant analysis, be associated with an identifiable household or group of people, and not be disturbed or contaminated by subsequent activities. Several types of potentially significant artifact deposits might be encountered in the project area:

- Deposits or other cultural remains associated with Fort Mason.
- Deposits associated with commercial buildings south of California Street, which had freight access through sidewalk openings. These were filled in prior to a Van Ness Avenue road resurfacing in the 1930s, providing an opportunity for disposing of unwanted refuse.
- Refuse deposits and perhaps residential privies in the Market to Mission section of Van Ness Avenue that cut through an existing neighborhood in the 1920s.
- Deposits associated with street or utility improvements whereby refuse was disposed (e.g., ceramics, glass, bricks).

Focused Documentary Research

There is the potential for buried resources. The project APE, however, is currently fully covered by modern development, and known or previously unidentified archaeological resources would only be encountered during subsurface excavation and not by pedestrian survey. Constraints of the modern urban environment make preconstruction archaeological field testing impracticable. The potential for encountering buried resources will be determined through focused documentary research and reconstructing the history of changes to the physical landscape, including cuts and fills to more accurately identify locations with potentially significant prehistoric remains. The research may result in recommendations for subsurface testing and possible mitigation, which would only take place just prior to construction, after design plans are finalized and only if a potentially significant resource was identified and could not be avoided.

4.5.3 | Historic and Architectural Resources

4.5.3.1 | AFFECTED ENVIRONMENT

Historic and Architectural Resources APE

In contrast to historic archaeological properties, historic and architectural resources are property types such as buildings, structures, objects, and districts that, in general, are still used or maintained. The evaluation of historic and architectural resources begins with the delineation of the APE. The APE is defined as the geographic area or areas within which an undertaking may cause direct or indirect changes in the character or use of historic properties, should any such properties be present. The SHPO reviewed and concurred with the adequacy of the historic and architectural APE delineated for the project alternatives on May 10, 2010 (see Appendix D for the APE exhibit maps and Appendix C for the SHPO concurrence letter).

Historic and Architectural Resources Methods

This section of the EIS/EIR summarizes information contained in the HRIER prepared for this project (Bunse and Allen, 2009).

Once the architectural APE had been established, background research was conducted on all properties that were 45 years old or older at the time of review. Though National Register and California Register criteria state that a property generally must be at least 50 years old to be considered for historical significance, because transportation projects often have long lead times from the time environmental studies are conducted to final project approval, typically 3 to 5 years, properties that might turn 50 years old during the life of a project were considered as a safeguard.

The area was surveyed to account for all buildings, structures, and objects found within the project APE. This field reconnaissance helped determine which resources appeared to be 45 years of age or greater and to confirm the current condition of properties already listed or

Background research to account for all buildings, structures, and objects found within the project APE was conducted on all properties that were 45 years old or older at the time of review.

determined eligible for listing in the NRHP and/or CRHR. Additional background research was conducted through review of the First American Real Estate Solutions commercial database, municipal government records, other historic archival documents, photographs, and plans to confirm dates of construction and building histories. Fieldwork occurred in March and April 2009.

The investigation of historic-era resources included research regarding the development context, as well as resource-specific research conducted in archival and published records, and many secondary sources. Research was conducted at San Francisco Architectural Heritage; San Francisco Building Department; San Francisco City and County Public Utilities Commission; San Francisco Office of City Planning; California State Archives and Library; California Historical Society; Bancroft Library (UC Berkeley); Shields Library (UC Davis); Caltrans Headquarters in Sacramento; and Caltrans District 4 Office in Oakland. In addition, the CHRIS was reviewed and a records search was conducted for the project in February 2009. Additionally, the Northwest Information Center provided an updated printing of the “Historic Property Data file for San Francisco County,” as of May 27, 2009. Researchers also reviewed the California Historical Landmarks and Points of Interest publications and updates, the National Register, and California Register, as well as San Francisco landmarks and local register listings and historic preservation guidance and publications. The HRIER included field checking any previously identified historic properties and providing updated information, where applicable.

Historic and Architectural Resources within the APE

There are 27 individual historic and architectural resources that appear to be 45 years of age or greater within the project APE that were reviewed for potential eligibility. In addition, 3 historic-era property types were also evaluated: the San Francisco Civic Center Historic District; the Van Ness Avenue roadway corridor; and a trolley pole system, or OCS support pole/streetlight system, located along both sides of Van Ness Avenue between Market Street and North Point Street. The former involved a Civic/Government complex, while the latter two involved infrastructure (see Table 4.5-3).

Table 4.5-3: Status of Historic Resources within the Project APE

HISTORIC RESOURCES	STATUS
PROPERTIES WITH PREVIOUS STANDING	
San Francisco Civic Center Historic District	<ul style="list-style-type: none"> • National Historic Landmark • NRHP listed • CRHR listed • San Francisco Historic District
11-35 Van Ness Avenue (Masonic Temple)	<ul style="list-style-type: none"> • determined eligible for NRHP listing • determined eligible for CRHR listing • San Francisco Category I (Significant) building
1699 Van Ness Avenue (Paige Motor Car Co. Building)	<ul style="list-style-type: none"> • NRHP listed • CRHR listed
PROPERTIES IDENTIFIED ELIGIBLE AS PART OF VAN NESS AVENUE BRT STUDY	
799 Van Ness Avenue (Wallace Estate Co. garage)	<ul style="list-style-type: none"> • determined eligible for NRHP listing • determined eligible for CRHR listing
945-999 Van Ness (Ernest Ingold Chevrolet Showroom)	<ul style="list-style-type: none"> • determined eligible for NRHP listing • determined eligible for CRHR listing
1320 Van Ness Avenue (Scottish Rite Temple)	<ul style="list-style-type: none"> • determined eligible for NRHP listing • determined eligible for CRHR listing
1946 Van Ness Avenue (California Oakland Motor Co. Showroom)	<ul style="list-style-type: none"> • determined eligible for NRHP listing • determined eligible for CRHR listing

Of these 30, 3 historic properties had previous standing in the NRHP, the CRHR, or as an NHL:

- San Francisco Civic Center Historic District; NHL; listed in NRHP and CRHR [see Figure 4.5-1, and identified as H-2 on Figures 4.5-2 and 4.5-3]
- 11-35 Van Ness Avenue (Masonic Temple); determined eligible for the NRHP [identified as H-1 on Figures 4.5-4 and 4.5-3]
- 1699 Van Ness Avenue (Paige Motor Car Co. Building); listed in the NRHP and CRHR [identified as H-6 on Figures 4.5-5 and 4.5-3]

No other historic and architectural (i.e., aboveground) resources within the APE had previous official status in the NRHP or CRHR. Although two of the resources were previously evaluated for the NRHP and the CRHR (1050-1066 Van Ness Avenue [current residential hotel] and 2001 Van Ness Avenue [current First Republic Bank]), the SHPO did not previously provide an opinion on their eligibility, and neither property was listed in the most current Historic Property Data File for San Francisco County when the survey was undertaken (May 27, 2009).

Several of the resources in the APE also have local designation status. The Civic Center is a designated San Francisco Historic District. San Francisco City Hall, a central component of the Civic Center district, is an individual San Francisco City Landmark, as is the War Memorial building for its association with the founding of the United Nations in 1945.

Many of the resources in the APE have been documented by previous local reconnaissance surveys and some are listed as “significant” or “contributory” buildings in San Francisco’s “Van Ness Avenue Area Plan.” According to *San Francisco Preservation Bulletin 16*: “City and County of San Francisco Planning Department CEQA Review Procedures for Historic Resources,” these types of previous ratings do not qualify as an adopted local register for the purposes of CEQA, and require further review. This further review was provided by submitting an advance copy of the Van Ness Avenue BRT HRIER and accompanying evaluation forms to the staff of the Historic Preservation Commission. As part of local agency coordination, an advance draft of this report was provided to the City of San Francisco Planning Department (Historic Preservation Commission staff) for review and comment. As the project corridor, Van Ness Avenue serves as US 101 through the City of San Francisco; a copy of the HPS was also provided to Caltrans for their review and comment.

Evaluations conducted as part of the HRIER were also consistent with *San Francisco Preservation Bulletin 5*: “Landmark and Historic District Designation Procedures,” which directs that historic properties be evaluated for local designation using the California OHP Recordation Manual. As a result, the California OHP Historical Resource Status Codes for eight of the studied properties were assigned status code “6L,” (which recognizes that a resource may merit special consideration in local planning, to reflect the Planning Department’s concerns and suggestions (see Table 4.7-4).

The HRIER concluded that the status of the three properties previously listed or determined eligible for listing in the NRHP and CRHR remained unchanged, as did their status as historical resources for the purposes of CEQA. Of the 27 other properties evaluated within the APE, the HRIER concluded that 4 appear eligible for listing in the NRHP and CRHR; therefore, they appear to be historical resources for the purposes of CEQA. Those buildings are located at:

- 799 Van Ness Avenue [Wallace Estate Co. garage; identified as H-3 on Figures 4.5-2 and 4.5-3]
- 945-999 Van Ness Avenue [Ernest Ingold Chevrolet; identified as H-4 on Figures 4.5-6 and 4.5-3]
- 1320 Van Ness Avenue [Scottish Rite Temple; identified as H-5 on Figures 4.5-6 and 4.5-3]
- 1946 Van Ness Avenue [California Oakland Motor Co.; identified as H-7 on Figures 4.5-5 and 4.5-3]



Figure 4.5-1: Civic Center Historic District Boundaries

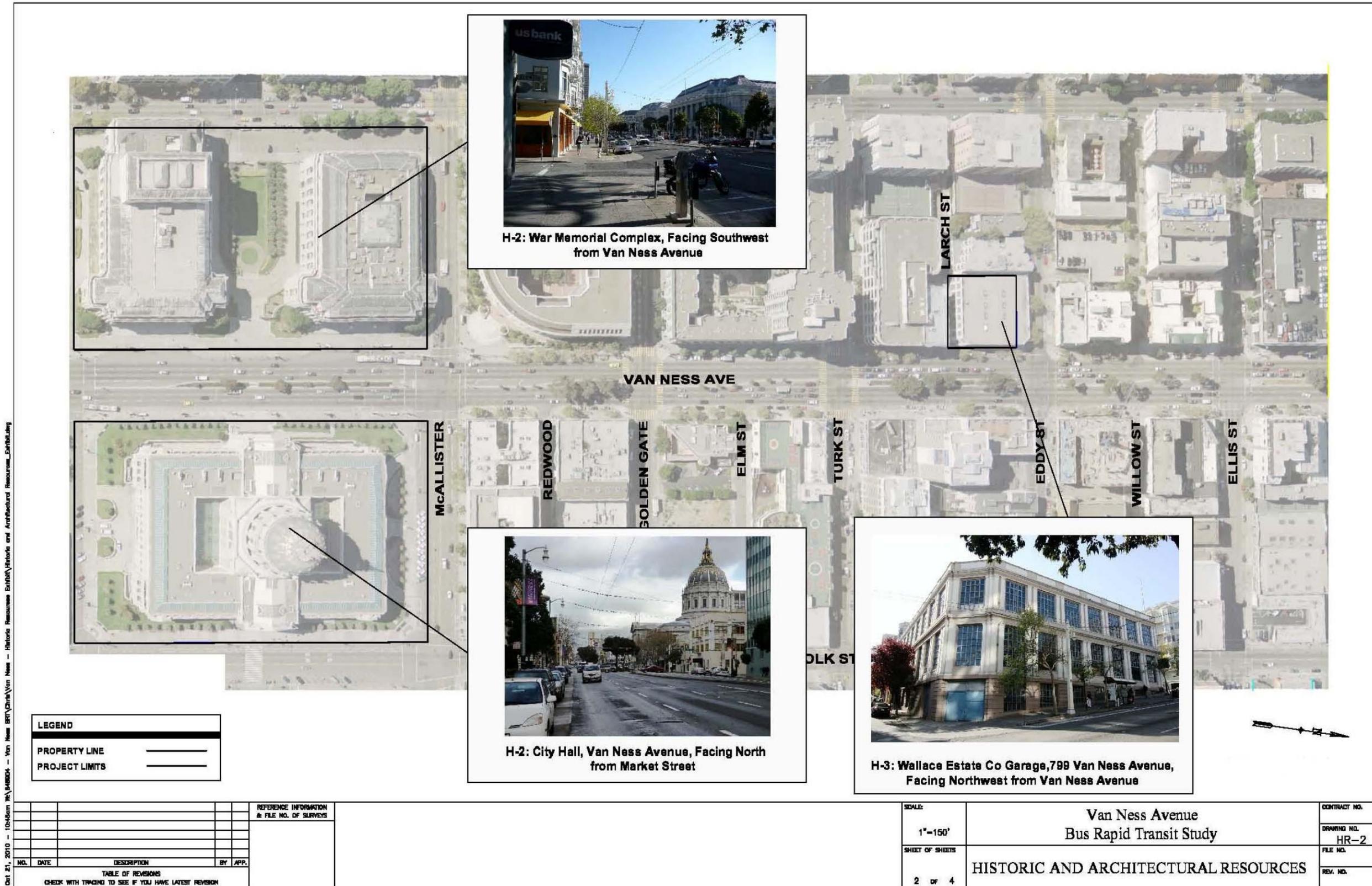


Figure 4.5-2: Historic Properties Listed or Eligible for Listing within Project APE

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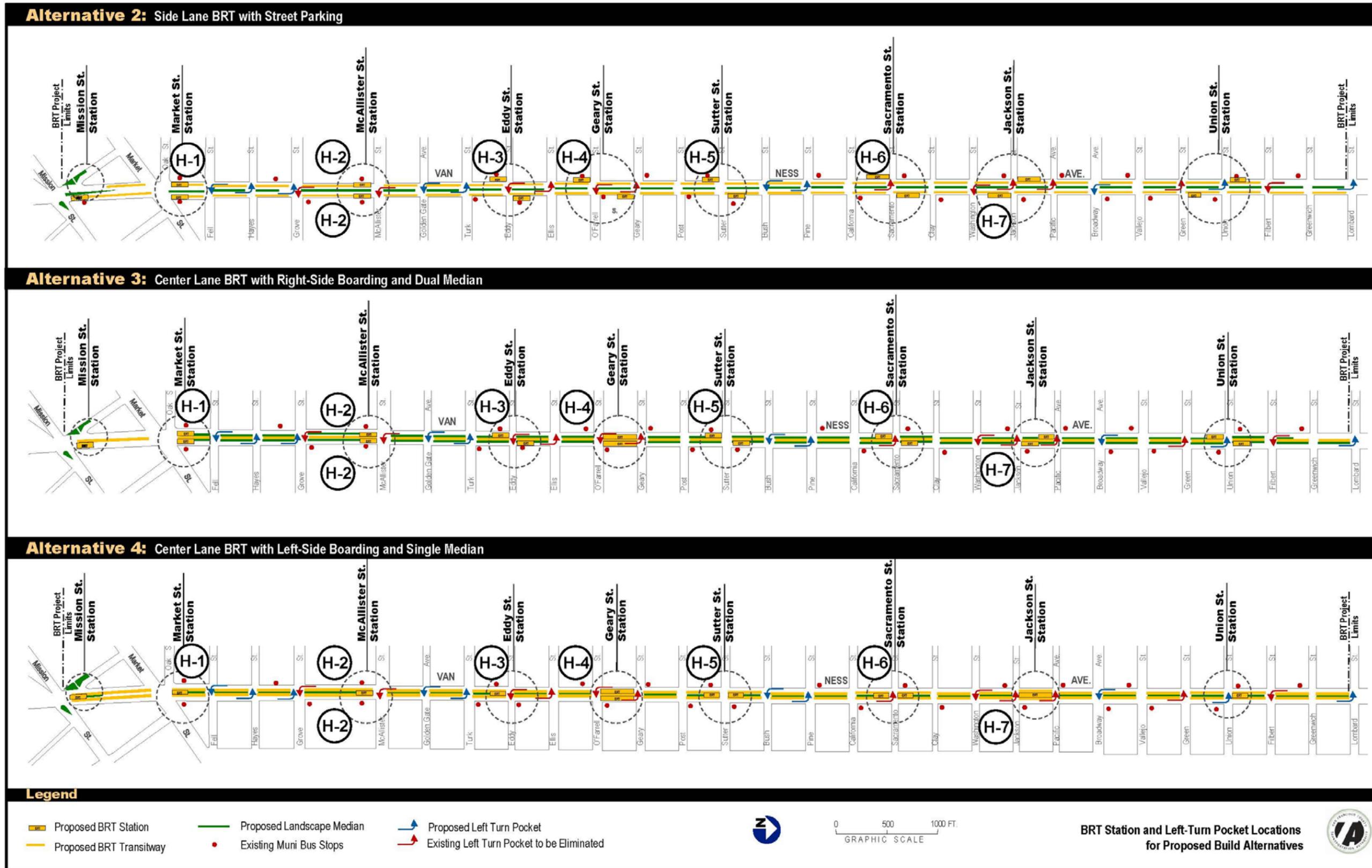


Figure 4.5-3: Project Features and Location Map of Historic Properties Listed or Eligible within Project APE

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Legend for Historic Properties Listed or Eligible within the APE (see map below):

- H-1 Masonic Temple, 11-35 Van Ness Avenue
- H-2 War Memorial Complex and City Hall
- H-3 Wallace Estate Co. Garage, 799 Van Ness Avenue
- H-4 Ingold Chevrolet, 945-999 Van Ness Avenue
- H-5 Scottish Rite Temple, 1320 Van Ness Avenue
- H-6 Paige Motor Car Co., 1699 Van Ness Avenue
- H-7 California Oakland Motor Co., 1946 Van Ness Avenue

LPA: Center Lane BRT with Right-Side Boarding/Single Median and Limited Left Turns

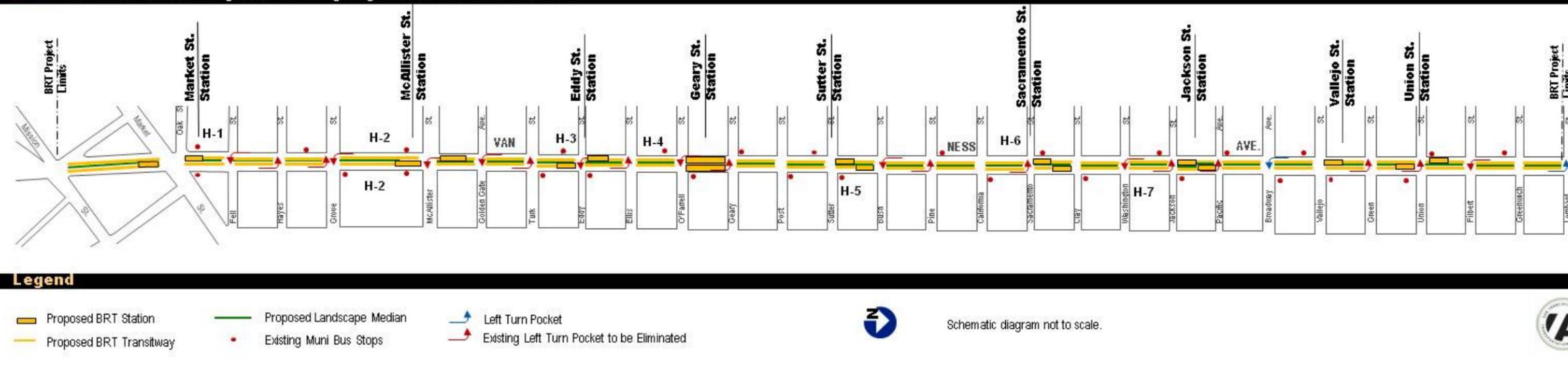


Figure 4.5-3: LPA Project Features and Location Map of Historic Properties Listed or Eligible within Project APE

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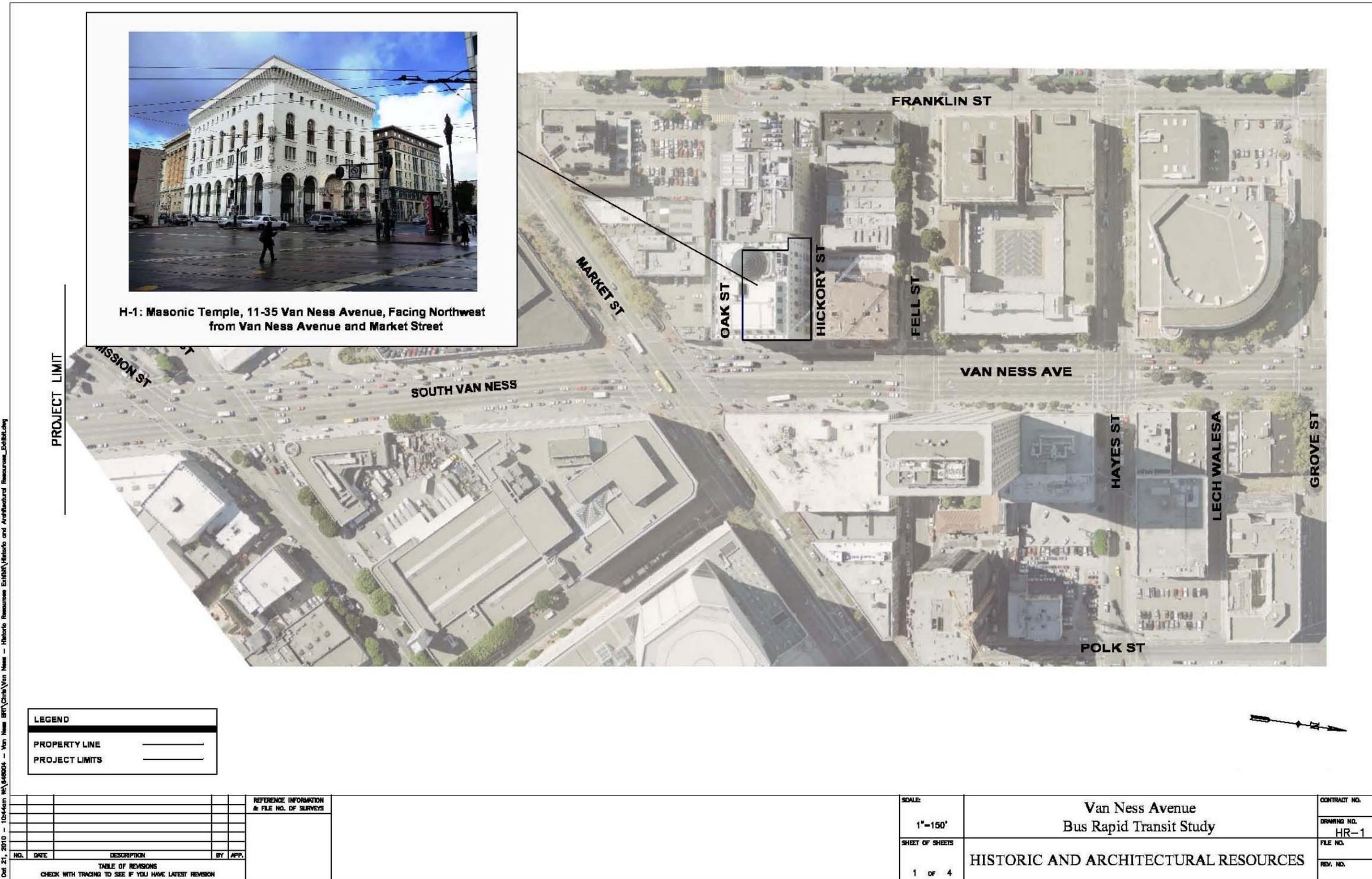


Figure 4.5-4: Historic Properties Listed or Eligible for Listing within Project APE

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Figure 4.5-5: Historic Properties Listed or Eligible for Listing within Project APE

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Figure 4.5-6: Historic Properties Listed or Eligible for Listing within Project APE

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Table 4.5-4: Properties Determined Not Eligible for National Register

PROPERTY TYPE	NAME	YEAR BUILT	OHP STATUS CODE
Infrastructure	Van Ness Avenue and northernmost block of South Van Ness Avenue	1858-ongoing	6L
Infrastructure	Van Ness Avenue Trolley Poles	1914, 1936	6L
Commercial	30 Van Ness Avenue	1908	6Z
Commercial	800 Van Ness Avenue	1920	6L
Residential	1050-1066 Van Ness Avenue	1908	6L
Commercial	1233 Van Ness Avenue	1913	6Z
Commercial	1243 Van Ness Avenue	1913	6Z
Commercial	1625 Van Ness Avenue	1919	6L
Commercial	1776 Sacramento Street	1919	6Z
Commercial	1730 Van Ness Avenue	1919	6Z
Commercial	1920 Van Ness Avenue	1918	6Z
Commercial	1930 Van Ness Avenue	1922	6Z
Commercial	1940 Van Ness Avenue	1920	6Z
Commercial	2001 Van Ness Avenue	1920	6Z
Commercial	2027 Van Ness Avenue	1936	6Z
Residential	2400 Van Ness Avenue	1907	6Z
Residential	2418 Van Ness Avenue	1909	6L
Residential	2420-2424 Van Ness Avenue	1914	6L
Residential	2430 Van Ness Avenue	1925	6Z
Residential	2501 Van Ness Avenue	1906	6Z
Residential	2509-2515 Van Ness Avenue	1902	6Z
Residential	2517-2521 Van Ness Avenue	1902	6L
Commercial	2525-2545 Van Ness Avenue	1942	6Z

California Office of Historic Preservation – Historical Resources Status Codes

6L: Found ineligible for NRHP and CRHR; may warrant special consideration in local planning

6Z: Found ineligible for NRHP, CRHR, or Local designation

The remaining resources in the APE, including remnants of a system of poles to support the overhead power supply wires for the electric streetcar system (i.e., OCS support poles/streetlights) and the Van Ness Avenue roadway corridor itself were evaluated and found not to be eligible for listing in either the NRHP or the CRHR; therefore, they are not considered historical resources for the purposes of CEQA. The SHPO concurred with these eligibility findings in a letter dated May 10, 2010 (see Appendix C).

4.5.4 | Environmental Consequences

4.5.4.1 | INTRODUCTION

In the context of a federally funded and permitted project, the significance of archaeological and architectural history resources is measured with reference to the evaluation criteria of the National Register (36 CFR 60). These criteria state that the quality of significance in American history, architecture, archaeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and which:

- a. Are associated with events that have made a significant contribution to the broad patterns of our history; or
- b. Are associated with the lives of persons significant in our past; or
- c. Embody the distinctive characteristics of a type, period, or method of construction, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
- d. Have yielded, or may be likely to yield, information important in prehistory or history (36 CFR 60.4).

Under CEQA, if a project would cause a substantial adverse change in the significance of a historical resource or archaeological resource, it may have a significant effect on the environment.

The four criteria, in addition to a property generally having to be a minimum of 50 years of age for NRHP consideration, are essential to evaluation of eligibility because they “indicate what properties should be considered for protection from destruction or impairment” (36 CFR 60.2). Any action that, as part of an undertaking, could affect significant cultural resources is subject to review and comment under Section 106 of the NHPA. All projects in California undergoing environmental review must also address the cultural resources requirements of CEQA, with resources evaluated under the California Register criteria. Under CEQA, if a project would cause a substantial adverse change in the significance of a historical resource or archaeological resource as defined in Section 15064.5 of CEQA, it may have a significant effect on the environment.

4.5.4.2 | APPLICATION OF THE CRITERIA OF ADVERSE EFFECT

DEFINITION

ADVERSE EFFECT is found when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the NRHP in a manner that would diminish the integrity of a historic property’s location, design, setting, materials, workmanship, feeling, or association.

The NHPA Section 106 regulations express that if there are historic properties in the APE that may be affected by a federal undertaking, the agency shall assess adverse effects, if any, in accordance with the Criteria of Adverse Effect defined at 36 CFR 800.5. These regulations state that an “adverse effect is found when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the NRHP in a manner that would diminish the integrity of a historic property’s location, design, setting, materials, workmanship, feeling, or association.”

Application of the criteria of adverse effect is largely an assessment of an undertaking’s impacts on the integrity of a historic property that contribute to its eligibility for listing in the NRHP. Effects can be direct, indirect, and cumulative. Direct effects include physical destruction or damage. Indirect effects include the introduction of visual, auditory, or vibration impacts to a historic property. For instance, a project can generally result in an adverse visual impact if it creates a demonstrable negative effect on aesthetics through elimination of open space related to a historic property, or by introducing an element that is incompatible, out of scale, in great contrast, or out of character with the surrounding historic setting, or if it would create an obstructive effect by blocking or intruding into a historic view, blocking a significant feature of a historic property, or substantially detract from a view of historic property.

Examples of adverse effects may include, but are not limited to, the following:

- a. Physical destruction of or damage to all or part of the property;
- b. Alteration of a property, including restoration, rehabilitation, repair, maintenance, stabilization, hazardous material remediation, and provision of handicapped access, that is not consistent with the Secretary’s Standards for the Treatment of Historic Properties (36 CFR 68) and applicable guidelines;
- c. Removal of the property from its historic location;
- d. Change of the character of the property’s use or of physical features within the property’s setting that contributes to its historic significance;
- e. Introduction of visual, atmospheric, or audible elements that diminish the integrity of the property’s significant historic features;
- f. Neglect of a property that causes its deterioration, except where such neglect and deterioration are recognized qualities of a property of religious and cultural significance to an Indian tribe or native Hawaiian organization; and

- g. Transfer, lease, or sale of property out of Federal ownership or control without adequate and legally enforceable restrictions or conditions to ensure long-term preservation of the property’s historic significance.

The term “adverse effects” under Section 106 and the term “use” under Section 4(f) are not equivalent, and each carries specific meaning. A use occurs when a project permanently incorporates land from a Section 4(f) property, even if the amount of land used is very small. In addition, a use can result from a temporary occupancy of land within a Section 4(f) property, if that temporary occupancy meets certain criteria. A use also can result from proximity effects (e.g., noise, visual) that substantially impair the protected features of the property. A use that results from proximity effects is known as a “constructive use.”

Constructive uses substantially impair the historic resource features or attributes of the Section 4(f) resource and may include these examples:

- The projected noise level increase attributable to a proposed project substantially interferes with the use and enjoyment of a resource protected by Section 4(f), such as enjoyment of a historic property where a quiet setting is a generally recognized characteristic.
- The proximity of a proposed project substantially impairs aesthetic features or attributes of a resource protected by Section 4(f), where such features or attributes are considered important contributing elements to the value of the resource. An example of substantial impairment to visual or aesthetic qualities would be the location of a proposed transportation facility in such proximity that it obstructs or eliminates the primary views of an architecturally significant historical building, or detracts from the setting of a park or historic site which derives its value in substantial part from its setting.
- A proposed project results in a restriction of access to the Section 4(f) resource, which substantially diminishes or eliminates the utility or function of the resource.
- The vibration impact from operation of a proposed project would substantially impair the use of a Section 4(f) resource, such as a projected vibration level that is great enough to affect the structural integrity of a historic building or substantially diminish the utility of a historic building.

FTA has determined that a constructive use does not occur when compliance with the requirements of 36 CFR 800.5 for proximity impacts of the proposed action, on sites listed on or eligible for the NRHP, results in an agreement of “no historic properties affected” or “no adverse effect” (23 CFR 774.15 [f][1]). For the proposed Van Ness Avenue BRT Project, a preliminary assessment of the project’s effects on historic and architectural resources is discussed in Section 4.5.4.5, and formal findings of effect will be reviewed by the SHPO for concurrence as part of the Section 106 review process.

4.5.4.3 | CEQA STANDARDS OF SIGNIFICANCE FOR POTENTIAL IMPACTS

Under CEQA, proposed projects must be evaluated for their probability to cause significant effects on “historical resources.” CEQA equates a “substantial adverse change” in the significance of a historic property with a significant effect on the environment (PRC Section 21084. 1). Thresholds of substantial adverse change are established in PRC Section 5020.1 and include demolition, destruction, relocation, or “alteration activities that would impair the significance of the historic resource.” In other words, California laws use essentially the same standard as used by the federal government concerning what constitutes adverse effects.

4.5.4.4 | PREHISTORIC AND HISTORICAL ARCHAEOLOGICAL RESOURCE IMPACTS

The methods used to identify known and potential prehistoric and historical archaeological resources within the Van Ness Avenue BRT APE are described in Section 4.5. Archaeological impacts and mitigation measures are primarily construction related and are discussed below.

DEFINITION

USE: A use occurs when a project permanently incorporates or temporarily occupies land from a Section 4(f) property. A use also can result from proximity effects (e.g., noise, visual) that substantially impair the protected features of the property.

California laws use essentially the same standard as the federal government concerning what constitutes adverse effects.

As discussed in Section 4.5.2, constraints of the modern urban environment make archaeological field testing impracticable. Additional research will more accurately identify locations with potentially significant prehistoric remains. Similarly, while construction of any of the build alternatives would not affect known historical archaeological resources, there are several locations where construction activities could potentially uncover significant historic-era features or deposits (HPS, Parsons, 2010a). Focused archival research, however, can effectively identify areas where potentially significant resources might survive under the modern urban landscape and areas where such resources are unlikely. Procedures for this additional research are detailed in Section 4.4.5.

As noted earlier, archaeological sites on or eligible for listing in the NRHP are not considered Section 4(f) resources when the significance of those sites is derived from what important historic or prehistoric information may potentially be garnered through their excavation (i.e., whether the data is actually recovered), rather than archaeological sites warranting preservation in place and being found eligible under other criteria. Section 4.5.6 contains further discussion of Section 4(f).

Alternative 1: No Build (Baseline Alternative)

As detailed in Section 2.2, some minimal subsurface disturbance would take place with implementation of the No Build Alternative. SFMTA, together with DPW and SFPUC, plans to replace the existing OCS and supporting poles/streetlights along Van Ness Avenue from Market Street to North Point Avenue within approximately 3 feet to 5 feet from the location of the existing poles, which would involve some ground-disturbance activities in areas that may or may not contain archaeological resources. No impacts to known prehistoric or historical archaeological resources would occur with this alternative.

Build Alternative 2: Side-Lane BRT with Street Parking

Build Alternative 2 would provide a dedicated bus lane in the rightmost lane of Van Ness Avenue in both the NB and SB directions, from Mission Street to Lombard Street, adjacent to the existing lane of parallel parking (see description in Section 2.2). The bus lanes would be traversable for mixed traffic. BRT stations would be located within the parking strip as extensions to the sidewalk. Under this alternative, the OCS overhead wire and support pole system would be replaced and upgraded, along with the associated street lighting. Build Alternative 2 also includes streetscape improvements and amenities, and replacement of the signal poles. Many of these activities would involve some form of ground disturbance (see Table 4.5-1) in areas that may or may not contain archaeological resources. No impacts to known prehistoric or historical archaeological resources would occur with this alternative.

Build Alternative 3: Center-Lane BRT with Right-Side Boarding and Dual Medians

Build Alternative 3 would involve placement of the bus platforms in existing landscaped dual medians (the medians would be approximately 4 feet to 9 feet wide in many locations; see full project description in Section 2.2). Table 4.5-1. depicts the anticipated excavation depths of associated work, including streetscape improvements and relocation of a sewer pipeline within the bus lane, with a 6-foot-wide trench to a depth of 11.5 feet. Most of the other work would occur at shallow depths, with the exception of the OCS support poles, which while small in diameter (3 feet), is proposed to extend between 11 feet and 16 feet bgs. Because much of the proposed construction work would occur within the existing median of Van Ness Avenue, which in earlier decades experienced placement and removal of trolley tracks, a major street widening, and construction of the landscaped concrete median, impacts to intact archaeological deposits appear to be a low probability.

No impacts to known prehistoric or historical archaeological resources would occur with the No Build Alternative (Alternative 1) or Build Alternative 2.

Because much of the proposed construction work for Build Alternatives 3 and 4 would occur within the existing median of Van Ness Avenue, impacts to intact archaeological deposits appear to be a low probability. Design Option B would make no known difference to possible buried archaeological deposits.

Build Alternative 4: Center-Lane BRT with Left-Side Boarding and Single Median

Build Alternative 4 (see description in Section 2.2) involves placement of a dedicated bus lane adjacent to a single, 14-foot-wide median. Station platforms would be located on the single center median. Build Alternative 4 also includes the streetscape improvements associated with the other build alternatives. Build Alternative 4 would require replacement of the sewer outside the proposed bus platform areas. A 6-foot-wide trench excavated to a depth of 11.5 feet would be required at each platform area. Build Alternative 4 would also include OCS support pole/streetlight replacement, which while small in diameter (3 feet), would require excavation between 11 feet and 16 feet bgs. Previous construction activity in the 20th century, including installation and later removal of trolley tracks, a major road widening, and construction of concrete median, would have greatly affected the upper layers of the ground where the most of the planned excavation work associated with the BRT construction would occur (see Table 4.5-1). The potential to uncover intact and undisturbed significant archaeological deposits remains a low probability.

Center-Lane Alternative Design Option B

The design option would restrict left-turn lanes to only one SB left-turn lane at Broadway Street. It would make no known difference to possible buried archaeological deposits.

LPA: Center-Lane BRT with Right-Side Boarding/Single Median and Limited Left Turns

The LPA, a refinement of the center-running Build Alternatives 3 and 4, would involve placement of the bus station platforms in landscaped dual medians that fluctuate in width between 6 and 11 feet. Blocks without a station would have a single median. Potential impacts to prehistoric and historical archaeological resources under the LPA are identified as part of the analysis presented above for the center-lane configured, build alternatives (Build Alternatives 3 and 4). Because much of the proposed construction work for a center-lane configured design would occur within the existing median of Van Ness Avenue, which in earlier decades experienced placement and removal of trolley tracks, a major street widening, and construction of the landscaped concrete median, impacts to intact archaeological deposits appear to be of low probability for the LPA (with or without the Vallejo Northbound Station Variant).

4.5.4.5 | HISTORIC AND ARCHITECTURAL RESOURCES IMPACTS

As discussed in Section 4.5.4.2, seven characteristics define the quality of significance of a historic property: location, design, setting, materials, workmanship, feeling, and association. The Van Ness Avenue BRT Project alternatives, including the LPA, would occur entirely within the existing street ROW, and no property acquisition would be required; therefore, the proposed project would not affect the following characteristics under any of the alternatives under consideration:

Location. *The place where the historic property was constructed or the place where the historic event occurred.* All historic properties would remain in their original location under all of the Van Ness Avenue BRT alternatives. The proposed project would not diminish any of the significant properties' integrity of location.

Design. *The combination of elements that create the form, plan, space, structure, and style of a property.* No work proposed under any of the project alternatives would alter any character-defining features that create the form, plan, space, structure, and style of any of the eligible buildings or historic district. The project would not diminish the integrity of design.

Materials. *The physical elements that were combined or deposited during a particular period of time and in a particular pattern or configuration to form a historic property.* Under none of the project alternatives under consideration would materials be affected. There would be no diminishment of historic materials.

Because the Van Ness Avenue BRT Project alternatives would occur entirely within the existing street ROW, and no property acquisition would be required, the proposed project would not affect the characteristics of location, design, materials, or workmanship.

Workmanship. *The physical evidence of the crafts of a particular culture or people during any given period in history or prehistory.* None of the historic properties identified in the project APE would be altered under any of the project alternatives; therefore, there is no diminishment of this aspect of integrity.

As described below, of the three remaining characteristics used to define integrity, the proposed project was assessed to determine if the alternatives would affect:

Setting. The physical environment of a historic property.

Feeling. The property's expression of the aesthetic or historic sense of a particular period of time.

Association. The direct link between an important historic event or person and a historic property.

For historic properties located in a setting where the sense of quiet represents a characteristic of its historical significance, increases in noise and vibration could have the potential of causing adverse effects and/or significant impacts. This is clearly not the case of the properties located on Van Ness Avenue, which has served as the route of US 101 through San Francisco since just after World War II. The Noise and Vibration Study (Parsons, 2010b) found that application of the standard mitigation measures required by the City and Caltrans would reduce the construction impact to less than significant; however, temporary increases in noise and vibration would still occur at some locations. Operational project-generated and cumulative noise impacts along Van Ness Avenue would remain below both FTA and Caltrans impact criteria. The study also found that BRT transit vehicle operational vibration impacts would be less than significant relative to the applicable FTA criteria. Based on these conclusions, no damage to historic structures in the study area as a result of vibration is expected; therefore, as the existing project area's noise levels are typical for a dense urban environment, noise associated with the BRT system would not be substantially different with its implementation, and it would not be out of character with its urban setting.

No damage to historic structures as a result of vibration is expected; and as the existing project area's noise levels are typical for a dense urban environment, noise associated with the BRT system would not be substantially different with its implementation, and it would not be out of character with its urban setting.

A discussion of the potential project effects on built-environment historic resources needs also to include the compatibility of the proposed project with the character of the setting of the existing historic resources. The compatibility of the project is determined by such factors as the size and proportion of the project features relative to the surrounding historic structures and architectural design features, height of the new elements and shadows they might cast, color; and the amount of open space that project components may obscure. Because the Van Ness Avenue BRT Project would be implemented in an already completely urbanized environment, changes to the overall setting would be largely inconsequential. As the Van Ness Avenue corridor contains a mix of buildings dating from various time periods, as recognized in the Van Ness Area Plan, there is no consistent historic theme that unites the various elements; rather the avenue possesses a wide range of different architectural styles from the span of its decades.

In addition, Van Ness Avenue has experienced successive waves of change related to the evolution of transportation. From its dusty beginnings in the late 1850s as it was laid out by survey as a boulevard, to the introduction of macadam pavement and a trolley line in the early 20th century, Van Ness Avenue long served as a travel way. By the mid 1930s with construction of the Golden Gate Bridge to the north uniting San Francisco and Marin County, Van Ness Avenue and Lombard Street became integral auto corridors shouldering US 101 traffic. The federal government and City partnered to widen Van Ness Avenue in 1936 by widening the roadbed and narrowing the sidewalk to 16 feet to accommodate the surge of auto and truck traffic; in the early 1950s the avenue's trolley tracks were removed and concrete median installed. All of the features of the roadway have changed substantially over time, with new paving and curb cuts, and installation of medians, modern fire hydrants, streetlights, and various other infrastructural elements added throughout the last century;

therefore, because the BRT project would be constructed in a completely and evolving urbanized environment, changes to the overall setting would not be considered substantial.

Alternative 1: No Build (Baseline Alternative)

As the alternative is detailed in Section 2.2, some activities would take place with implementation of the No Build Alternative. While most would involve system management changes, certain elements may have a slight physical change on the project setting. SFMTA, together with DPW and SFPUC, plans to replace the existing OCS/streetlight poles along Van Ness Avenue from Market Street to North Point Avenue, potentially replacing poles within approximately 3 feet to 5 feet from their current locations; replacement may be implemented as a comprehensive project or as a phased maintenance program, with the most structurally compromised poles replaced earliest. The existing traffic signal heads would also be replaced and the poles upgraded to become mast armed poles (i.e., arched to hang over the traffic lanes). In addition, SFMTA is proposing to install real-time bus arrival displays (NextMuni) at the major bus stops with shelters along Van Ness Avenue. When the scale of the No Build Alternative components are considered relative to the built-out and contemporary Van Ness Avenue traffic-related control infrastructure, these changes would be imperceptible to the overall setting, feeling, or association of any significant historic and architectural resources.

Build Alternative 2: Side-Lane BRT with Street Parking

As described in Section 2.2, BRT station platforms are proposed under all of the build alternatives. All of the proposed BRT stations would consist of a 130-foot-long platform, a canopy of 8 feet to 11 feet in height and landscaped planters (see visual simulations in Section 4.4.3, Analysis of Key Viewpoints, in Section 4.4, Aesthetics/Visual Resources). Other station amenities would include installing TVMs at selected stations, seating, lighting, garbage receptacles, and way-finding maps/signage. Figure 4.5-3 shows the proposed BRT station platform locations for each build alternative relative to the NRHP-eligible or listed historic and architectural properties within the project's APE.

Build Alternative 2, because it features station platforms at curbside locations in closest proximity to the affected historic properties, is considered to have the most notable effect on adjacent properties. Going from the south part of the project area to the north, for each of the seven historic properties within the APE, the proposed project would have effects relative to the potential impacts presented above (Section 4.5.4.2):

- **11-35 Van Ness Avenue (Masonic Temple).** The proposed project would include installation of a BRT station platform in front of this building. This is at the location of the proposed SB Market Street BRT station. The marble and terracotta building, rectangular in form and solid in its massing, has a series of symmetrical Romanesque arches, with a distinctive and decorative inset central arch, and a prominent cornice among the significant character-defining stylistic elements. The greater proportion of design features are located well above the height of the proposed station 8-foot to 11-foot canopy, but the setting and feeling of balance reflected in the historic property would be diminished by the placement of the new bus station platform in front of the street-level façade by inserting an obstruction to viewers looking upon the historic building from across the street; however, the proposed undertaking would not be so substantially adverse as to constitute changing the property's NRHP eligibility status.
- **San Francisco Civic Center Historic District.** The section of Van Ness Avenue between McAllister Street and Grove Street is dominated by civic/government buildings of historic importance and classical architectural grandeur that have been collectively recognized with designation as the Civic Center Historic District. Under Build Alternative 2, a new BRT station is proposed on the east side of Van Ness Avenue, extending 150 feet south from the McAllister Street intersection in front of City Hall; it

Although the setting, feeling, and association reflected in the historic properties would be diminished under some of the Build Alternatives, this would not be so substantially adverse as to constitute changing any of the properties' NRHP eligibility status.

KEY FINDING

Under Build Alternative 2, for each of the seven historic properties within the APE, the proposed project would have effects relative to the potential impacts due to the implementation of station platforms blocking some of the viewshed of the historic properties.

would replace an existing curbside bus shelter of more diminutive size. On the opposite side of Van Ness Avenue, the same alternative would also replace the existing curbside bus shelter with a longer station and platform in front of the War Memorial Veterans Building and Opera House. This is at the location of the proposed NB and SB McAllister Street BRT stations.

The viewshed to either the War Memorial Building/Opera Hall paired buildings on the west side of Van Ness Avenue and City Hall on the east side would be only slightly changed under Build Alternative 2 (see Section 4.5 for a simulation of the bus station at this location). Given the size and scale of these historic properties from the perspective of being a short distance away, the replacement of the existing shelter with a larger BRT station and platform would be largely inconsequential to the overall monumental size of the civic structures and their respective prominent architectural features. The significant character-defining features are never out of view, but placement of the newer BRT infrastructure would partially detract from the view by an Observer, although it is important to remember that transportation infrastructure has always been part of the streetscape fronting these buildings. Though it represents just a small proportion, the new bus platform and low canopy would present a partial obstruction of each historic building from the perspective offered from those looking on from the immediate foreground from the north or south elevation, or from across Van Ness Avenue to either of the large civic buildings. In relationship to its overall historic setting, as one would experience the new BRT station up close, there would be slight diminishment in the feeling and association of the district's historicity with the introduction of the contemporary element. The type and color of scheme of the bus infrastructure could likely further enhance or detract from the feeling, association, and setting of the historic property.

There are sixteen 25-foot-tall trolley/streetlight poles on Van Ness Avenue between Grove and McAllister streets, some of which date back to 1914 when Muni first established a trolley line along Van Ness Avenue; these were subsequently modified and restylized in conjunction with the opening of the Golden Gate Bridge in 1937 and the rebirth of Van Ness Avenue (Bunse and Allen, 2009). Though the SHPO agreed with FTA's finding that the poles did not constitute a National Register-eligible property in and of themselves because of a major compromise in the overall integrity of the poles, they nonetheless represent a landscape and streetscape element of the Civic Center Historic District. The replacement poles for all build alternatives are proposed to be of compatible architectural design. The replacement poles would be approximately 30 feet tall. Though slightly taller than the original height, the OCS structures would not be out of character with the setting of the Civic Center Historic District.

- **799 Van Ness Avenue (Wallace Estate Co. Auto Garage).** Build Alternative 2 would result in the removal of an existing bus shelter and replacement with a 150-foot BRT station (platform and canopy) in front of this building. This is at the location of the proposed NB Eddy Street BRT station. Because the reinforced concrete frame building's most character-defining features are a second and third symmetrical arrangement of industrial windows flanking all exposed elevations, the setting, feeling, and association would not be greatly diminished by the proposed BRT changes at ground level. The property's NRHP eligibility status would not change.
- **945-999 Van Ness Avenue (Ernest Ingold Chevrolet Auto Showroom).** With the exception of the placement of some new OCS/streetlight poles on Van Ness Avenue as part of the BRT system, there are no physical changes anticipated under Build Alternative 2 in front of the property located near O'Farrell Street; therefore, none of the building's significant character-defining features, nor its setting, feeling, or association would be altered by the proposed project. The property's NRHP eligibility would not be affected.
- **1320 Van Ness Avenue (Scottish Rite Temple).** Build Alternative 2 would replace the current bus shelter with a station platform in front of this four-story building. This is at the

location of the proposed NB Sutter Street BRT station. The symmetrical steel frame concrete building rests on a smooth granite base. A simple dentil stringcourse separates the first story from the upper stories of the building, which are dominated by seven two-story arched window insertions. The fourth story is demarcated by a narrow course of windows, separated by eight embossed panels and a highly designed cornice. While the greater proportion of significant character-defining features are located well above the height of the proposed station canopy, the visual character of the historic property would be slightly diminished by its placement, and the property's setting and feeling would be altered. Even with the proposed changes induced by the project, the property's NRHP eligibility would remain.

- **1699 Van Ness Avenue (Paige Motor Car Co. Auto Showroom).** The former auto showroom at the corner of Van Ness Avenue and Sacramento Street would experience a slight obstructive effect under Build Alternative 2 because the proposed SB Sacramento Street BRT station platform would replace the smaller existing bus stop and would extend in front of the building's front door entrance. Therefore, the project would partially block the street frontage views of the historic property, including the distinctive arch-shaped two-story-tall floor-to-ceiling show window; however, because the character-defining features, in addition to the show windows, include the roof cornices, upper-story fenestration, and uniform layout symmetry, all would remain plainly visible to those viewing it. The changes would slightly diminish its overall setting and feeling but would not constitute a substantial change in the property's historic character. The property's NRHP eligibility would not be affected.
- **1946 Van Ness Avenue (California Oakland Motor Co. Auto Showroom).** There would be a slight obstructive effect to this property under Build Alternative 2 because the proposed NB Jackson Street BRT station platform would be located within the curbside parking area as a curb extension in front of the building's front door entrance, and it would partially block first-floor views of the historic property from the street level. It would not physically touch the building or affect its ingress/egress. Because the character-defining features are those that extend skyward and highlight its factory-like orderly grid, massive scale, and functionalism, there would be no measurable change to its overall setting, feeling, or association due to its highly urbanized setting. The property's NRHP eligibility would not change.

Build Alternative 3: Center-Lane BRT with Right-Side Boarding and Dual Medians

Build Alternative 3 (see description in Section 2.2) would involve placement of the bus platforms in existing landscaped dual medians (the medians would be approximately 4 feet to 9 feet wide in many locations), in addition to the OCS pole/street light replacement. See Figure 4.4-8 for a simulation of the Build Alternative 3 BRT bus station at the location of City Hall. Because much of the proposed construction work would occur within the existing median of Van Ness Avenue, which in earlier decades experienced placement and then removal of trolley tracks, a major street widening, and construction of a concrete median, the character-defining characteristics of none of the NRHP properties would be substantially affected. While the proposed changes associated with this alternative would result in a slight alteration in the urban setting, they would not constitute a significant change in the setting, feeling, or atmosphere to any of the seven significant historic and architectural properties in the APE.

Build Alternative 4: Center-Lane BRT with Left-Side Boarding and Single Median

Build Alternative 4 (see description in Section 2.2) involves placement of a dedicated bus lane adjacent to a single 14-foot-wide median. Station platforms would be located on the single center median. See Figure 4.4-8 for a simulation of the Build Alternative 4 BRT bus station platform at the location of the City Hall. Build Alternative 4 also includes the streetscape improvements associated with the other build alternatives and OCS pole/

streetlight replacement. Previous infrastructure construction activity, including a major widening of Van Ness Avenue in 1936-37, installing trolley tracks and subsequent removal of them, constructing concrete medians, and various other improvements as Van Ness Avenue transformed over time as US 101, have collectively continued to change the urban environment; therefore, while the proposed changes associated with this alternative would result in a slight alteration in the urban setting, they would not constitute a significant change in the feeling or association of any of the seven significant historic and architectural properties in the APE. Therefore, the NRHP eligibility status would not change for any of the seven significant historic and architectural properties in the APE.

Center-Lane Alternative Design Option B

The design option would involve incorporating left-turn lanes at certain street locations; it would make no difference to the qualities and important features of the NRHP-eligible or listed properties in the APE.

LPA: Center-Lane BRT with Right-Side Boarding/Single Median and Limited Left Turns

The LPA is a refinement of the center-running alternatives with limited left turns (Build Alternatives 3 and 4 with Design Option B), as described in Chapters 2 and 10. Under the LPA, BRT vehicles would run alongside a single median for most of the corridor, similar to Build Alternative 4, and at station locations BRT vehicles would transition to the center of the roadway, allowing for right-side loading at station platforms similar to Build Alternative 3. The LPA BRT station platform locations are configured to optimize use of the median for landscaping, transit operations, and pedestrian safety; these station locations are shown in Figure 4.5-3, and more detailed information on the analysis and environmental consequences is presented in Chapter 10, Section 10.4.1.3.

As described for Build Alternatives 3 and 4, while the proposed changes associated with the LPA (with or without the Vallejo Northbound Station Variant) would result in a slight alteration in the urban setting, they would not constitute a significant change in the feeling or association of any of the seven significant historic and architectural properties in the APE. Therefore, the NRHP eligibility status would not change for any of the seven significant historic and architectural properties in the APE. No NRHP-eligible or listed architectural resources were identified in the block of Van Ness Avenue between Vallejo and Green streets where the Vallejo Northbound Station Variant is under consideration. Moreover, FTA and SFCTA, in applying the Criteria of Adverse Effect, concluded that a finding of No Adverse Effect with Conditions (for focused documentary research for archaeological resources) is appropriate for the LPA and sought concurrence from the SHPO pursuant to 36 CFR 800.5(c). Upon review of this determination, the SHPO concurred that the project would not change the NRHP eligibility status for any of the seven significant historic and architectural properties in the APE and that the proposed undertaking would have no adverse effect on these properties, or on archaeological resources with the condition that the project proponents will produce detailed documentary research, and a site treatment plan if necessary (see Section 4.15.4.2) to identify and protect potential buried archaeological resources (see SHPO letter dated May 17, 2013, Appendix C).

KEY FINDING

Constructive use of the Section 4(f) historic architectural properties would not occur.

Opportunities for harmonizing the visual effects of project elements with adjacent historic properties will continue to be explored as the design consultation process goes forward.

4.5.5 | Avoidance, Minimization, and/or Mitigation Measures

As explained in Section 4.4, Aesthetics/Visual Resources, depending on the alternative selected, opportunities for harmonizing the visual effects of project elements with adjacent historic properties will continue to be explored as the design consultation process goes forward. In addition to design, appropriate lighting, materials, and color choices that complement the historic properties and are sensitive with their surroundings will be identified. Design will be guided by the Secretary of the Interior's *Standards for the Treatment of*

Historic Properties (Standards) to the extent applicable. In particular, the design for any of the platform boarding areas and shelters near the Civic Center NHL District will be reviewed by SFCTA, the HCP, City Hall Preservation Advisory Commission, and a historic architect hired by SFMTA for compliance with the Secretary of the Interior's Standards based on compatibility with the character-defining features of the district in terms of massing, size, scale, and architectural features. The Historic Preservation Commission shall make a determination regarding the Certificate of Appropriateness application for the work proposed in the historic district. The BRT infrastructure at this location will be designed to reinforce the established character of the historic district and provide visual continuity of the streetscape.

See the following mitigation measures presented in Section 4.4.4 that pertain to historic properties: M-AE-2, M-AE-3, M-AE-5, and M-AE-6. These mitigation measures incorporate approval processes and design parameters that ensure compatibility of the BRT project with historic elements such as the Civic Center NHL District. In addition, see Section 4.15.4 for the following mitigation measures to address potential impacts to archaeological resources prior to and during the construction period: M-CP-1, M-CP-2, M-CP-3, and M-CP-4. These mitigation measures are intended to ensure that more detailed investigation of archaeological resources is undertaken and that all actions are taken to protect archaeological resources discovered during construction. The mitigation measures listed in Sections 4.4.4 and 4.15.4 and referenced above are derived from the Finding of Effect with Conditions prepared by FTA and SFCTA for the LPA (Parsons, 2013c). As discussed above, the SHPO concurred with these measures as part of the basis for the determination of No Adverse Effect with Conditions for the LPA (see Appendix C).

With regard to the potential for impacts to archaeological resources, see mitigation measures M-CP-C1 and M-CP-C2 in Section 4.15.4.2. These mitigation measures provide for focused archival research to identify any specific areas within the APE that may be likely to contain potentially significant remains, and the development and implementation of a Testing and Treatment Plan in event that major areas of direct impact contain locations with a moderate to high potential to retain extant historic or prehistoric archaeological remains that could be evaluated as significant resources.

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4.6 Utilities

This section summarizes the regulatory setting; affected environment; environmental consequences; and measures to avoid, mitigate, or compensate for long-term, permanent impacts to utilities as a result of the proposed project. Construction-phase impacts and avoidance measures are presented in Section 4.15.5. Documents reviewed in support of this study include the *Water Quality Technical Report: Van Ness Avenue Bus Rapid Transit Project* (Parsons, 2013), *Project Construction Plan for the Van Ness Avenue Bus Rapid Transit Project* (Arup, 2012), and the *San Francisco Better Streets Plan* (City of San Francisco, 2010). In addition, a list of utility providers in the project area was obtained from Underground Service Alert (USA, 2008). Utility maps of the project corridor were created based on as-built plans obtained from utility providers and City Departments and information compiled by SFDPW for the Van Ness Avenue Feasibility Study.

The LPA included in this Final EIS/EIR is a refinement of the center-running alternatives with limited left turns (Build Alternatives 3 and 4 with Design Option B), as described in Chapters 2 and 10. The environmental consequences related to utilities under the LPA, with or without the Vallejo Northbound Station Variant, are identified as part of the analysis presented for the build alternatives in this chapter. Since the LPA configuration is a variation of the configurations analyzed for the center-running alternatives in the Draft EIS/EIR, the LPA has slightly different implications to utilities (namely sewer) than as described for Build Alternatives 3 and 4. Nonetheless, the overall impact findings for the LPA, with or without the Vallejo Northbound Station Variant, are consistent with the findings for Build Alternatives 3 and 4, as presented in this subsection.

4.6.1 | Regulatory Setting

SFDPW coordinates utility work and construction projects within the City public ROW to minimize impacts of construction and maintenance activities on neighborhoods and on the people who are served by the utility systems. SFDPW employs several tools and depends on specific regulations to coordinate street excavation, utility work, and other construction in the public ROW, as described below. In addition, as the owner of the Van Ness Avenue ROW, Caltrans has mandatory standards, policies, and procedures for the placement and protection of underground utility facilities within highway ROW. These tools, standards, and policies are discussed below.

4.6.1.1 | SAN FRANCISCO DEPARTMENT OF PUBLIC WORKS CODE, ARTICLE 2.4 AND DIRECTOR'S ORDER NO. 176, 707

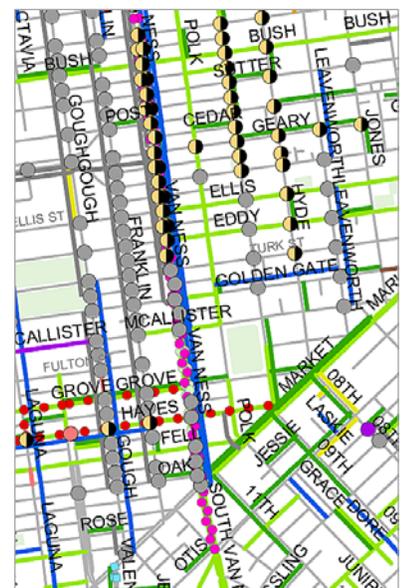
Public Works Code Article 2.4 Excavation in the Public Right-of-Way governs excavation within the public ROW that is under jurisdiction of SFDPW. Article 2.4 requires any person excavating in the public ROW to obtain an excavation permit and comply with the Orders and Regulations of SFDPW Order No. 176, 707. This Order establishes rules and regulations for excavating and restoring streets in San Francisco that are under jurisdiction of SFDPW. These rules and regulations are intended to “balance the needs to preserve and maintain public health, safety, welfare, and convenience” by minimizing disruption to neighborhoods and the traveling public while upgrading and maintaining utility services (SFDPW, 2007). This Code and Director’s Orders apply to the proposed Van Ness Avenue BRT Project and have been taken into account in the construction phasing and staging plan in the Project Construction Plan (PCP) (Arup, 2012).

4.6.1.2 | UTILITY AND PAVING FIVE-YEAR PLAN REPORTS, MAPS, AND DATABASE

DPW Order No. 176, 707 establishes the requirement for 5-year plans of major anticipated work. Each April and October, utility providers and municipal excavators, or City project



The SFDPW maintains a Five-Year Plan to coordinate utility work and construction projects within the City public ROW to minimize impacts of construction and maintenance



The SFDPW Five-Year-Plan is available online at www.sfdpw.org/index.aspx?page=370

proponents, must submit a 5-year plan to SFDPW that lists all major work anticipated to be completed within the public ROW. SFDPW coordinates these plans with the SFDPW Five-Year Paving Plan into a single, comprehensive Five-Year Plan and Map to identify conflicts and opportunities for joint work. This work is coordinated through the SFDPW-led Committee for Utility Liaison on Construction and Other Projects (CULCOP). The CULCOP includes every utility provider and municipal excavator in the City and meets monthly to discuss the scheduling of utility work and major projects. The Street Construction Coordination Center works closely with CULCOP to coordinate all work in City streets and provides an agency contact list for official written intent to begin construction, known as NOI, for distribution. Prior to issuance of an excavation permit, the permit application is checked against the Five-Year Plan and scheduled paving projects. The proposed BRT project is in the Five-Year Plan and is being tracked by CULCOP.

DEFINITION

5-YEAR MORATORIUM:
No project may excavate on San Francisco streets that have been reconstructed, repaved, or resurfaced within a preceding 5-year timeframe.

Order No. 176, 707 establishes a 5-year plan moratorium on excavating in streets that have been reconstructed, repaved, or resurfaced within a preceding 5-year period. Such projects are listed in the *Streets under Excavation Moratorium* list maintained by SFDPW. The 5-year plan moratorium encourages utility owners to determine alternative methods of making necessary repairs to avoid excavating in newly paved streets. It also encourages utility providers and construction project proponents to coordinate and plan activities to avoid work in the recently disturbed public ROW. Waivers to the moratorium and permits to excavate in moratorium streets may be granted by the Director of Public Works for “good cause,” such as to repair leaks, deploy new technology, provide new service, or other situations deemed to be in the best interest of the general public (SFDPW, 2007). Currently, there are no moratoria on Van Ness Avenue. The CULCOP that monitors and updates the Five-Year Plan has already begun to coordinate related and planned projects in the Van Ness Avenue corridor, including the proposed project.

A Five-Year Plan database is a tool that supports the aforementioned planning efforts by tracking projects. A user-friendly application of this database, which lists all active permits in the public ROW by street, is available online to the general public.

4.6.1.3 | REGULATIONS FOR WORKING IN SAN FRANCISCO STREETS (BLUE BOOK)

Regulations for Working in San Francisco Streets (the Blue Book) are put out by SFMTA and are intended to establish rules so that construction and repair work can be done safely and with the least interference to pedestrians, bicycles, transit, and vehicular traffic. It requires the use of control, warning, and guidance devices that must conform to the most current version of the CAMUTCD, which is the amended version of FHWA’s MUTCD for use in California. The Blue Book states that only one general contractor at a time (and associated subcontractors) is allowed to work on any one block. This means that project construction and maintenance work must be coordinated with other projects, including those of utility providers, along the corridor to ensure that adequate and continuous traffic lanes remain open. In addition, typically only one crosswalk at an intersection is allowed to be closed at a time per the Blue Book. Furthermore, appropriate temporary crosswalk signs must be posted to guide pedestrians and bicyclists. The Blue Book rules would be applied to the proposed project as appropriate and at SFMTA’s discretion because the Blue Book is intended for minor development or construction projects that are typically only a few blocks in extent.

4.6.1.4 | STATE OF CALIFORNIA CODE OF REGULATIONS, SUBCHAPTER 5, ELECTRICAL SAFETY ORDERS, GROUP 2, ARTICLE 37

Maintenance and other work around the OCS is governed by the California Division of Occupational Safety and Health Administration (Cal-OSHA) Rule for working around the energized wires, specifically, Subchapter 5, Electrical safety orders, group 2, Article 37. This section sets the clearance requirements for equipment type used around energized OCS. Of specific relevance to the Van Ness Avenue BRT project are the minimum allowable clearances to wires and work requirements near overhead lines.

RESOURCES

SFDPW public works code:
www.municode.com/Library/clientCodePage.aspx?clientID=4201

SFMTA Blue Book:
www.sfmta.com/cms/vcons/bluebook.htm

State of California General Order 95:
docs.cpuc.ca.gov/published/GENERAL_ORDER/52593.pdf

Better Streets Plan:
www.sf-planning.org/ftp/BetterStreets/index.htm

4.6.1.5 | CALTRANS REQUIREMENTS

Caltrans has mandatory standards, policies, and procedures for the placement and protection of underground utility facilities within highway ROW, as specified in Chapter 13 of the *Right-of-Way Manual* and the *Policy on High- and Low-Risk Underground Facilities within Highway Rights-of-Way*. Such policies require all utility relocations to be approved through an encroachment permit process, and they govern identification, location, and clearances, as well as activities during construction. Construction of the Van Ness Avenue BRT would require an encroachment permit and would need to comply with Caltrans requirements. Van Ness Avenue is classified as a conventional highway (US 101) within the limits of the project; therefore, it is not subject to the utility relocations requirements described in Chapter 17 of the PDDM “Encroachment in Caltrans Right-of-Way,” which only apply to Freeways and Expressways.

4.6.1.6 | SAN FRANCISCO BETTER STREETS PLAN

The *San Francisco Better Streets Plan* sets forth guidelines for streetscape and pedestrian design as part of a larger planning effort to create a unified set of standards, guidelines, and implementation strategies for the City’s pedestrian environment. Chapter 6.6, Utilities and Driveways, sets forth guidelines for well-organized utility design and placement that address the following goals:

- Minimization of streetscape clutter and maximization of space for plantings;
- Improved efficiency of utilities and integrated alignment with stormwater facilities, street furnishings, and lighting;
- Reduced cutting and trenching;
- Reduced long-term maintenance conflicts and potential costs;
- Reduction of long-term street and sidewalk closures; and
- Improved pedestrian safety, quality of life, and ROW aesthetics.

The *San Francisco Better Streets Plan* also includes guidelines for screening surface-mounted utilities and recommendations that support utility undergrounding to address aesthetic goals in Citywide streetscape improvement. Section 4.4, Visual/Aesthetics, discusses these and other City aesthetic streetscape policies.

4.6.2 | Affected Environment

Underground and aboveground utilities are present along Van Ness Avenue and throughout the project corridor. Utility facilities in the project corridor include utility poles and overhead wires, surface-mounted utility boxes, utility (i.e., water and sewer) mains, laterals and vaults, and valves. These features support the combined sewer (i.e., stormwater and wastewater combined system), water, gas, and telecommunications, as well as traffic signals, street lights, and Muni OCS support poles/streetlights. Utilities typically run parallel to Van Ness Avenue within the sidewalk, pavement, and median. Utilities also run perpendicular to Van Ness Avenue at cross street locations and at lateral connections serving adjacent land uses.

4.6.2.1 | UTILITIES AND MAJOR SERVICE PROVIDERS

Primary utility providers and facilities serving the project corridor include:

- SFPUC underground combined sewer/stormwater treatment system;
- City and County of San Francisco Water Department (SFWD) potable (i.e., drinking) water lines;
- SFFD auxiliary water supply service (AWSS) lines and underground cisterns;
- SFPUC Hetch Hetchy Water and Power street lights;
- SFMTA underground traction power duct bank and OCS facilities;
- SFMTA Bureau of Engineering traffic signal hardware and conduits;
- Pacific Gas and Electric (PG&E) underground natural gas lines;



- PG&E electrical transmission and distribution lines; and
- Telecommunications copper and fiber-optic lines, including those owned by AT&T, MCI, MFS, RCN, SBC, Level 3, and Comcast.

Related utility facilities in the project corridor include:

- Electrical and communications vaults located along duct-bank alignments to facilitate the installation of conductors and cables;
- Sewer manholes used for maintaining the sewer mains;
- Water main gate valves and other appurtenances for isolating sections of the main for maintenance; and
- Service laterals to adjacent land uses (e.g., residences and businesses) for all utilities.

A description of existing utility facilities in the Van Ness Avenue corridor follows.

Sewer / Stormwater Treatment System

SFPUC operates and maintains various sewer lines that run down the center of Van Ness Avenue from Market to Lombard streets and the associated manholes. The sewer also functions as a stormwater system, called the combined sewer system (CSS) as described in Section 4.9, Water Quality and Hydrology. The sizes and types of sewer lines include 3-foot by 5-foot brick; 12-inch to 27-inch vitrified clay pipe (VCP), which is located underneath the existing center median; a 16-inch reinforced concrete pipe (RCP); 15-inch and 16-inch iron stone pipe (ISP); and 16-inch brick pipe within Van Ness Avenue. The sewer dates from the 1840s and is in varied condition. Several sections have been upgraded over the years, but many emergency repair projects have been required in recent years due to pipe failure. Currently, SFPUC is preparing a Sewer Master Plan that will include a rating of each sewer in San Francisco and prioritization for upgrade work.

Potable (Drinking) Water

The SFWD of SFPUC operates the water system that feeds low-pressure fire hydrants and provides drinking water to the area. The system includes underground pipes, gate valves to control water flow, and hydrants along the west and east sides of Van Ness Avenue. Water lines are typically 4 to 8 inches in diameter.

Auxiliary Water Supply System

SFFD operates the AWSS system, which is a high-pressure water system that supplies water to SFFD. The system includes underground ductile iron and cast-iron pipes, underground cisterns, and aboveground gate valves to control water flow. A special truck with a motorized rig is used to turn gate valves. AWSS pipelines run along the east and west sides of Van Ness Avenue beneath the roadway, and they are typically 8 to 18 inches in diameter. The location of AWSS lines from the face of curb to the centerline of the pipes varies between 20 feet and 30 feet. Cisterns are large storage tanks buried under the roadway surface approximately 25 to 30 feet in diameter and 20 to 25 feet tall, and they hold approximately 75,000 gallons of water. The cisterns provide a source of water second to that of fire hydrants. Approximately 10 cisterns have been identified along Van Ness Avenue within the project corridor.

Traction Power Duct Bank

SFMTA operates and maintains a major duct bank, consisting of a series of concrete-encased ducts that runs the length of Van Ness Avenue beneath the SB parking lane. The duct bank provides traction power for the OCS, and it also carries a PG&E 12-kilovolt (kV) supply line and traffic signal interconnect conduits. The duct bank varies in size, but it



The auxiliary water supply system (AWSS), constructed after the 1906 earthquake, is a water distribution system operated and maintained by the San Francisco Fire Department. It delivers water under high pressure for fire fighting and is independent from San Francisco's domestic water system. It consists of 2 pump stations, 2 water storage tanks, 1 reservoir, 172 cisterns, and approximately 135 miles of pipes.

typically carries up to nine 2- and 3-inch ducts within an approximate 1-foot 6-inch by 2-foot concrete encasement.

Gas and Electricity

Natural gas and electric power is supplied to the project corridor by PG&E. There are no aboveground electric transmission and distribution lines along Van Ness Avenue; however, overhead lines cross Van Ness Avenue at some cross street locations. A 12-kV line runs within the traction power duct bank.

Natural gas is supplied to the project corridor via a system of 2- to 4-inch-diameter underground pipelines located parallel to and across Van Ness Avenue. There are 12-inch gas mains in the vicinity of Market Street and gas mains ranging from 2 to 16 inches at various cross street locations. There are also many abandoned and deactivated gas mains along Van Ness Avenue.

Telecommunications Systems

Several telecommunications lines, including copper and fiber, are located beneath Van Ness Avenue within the project corridor. In addition, aboveground telephone lines cross Van Ness Avenue at various cross street locations.

4.6.2.2 | OTHER PLANNED UTILITY PROJECTS

Other planned projects involving utilities in the Van Ness Avenue ROW are included in the No Build Alternative, and these projects would be integrated into construction of a BRT build alternative in compliance with City policies to minimize community disturbance and identify potential conflicts and opportunities for joint work (see Section 4.6.2.3). These projects are reviewed below.

OCS Support Poles/Streetlights

The existing 25-foot-tall OCS support poles/streetlights are proposed for replacement under the proposed build alternatives, as well as under the No Build Alternative, based on need and funding availability, as described in Section 2.2, Project Alternatives. SFMTA, together with SFDPW and SFPUC, would replace the OCS support poles/streetlights to address the failing structural condition of the aged pole system (DPW, 2009). With the build alternatives, replacement would include removal of all existing poles and light fixtures, and installation of new poles and light fixtures as described in Section 4.15, Construction Impacts. This construction would be integrated with construction of the proposed BRT project, and replacement OCS support poles/streetlights would be designed to handle modern loads as required by the existing bus fleet and/or the proposed BRT bus fleet; the replacement poles would be approximately 30 feet tall to accommodate the BRT. New lighting would be energy efficient, require low maintenance, and meet current lighting requirements for safety. A new duct bank would be constructed within the sidewalk area to support the streetlights and traffic signal interconnect conduits.



Due to structural failing, the OCS support poles/streetlights along Van Ness Avenue would be replaced under all alternatives, including the No Build Alternative.

SFgo

SFMTA operates the traffic signals along Van Ness Avenue. The traffic signals along Van Ness Avenue, Franklin, and Gough streets are proposed for replacement as part of MTA's SFgo program (see Chapter 2), and this work would be coordinated with construction of TSM features, including a fiber-optic communication system between signals, proposed as part of the BRT build alternatives.

Pavement Rehabilitation

Caltrans is responsible for maintenance of the Van Ness Avenue pavement. Caltrans prepared a draft Capital Preventive Maintenance Project Report in 2008 to address pavement rehabilitation (i.e., repair and replacement of failed areas) on Van Ness Avenue between Golden Gate Avenue and Lombard Street. Pavement rehabilitation is included as a project in the Caltrans 2007 Ten-Year SHOPP Plan for 2011/2012 FY and the 2010 SHOPP. This project would be coordinated with construction of the proposed BRT project and the aforementioned utility projects.

Road Repaving and Street Safety Bond Projects

A \$248 million Road Repaving and Street Safety Bond was approved by voters in November 2011 (Proposition B). Recommended as part of the citywide Ten-Year Capital Plan to improve and invest in the City's infrastructure, the bond will repave streets; make repairs to deteriorating street structures; improve streetscapes for pedestrian and bicyclist safety; improve traffic flow on local streets; and install sidewalk and curb ramps to meet the City's obligations under the Americans with Disabilities Act (ADA). More information on this program can be found at <http://sfdpw.org/index.aspx?page=1580>.

As part of this program, the City has prioritized Gough, Franklin and Polk streets, parallel to the proposed BRT project, for resurfacing ahead of the construction start date of Van Ness Avenue BRT. For Gough and Franklin streets, the projects are being coordinated with the installation of pedestrian and traffic signal conduits to enable SFgo and pedestrian countdown signals for the length of the corridor. The Franklin Street project, which is scheduled to begin in 2013, has also included pedestrian bulbs at two intersections in the Market and Octavia Plan Study area. Other improvements, including pedestrian improvements, on Gough and Polk streets are being planned by the City.

4.6.3 | Environmental Consequences

The proposed project could result in adverse impacts to utilities if it would:

- Result in the need for expanded or additional facilities by a utility provider, or if a utility provider determines that it has inadequate capacity to serve a project's projected demand in addition to existing demand;
- Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board (RWQCB); or
- Conflict with access to key public utilities by utility providers.

The utilities to be analyzed include all those listed under Section 4.6.2 above. In addition, impacts to offsite landfill capacity are considered.

4.6.3.1 | UTILITY DEMAND AND CAPACITY

As discussed in Section 4.9, Water Quality and Hydrology, the proposed project would result in a net, slight increase in pervious surface area in the corridor; therefore, the proposed project would not result in increased stormwater flows that would require new or expanded stormwater facilities. None of the project build alternatives, including the LPA, (with or without the Vallejo Northbound Station Variant), would impact the combined sewer/stormwater treatment system.

Similarly, the proposed project would result in an increase in landscaped areas; however, this increase is not anticipated to require substantially more water usage over the existing conditions or No Build Alternative. Maintenance of the proposed BRT bus fleet may require additional water usage and wastewater generation; however, the existing water and wastewater infrastructure would be sufficient to accommodate such increases. The proposed project would not otherwise require additional water usage or wastewater treatment. No

changes to the potable water and auxiliary water supplies would result under any project alternative, including the LPA (with or without the Vallejo Northbound Station Variant).

Trash receptacles would be provided at BRT station platforms to accommodate additional garbage generated by bus patrons. This additional garbage would not affect landfill capacity.

The proposed project would not require additional capacity or infrastructure for natural gas or other utility systems in the project corridor. No change in utility usage or facility expansion would occur under the No Build Alternative, with the exception of the OCS support pole/streetlight upgrade and new duct bank constructed within the sidewalk area to provide streetlight power and traffic signal interconnect conduits for the SFgo Program. Construction of this duct bank and the OCS poles could result in conflicts with existing utilities, necessitating their relocation.

Replacement of the OCS support poles/streetlights would involve upgrade of the lighting system to a modern, energy-efficient system that meets current pedestrian and roadway lighting requirements (DPW, 2009). The proposed project would benefit the street lighting with improved energy efficiency, increased reliability, reduced risk to maintenance staff due to a new standardized electrical service, and decreased operational costs.

Incorporation of Design Option B under Build Alternative 3 or 4 would not result in changes to utility demand and capacity.

4.6.3.2 | UTILITY FACILITY ACCESS AND PLANNING

In addition to serving as a transportation facility, Van Ness Avenue provides access to key public utilities. As noted in Section 4.6.2, several utility facilities are provided aboveground and belowground within the Van Ness Avenue corridor. Utility providers need to access these facilities for maintenance, repair, and upgrade/replacement. The proposed project involves construction of a dedicated transitway, station platforms, curb bulbs, center medians, and landscaping that all have the potential to conflict with access to public utilities by utility providers. Due to the close proximity to existing facilities, utilities would require relocation or modification in some instances to maintain access for utility providers to conduct maintenance, repair, and upgrade/replacement activities. For example, construction of curb bulbs may require relocation of some existing stormwater drainage facilities, fire hydrants, manholes, or other appurtenances. In other cases, these facilities would simply need to be modified and adjusted to grade at new curb bulb locations.

In situations where utility facilities cannot be relocated, SFMTA would have a plan in place to accommodate temporary closure of the transitway and/or stations to allow utility providers to perform maintenance, repair, and upgrade/replacement of underground facilities. Planning for utility access within the transitway would likely involve temporarily rerouting bus service to a mixed-flow traffic lane and providing temporary curbside stations or station consolidation if needed. Temporary rerouting of bus service could involve a change in bus vehicle from electric trolley to motor coach to eliminate reliance on the OCS. Signage for BRT patrons and safety protocols for Muni operators and utility providers would be coordinated. These planning efforts would avoid impacts to facility access by utility providers.

Based on available information, it is anticipated that construction and operation of the proposed project could be coordinated with utility providers to avoid adverse impacts to utility facilities. The only exception is potential impacts to the existing VCP sewer pipeline located beneath the Van Ness Avenue median. Due to the age of this sewer pipeline, it is conservatively assumed that construction of Build Alternatives 3 and 4 could potentially damage this pipeline because construction of BRT facilities would occur directly above it.⁸⁵ The proposed BRT transitway and stations under Build Alternative 3 (including Design Option B) would be located above the existing sewer pipeline. Under Build Alternative 4

⁸⁵ No impacts to the sewer main would result under Build Alternative 2 because construction and operation of the BRT would not occur above the sewer main.



Due to the close proximity to existing facilities, some utilities would require relocation or modification to maintain access for utility providers.



Construction of curb bulbs may require relocation of some existing stormwater drainage facilities, fire hydrants, manholes, or other appurtenances.

(including Design Option B), only the portion of the proposed BRT transitway and stations located on the block of Van Ness Avenue between Geary and O'Farrell streets, and the transitional portions of the transitway just north and south of this block, would be located above the sewer pipeline. Under the LPA (with or without the Vallejo Northbound Station Variant), which combines design features of Build Alternatives 3 and 4, replacement of the aging sewer pipeline would be required at station locations and in areas where the vibration resulting from construction of the transitway has potential to damage the sewer.

An inspection of the sewer pipeline was performed in spring 2012. Based on preliminary results, 14 segments on 7 blocks are in poor condition and need to be replaced regardless of whether the Van Ness Avenue BRT Project is implemented. An additional 16 segments on 13 blocks need to be repaired. Even though the entire analysis of the sewer pipeline is still in progress, it can be assumed based on available data that potential adverse impacts to the sewer would result from Build Alternatives 3 and 4 and the LPA. For the segments where the inspection reveals that the sewer is deteriorated to the point at which construction of the BRT lane under Build Alternative 3 or 4, including the LPA, could damage it, SFPUC and SFMTA would coordinate to accelerate planned replacement, rehabilitation, or relocation of the sewer main as needed.

Complete relocation and replacement of the sewer pipeline within the project area is assumed under Build Alternative 3 (including Design Option B). Relocation and replacement of the sewer pipeline on Van Ness Avenue, approximately between Geary and O'Farrell streets, is assumed under Build Alternative 4. Under the LPA (with or without the Vallejo Northbound Station Variant), replacement of the sewer pipeline is assumed at station locations and in areas where the vibration resulting from construction of the transitway has potential to damage the sewer. This would ensure that construction of the BRT transitway would not damage the sewer pipeline and would minimize the likelihood that the new pavement constructed for the transitway would need to be excavated for future pipeline repair work per the goals of the City's Five-Year Plan and Streets under Excavation Moratorium. This relocation and replacement of the sewer pipeline is accounted for in the project construction schedule presented in Sections 2.6 and 4.15. Complete relocation and replacement of the sewer pipeline under Build Alternative 3, with or without incorporation of Design Option B, is anticipated to lengthen the construction timeframe between 4 and 12 months (Arup, 2012). Partial relocation and replacement of the sewer pipeline under Build Alternative 4, with or without incorporation of the Design Option B, is anticipated to lengthen construction between 2 and 4 months (Arup, 2012). Since the project has not completed its load (weight) analysis, there currently is no estimate for lengthening the timeframe due to replacement of sewer pipeline under the LPA, but the timeframe will fall between the full replacement of Build Alternative 3 and the partial replacement of Build Alternative 4. A more refined understanding of the sewer replacement work and its timeline will be part of 30 percent design work.

In conclusion, significant projects are planned within the Van Ness Avenue corridor that would involve utility work. Known projects to be coordinated with the proposed BRT project include replacement of the SFPUC sewer main pipeline, SFgo signal upgrades, Road Repaving and Street Safety Bond repaving and pedestrian improvement projects on Gough, Franklin, and Polk streets, and curb-to-curb pavement rehabilitation under the SHOPP. In addition, SFWD may plan to replace their water mains and laterals as part of the BRT construction. These projects and other planned projects in the project corridor listed in Section 1.3.4, Related Projects (e.g., CPMC, Doyle Drive, SFPark, and Geary BRT), would also be recognized and coordinated with CULCOP and the San Francisco Street Construction Coordination Center to avoid impacts to utilities to the largest extent possible.

4.6.4 | Avoidance, Minimization, and/or Mitigation Measures

In compliance with City and Caltrans policies, coordination with the utility providers and Caltrans would be initiated during the preliminary engineering phase of the project and would continue through final design and construction. Where feasible, utility relocations would be undertaken in advance of project construction. Design, construction, and inspection of utilities relocated for the BRT project would be done in accordance with City and Caltrans requirements. SFMTA would coordinate with the affected service provider in each instance to ensure that work is in accordance with the appropriate requirements and criteria.

The following avoidance and mitigation measures would be incorporated into project design and planning to avoid adverse impacts to utility systems and services:

M-UT-1. BRT construction will be closely coordinated with concurrent utility projects planned within the Van Ness Avenue corridor.

M-UT-2. An inspection and evaluation of the sewer pipeline within the project limits will be undertaken to assess the condition of the pipeline and need for replacement. Coordination with SFPUC and SFDPW will continue and be tracked by CULCOP.

M-UT-3. During planning and design, consideration must be given to ensure that the proposed BRT transitway and station facilities do not prevent access to the underground AWSS lines. There must be adequate access for specialized trucks to park next to gate valves for maintenance. The gate valves must not be located beneath medians or station platforms.

M-UT-4. In situations where utility facilities cannot be relocated, SFMTA will create a plan to accommodate temporary closure of the transitway and/or stations in coordination with utility providers to allow utility providers to perform maintenance, emergency repair, and upgrade/replacement of underground facilities that may be located beneath project features such as the BRT transitway, station platforms, or curb bulbs. Signage for BRT patrons and safety protocols for Muni operators and utility providers will be integrated into this plan.

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4.7 Geology/Soils/Seismic/Topography

This section describes the geologic resources along the project corridor and describes related impacts that could result from the Van Ness Avenue BRT Project. Geologic resources include geology, topography, subsurface soil conditions, groundwater, and seismicity. This section summarizes the findings of a Geologic Impacts Assessment Report prepared for the proposed project, which includes a review of published and online maps and reports presenting data on regional geology, seismic hazards, and faulting, in addition to San Francisco City records of geotechnical and environmental site investigations, and planning and database sources (AGS, 2009a).

The LPA included in this Final EIS/EIR is a refinement of the center-running alternatives with limited left turns (Build Alternatives 3 and 4 with Design Option B), as described in Chapters 2 and 10. The environmental consequences related to geologic resources under the LPA, with or without the Vallejo Northbound Station Variant, are identified as part of the analysis presented for the build alternatives in this chapter. There would be no difference in such impacts under the LPA compared with the impacts described for the build alternatives in this subsection.

4.7.1 | Geologic Setting

4.7.1.1 | TOPOGRAPHY

The terrain in northeastern San Francisco is hilly, consisting of gentle to moderately steep sloping ridgelines or hills and spur ridges, separated by small valleys or basins. The project alignment crosses near the low point of one of these east-west trending ridgelines that connects Nob Hill to the east and Pacific Heights to the west. Farther north, the project alignment crosses near the western toe of Russian Hill. The valleys and basins were typically filled by sediments, particularly by the irregular forms of alluvium and dune sands. To a lesser extent, the native topography has been altered by urban development, particularly by the grading and placement of fill materials to varying extents along the entire length of the project alignment.

The topography along the project corridor varies in ground elevations from 44 feet above mean sea level (amsl) at Van Ness Avenue and Mission Street, to a maximum elevation of 200 feet amsl at the Clay Street and Van Ness Avenue intersection. Gradients vary from less than 1.5 percent to as high as 8.0 percent along the project alignment. Figure 4.7-1 shows the slope gradient along the project alignment.

4.7.1.2 | GEOLOGY

The project corridor is situated within the Coast Ranges Geomorphic Province. This province forms a nearly continuous barrier between the Pacific Ocean to the west and the San Joaquin and Sacramento valleys to the east. The structural depression of the San Francisco Bay and the alignment of the ridges and valleys is a result of long-term ground deformation from regional tectonic stresses. These stresses are periodically relieved by ruptures occurring along the active fault traces in the region, notably along segments of the San Andreas Fault system and other related faults.

The area east of the San Andreas Fault, including the project alignment, is underlain at depth by late Mesozoic era (i.e., Jurassic to Cretaceous) bedrock of the Franciscan Complex, consisting mainly of shale, sandstone, chert, pillow basalt, and serpentinite. The bedrock is exposed in erosive cuts and bluffs, and also in the steeper terrain where it has remained uncovered by dune sand, alluvium, or artificial fill. The type of bedrock that is present reflects the tectonic environment in which it formed, ranging from a deep offshore to shallow onshore margin, where sediment was initially compressed to form rock over the top of the underlying



The topography between Filbert and Eddy streets in the Van Ness Avenue corridor.



Figure 4.7-1: Project Alignment Slope Map

oceanic crust and later deformed in the process of the Pacific Plate subducting underneath the North American Plate. This type of tectonic regime continued until a shift during the Late Cenozoic Era, between 30 million years ago (Ma) and 25 Ma, when lateral strike-slip motion along the ancestral faults of the San Andreas Fault system became prevalent.

Four distinct geologic units underlie different portions of the project alignment. From youngest to oldest, these units are historic fill, dune sand, alluvium, and Franciscan Complex Bedrock. Figure 4.7-2 shows the geologic units along the project alignment. As shown in Figure 4.7-2, deposits of dune sand and alluvium underlie the Civic Center and South of Market portions of the project alignment. In these areas, the dune sand and alluvium deposits are more than 200 feet thick (AGS, 2009a). The sedimentary deposits thin out on the sides of Nob Hill, Pacific Heights, and Russian Hill, including the area of the project alignment, where Franciscan bedrock is likely to be found at moderately shallow depths of less than 100 feet (AGS, 2009a).

Four distinct geologic units underlie different portions of the project alignment: historic fill, dune sand, alluvium, and Franciscan Complex Bedrock.

4.7.1.3 | SUBSURFACE SOIL CONDITIONS

General subsurface soil conditions underlying the project alignment are described below by segment. More-detailed information on subsurface soil conditions is provided in the Geologic Impacts Assessment Report prepared for the proposed project (AGS, 2009a). The report explains that local areas of historical fill, including pavement fill and structural fill underneath the buildings and structures, are likely present throughout most of the project alignment due to the long urban history of the Van Ness Avenue corridor.

Mission Street to McAllister Street

As shown in Figure 4.7-2, dune sand (Qds) is mapped underneath most of this segment of the project alignment. Underneath the dune sand are variably thick layers of older alluvium and at depth, Franciscan Complex bedrock. Groundwater has been encountered in this area at a depth of approximately 20 feet (AGS, 2009a).

McAllister Street to Clay Street

Dune sand (Qds) is mapped underneath this segment of the project alignment, but the depth to bedrock is expected to be shallower than farther south, particularly at the higher elevations between California and Clay streets (Joyner, 1982). Soil borings to a depth of 25 feet bgs that were completed in 1998 in this area did not encounter groundwater.

Clay Street to Union Street

Dune sand (Qds) is mapped as far north as Broadway Street in this portion of the project alignment. A large contiguous deposit of fill (af) is mapped north of Broadway Street, to the south of Union Street. Immediately south of Union Street, there is a contact between the fill to the south and native alluvial soils (Qoa) to the north (Witter, *et al.*, 2006). Soil borings drilled in this area to depths of 26 feet bgs did not encounter groundwater.

Union Street to North Point Street

Alluvium (Qoa) is mapped underneath the Union Street intersection northward to the western portion of the Van Ness Avenue/Greenwich Street intersection, where there is a contact with the underlying Franciscan sandstone and shale bedrock (br). Shallow bedrock (br) occurs beneath the eastern portion of the Van Ness Avenue/Greenwich Street intersection northward to the southern edge of the Van Ness Avenue/Lombard Street intersection. Alluvium (Qoa) is mapped underneath the actual Van Ness Avenue/Lombard Street intersection northward to the Van Ness Avenue/North Point intersection (Graymer, *et al.*, 2006). Chestnut to North Point streets is underlain by dune sand (Qsd). No previous studies were identified that could provide known groundwater depths in this segment (AGS, 2009a).

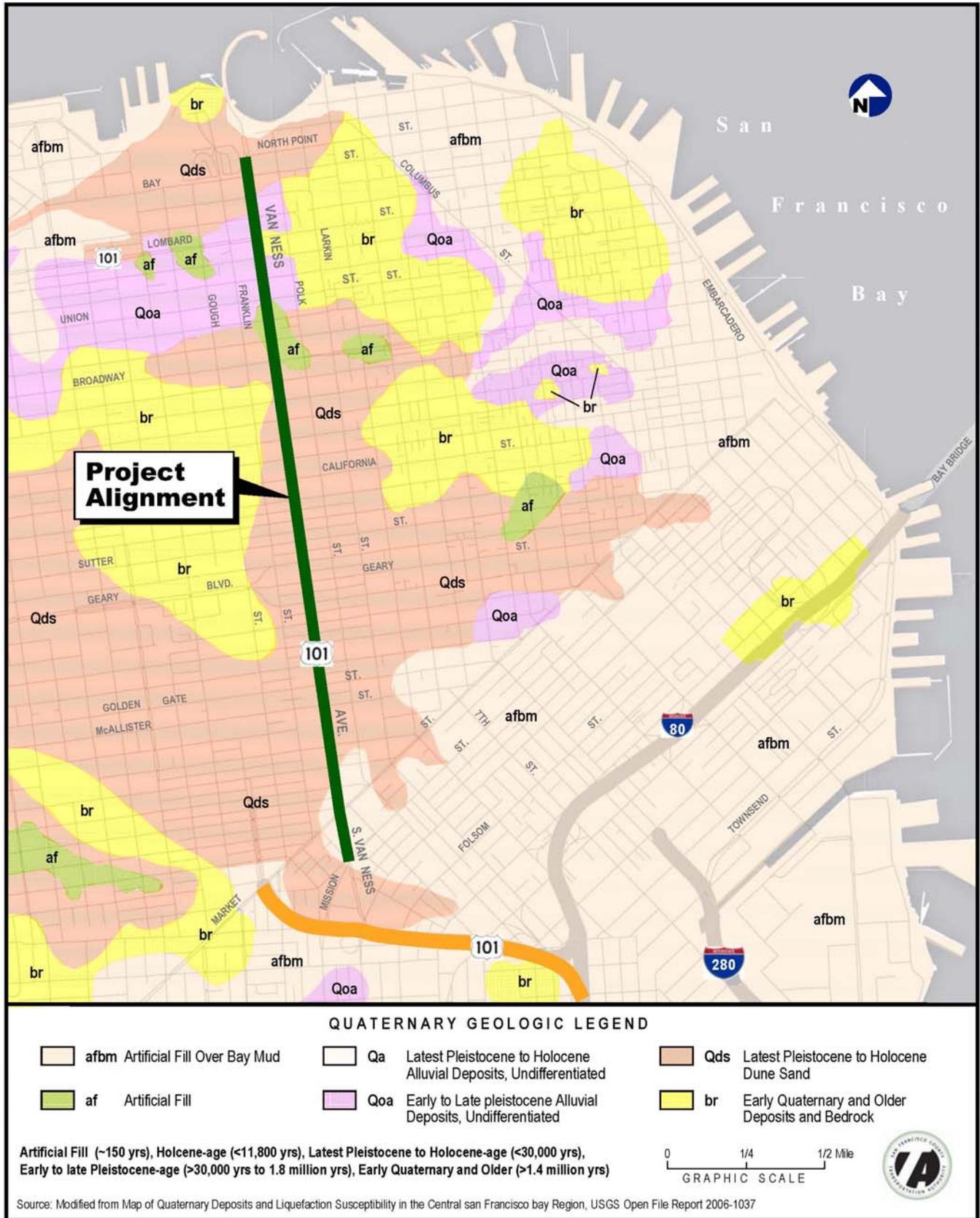


Figure 4.7-2: Mapped Soils Underlying Project Alignment

4.7.1.4 | GROUNDWATER

The project area is largely located within the Downtown Groundwater Basin (Basin 2-40) (AGS, 2009a). None of the geologic formations along the project alignment are considered useful aquifers due to poor overall water quality and high concentrations of undesirable minerals. In general, reported groundwater levels are expected to vary seasonally and annually based on rainfall patterns, microtopography and distribution of impervious surfaces, and the pattern of groundwater withdrawal or localized pumping. Geologic mapping indicates that the groundwater table occurs less than 20 feet bgs in most of the lower-lying areas along the project alignment, where the ground elevation is less than approximately 150 feet amsl. Available monitoring well data indicate depth to groundwater ranges from 5 to 20 feet bgs in two areas of the project corridor: (1) along Van Ness Avenue from Mission Street northward to the vicinity of Geary Boulevard; and (2) along Van Ness Avenue north of Broadway Street to Lombard Street. Monitoring well data indicate that groundwater depths exceed 20 feet bgs along Van Ness Avenue between Geary Boulevard and Broadway Street.

The direction in which groundwater flows changes with the varied topography along the project alignment. A Geotcheck™ report prepared in 2008 for the proposed project indicates that groundwater flow in the vicinity of Mission and Market streets is to the east; on the south-facing hillside north of the Civic Center, the flow is generally to the south or southeast; and on the north-facing hillside north of Clay Street, the flow is generally to the northwest (EDR, 2008).

4.7.1.5 | SEISMICITY

The project corridor is located in a seismically active region with a history of strong earthquakes (AGS, 2009a). No active faults are known to cross the project corridor. Several major active faults are mapped within 30 miles of the project alignment, including the San Andreas, Hayward, Calaveras, and San Gregorio faults. Table 4.7-1 lists the major active faults that may affect the project area in order of proximity to the project corridor. Major faults in the project region are shown in Figure 4.7-3.

The maximum moment magnitude earthquake (Mmax) is defined as the largest earthquake that a given fault is calculated to be capable of generating. For the project corridor, the controlling Mmax would be a magnitude 7.9 event on the San Andreas Fault, which is located approximately 6.8 miles to the southwest of the southern project limit (AGS, 2009a).

Table 4.7-1: Active Fault Seismicity

FAULT	DISTANCE TO PROJECT AREA (MI)	MAXIMUM MOMENT MAGNITUDE EARTHQUAKE (MMAX)
San Andreas	6.8	7.9
San Gregorio	10.5	7.3
Hayward	11	7.1
Calaveras	23	6.8
Concord-Green Valley	25	6.9
Rodgers Creek	28	7.0
West Napa	29	6.7
Greenville	29	7.0

SOURCE: AGS, 2009a.



Figure 4.7-3: Earthquake Fault Map

4.7.1.6 | SEISMIC HAZARDS

Seismic hazards include primary and secondary effects from earthquakes, including fault rupture, ground shaking, liquefaction, ground settlement, slope instability and landslides, and tsunamis. The potential for these hazards to occur, as applicable to the proposed project, is discussed in this section.

Fault Rupture

There is no Alquist-Priolo Earthquake Fault Zone Map covering the San Francisco North Quadrangle, which includes the area of the project alignment, and geotechnical investigation reports completed in the area do not identify faulting; therefore, fault rupture is not anticipated in the project corridor.

Ground Shaking

The severity of future ground shaking along the project alignment is influenced by many factors, including the proximity of the project alignment to the location of the causative earthquake, the duration and intensity of the earthquake, and the type of geologic materials underlying the site. As described above, the project is located in a seismically active region with a history of strong earthquakes. The project area may be subject to very strong ground shaking (AGS, 2009a).

Liquefaction

Soil liquefaction is a phenomenon in which saturated, cohesionless soils lose their strength due to the build-up of excess pore water pressure, especially during cyclic loadings (i.e., shaking) such as those induced by earthquakes. In the process, the soil acquires mobility sufficient to permit horizontal and vertical movements if not confined. Soils most susceptible to liquefaction are loose, clean, uniformly graded, fine-grained sands. Gravels and coarse-grained sands are also susceptible to liquefaction, as are saturated silty and clayey sands. The consequences of liquefaction can include seismically induced settlements, additional lateral loads on piles, down drag forces on pile foundations, localized lateral deformation of soils, and flotation (i.e., buoyancy) of underground structures (i.e., tanks, pipelines, and manholes) underlain by the potentially liquefiable soils.

Two separate areas of the project alignment are considered susceptible to liquefaction, as shown in Figure 4.7-4. These are (1) the area between the Union Street and Broadway Street intersections, which is an area where historic fill is mapped; and (2) the area between the Hayes Street and Mission Street intersections, which is an area where artificial fill is mapped. Other portions of the project alignment are considered to have low to moderate susceptibility to liquefaction.

DEFINITION

SOIL LIQUIFACTION: When saturated, cohesionless soils lose their strength due to the build-up of excess pore water pressure, especially during cyclic loadings (i.e., shaking) such as those induced by earthquakes.

Seismically Induced Settlements

Seismic shaking may cause settlement of non-saturated soils to occur. Collapse of void space in porous soils reduces ground volume. Seismically induced settlements are expected to be concentrated where there are loose sandy soils with little fines and high porosity and in unconsolidated fill soils. Seismic shaking can result in consolidation of previously unconsolidated fill, which can trigger ground settlement. The dune sand areas, and potentially the artificial fill areas, within the project area may be subject to settlement.

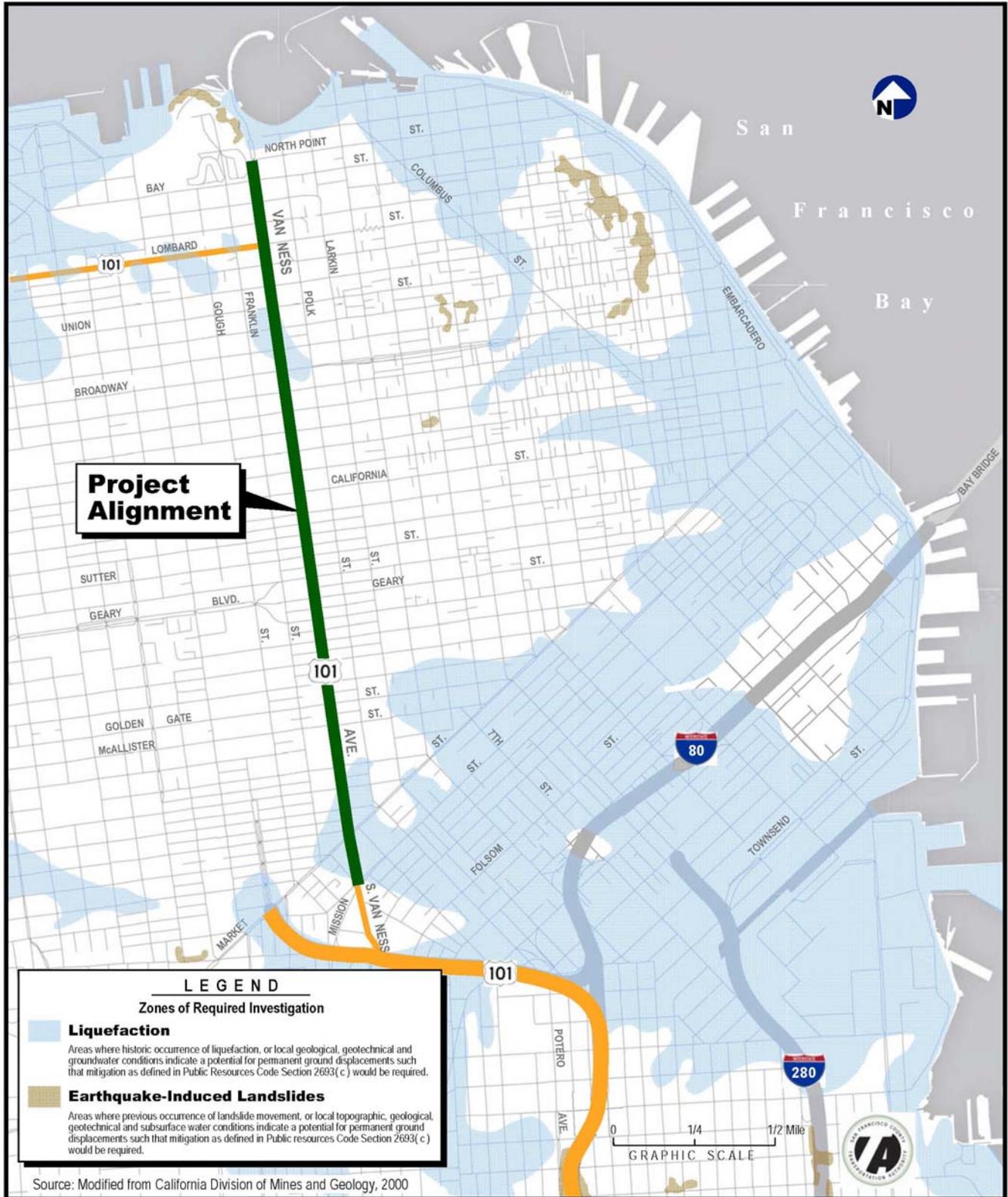


Figure 4.7-4: Seismic Hazard Map

Tsunamis

A tsunami is a series of traveling ocean waves of extremely long length generated by disturbances associated primarily with earthquakes occurring below or near the ocean floor. Underwater volcanic eruptions and landslides can also generate tsunamis. ABAG tsunami evacuation planning maps for the ocean side of San Francisco and San Mateo counties are based on modeling of potential earthquake sources and hypothetical extreme undersea, near-shore landslide sources. According to the ABAG tsunami evacuation planning map for San Francisco and San Mateo counties, the project corridor is not located within a tsunami evacuation area.

RESOURCE

To see the ABAG tsunami evacuation planning map for San Francisco and San Mateo counties, go to: <http://gis.abag.ca.gov>.

4.7.1.7 | OTHER GEOLOGIC HAZARDS

Other types of geologic hazards typically depend upon the ground configuration and stability of underlying materials. These hazards exist regardless of the occurrence of earthquakes, but they are affected by factors such as weather and flooding potential, ground loading, construction-induced ground movements, and other types of natural disasters such as volcanic eruptions, non-seismically generated waves, and various types of slope failures. Hazards applicable to the project alignment are discussed in this section.

Slope Instability

Areas with the greatest potential for slope failure possess steep slopes and weak underlying rock or soil conditions. Increasing the risk of slope failure are saturated ground, rock bedding parallel to the slope gradient, and the occurrence of past landslides subject to reactivation, where there may be a zone or plane of weakness in the subsurface upon which ground movement could be triggered.

A major landslide or slope failure is not likely to occur along the project alignment. There are also no mapped landslides crossing the project alignment (Knudsen *et al.*, 2000), as depicted in Figure 4.7-4. The steepest slopes are between Pacific and Broadway (8 percent), and between Broadway and Vallejo (6.5 percent), as shown in Figure 4.7-1. The overall risk for slope instability or failure along the project alignment is low because slopes are flatter than 10 percent. More likely to occur would be minor slope failure, including instability resulting from local construction-induced settlements, or slumping if there were to be an improperly supported excavation near the base of a hillside.

A major landslide or slope failure is not likely to occur along the project alignment.

Settlement or Instability of Subsurface Materials

As described above in Section 4.7.1.6, dune sand and artificial fill areas in the project corridor may be subject to settlement.

4.7.2 | Environmental Consequences

The Van Ness Avenue corridor may be susceptible to the following geologic and seismic hazards: very strong ground shaking, liquefaction, and settlement. Risk of slope instability during project construction is discussed in Section 4.15.6.

Each build alternative (including Design Option B) and the LPA (with or without the Vallejo Northbound Station Variant) would include the following project components subject to the aforementioned geologic and seismic hazards: new concrete paving (with an asphalt wearing surface) and rehabilitation or resurfacing of existing pavement throughout the BRT project alignment; sidewalk pedestrian curb bulbs; station platforms with approach ramps, canopies and signage; installation of modern OCS support poles/streetlights and associated conduit trench replacement, and potentially additional lighting. Build Alternatives 3 and 4 (including Design Option B) and the LPA (with or without the Vallejo Northbound

Risk of slope instability during project construction is discussed in Section 4.15.6.

Station Variant) may involve replacement of all or portions of the existing, underground sewer pipeline.

The No Build Alternative would include the following project components subject to the aforementioned geologic and seismic hazards: curb-to-curb pavement resurfacing, construction of pedestrian curb ramps, installation of modern OCS support poles/streetlights and associated conduit trench replacement, and potentially additional lighting.

KEY FINDINGS

Soils along the project alignment generally appear suitable for the support of these structures proposed as part of each build alternative, including the LPA, and the No Build Alternative. The risk of geologic hazards is low in the build alternatives, and the project would not increase those risks. No mitigations are proposed.

Soils along the project alignment generally appear suitable for the support of these structures proposed as part of each build alternative and the No Build Alternative. However, soil areas mapped as fill may be subject to settlement, and part of the project alignment is located in a liquefaction area; therefore, design of the aforementioned structures in each build alternative and in the No Build Alternative would include features to address very strong ground shaking, liquefaction, and settlement.

The scope of project structures is limited to that of streetscape features that would bear light loads; therefore, the risk of the aforementioned geologic hazards is low. The design of project features would meet seismic standards, and the project alternatives would not increase the risk of geologic hazards. Design features to address very strong ground shaking, liquefaction, and settlement are discussed below in Section 4.7.3.

4.7.3 | Avoidance, Minimization, and/or Mitigation Measures

The results of the preliminary geologic assessment indicate that there are no substantial geologic hazard impacts that would not be fully addressed by design requirements, and no mitigation measures are proposed. Design features to address identified geologic hazards will be confirmed as the project progresses into advanced design. Some of these design features that may be applicable to each build alternative (including Design Option B) and the LPA (with or without the Vallejo Northbound Station Variant) are identified as the following improvement measures:

IM-GE-1. Localized soil modification treatments will be performed as needed at locations where station platforms would be located in areas of fill or mapped as a liquefaction area. Such soil modification may include soil vibro-compaction or permeation grouting.

IM-GE-2. Fill soils will be overexcavated and replaced with engineered fill as needed in areas where proposed project structures would be located in areas of fill or in liquefaction zones.

IM-GE-2. Deeper foundations will be designed for station platforms and canopies located in areas of fill or areas mapped as a liquefaction area, as needed.

4.8 Hazardous Waste/Materials

This section summarizes potential impacts from pre-existing hazardous materials that could expose construction workers or the general public to health risks and that may require implementation of special soil and/or groundwater management procedures. Section 4.15.7 discusses the potential impacts of hazardous materials and wastes that may be used or stored in conjunction with the project construction activities.

The LPA included in this Final EIS/EIR is a refinement of the center running alternatives with limited left turns (Build Alternatives 3 and 4 with Design Option B), as described in Chapters 2 and 10. The environmental consequences related to hazardous waste and materials under the LPA, with or without the Vallejo Northbound Station Variant, are identified as part of the analysis presented for the build alternatives in this chapter. There would be no difference in such impacts under the LPA compared with the impacts described for the build alternatives in this subsection.

4.8.1 | Regulatory Setting

Hazardous materials and hazardous wastes are regulated by many state and federal laws. These include not only specific statutes governing hazardous waste, but also a variety of laws regulating air and water quality, human health, and land use.

The primary federal laws regulating hazardous wastes/materials are the Resource Conservation and Recovery Act of 1976 (RCRA) and the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA). The purpose of CERCLA, often referred to as Superfund, is to clean up contaminated sites so that public health and welfare are not compromised. RCRA provides for “cradle to grave” regulation of hazardous wastes. Other federal laws include:

- Community Environmental Response Facilitation Act (CERFA) of 1992
- Clean Water Act (CWA)
- Clean Air Act (CAA)
- Safe Drinking Water Act
- Occupational Safety and Health Act (OSHA)
- Atomic Energy Act
- Toxic Substances Control Act (TSCA)
- Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA)

In addition to the acts listed above, E.O. 12088, Federal Compliance with Pollution Control, mandates that necessary actions be taken to prevent and control environmental pollution when federal activities or federal facilities are involved.

Hazardous waste in California is regulated primarily under the authority of the federal RCRA and the California Health and Safety Code. Other California laws that affect hazardous waste are specific to handling, storage, transportation, disposal, treatment, reduction, cleanup, and emergency planning.

Worker health and safety and public safety are key issues when dealing with hazardous materials that may affect human health and the environment. Proper disposal of hazardous materials is vital if it is disturbed during project construction.

RESOURCES

For more information on federal laws pertaining to hazardous wastes/materials, please see:

RCRA:

www.epa.gov/osw/laws-regs/regs-haz.htm

CERCLA :

epa.gov/superfund/policy/cercla.htm



The 1927 Bernard Maybeck Packard showroom (left, now British Motors) sits across Olive Street from the Art Moderne then-Cadillac dealership, built 10 years later. The proliferation of automobile-related sales and service businesses along Van Ness Avenue began in the 1920s and has contributed to contamination of the corridor.

4.8.2 | Affected Environment

4.8.2.1 | SETTING

As far back as 1869, Van Ness Avenue has been used as a transportation corridor. At that time, only scattered structures existed along the corridor. By 1884, Van Ness Avenue remained mostly undeveloped; however, by the early 1900s, more structures had been built along Van Ness Avenue. After the 1906 earthquake, commercial businesses moved out of downtown San Francisco and relocated to Van Ness Avenue. By the 1920s, the two most common uses on Van Ness Avenue were large apartment buildings and automotive businesses, including repair shops, gasoline stations, and showrooms. After Van Ness Avenue was designated as US 101, the number of automotive businesses continued to increase until a general decline began in the late 1970s (JRP, 2009). Currently, Van Ness Avenue is a bustling six-lane City arterial street that also serves as State Route 101, connecting freeway entrances and exits to south of the city with Lombard Street and the Golden Gate Bridge that provide access north of the city. The project corridor is fully developed with a mix of commercial, residential, institutional, and light industrial uses.

DEFINITIONS

Recognized Environmental Conditions (RECs): The presence or likely presence of hazardous substances or petroleum products on a property under conditions that indicate an existing release, a past release, or a material threat of a release of any hazardous substances or petroleum products into structures on the property or into the ground, groundwater, or surface water of the property.

4.8.2.2 | RECOGNIZED ENVIRONMENTAL CONCERNS FROM DATABASE LISTED SITES

An Initial Site Assessment (ISA) was prepared for the project alignment in 2009 by AGS, Inc. The ISA was prepared in general accordance with American Society for Testing and Materials (ASTM) E-1527-05 guidelines (AGS, 2009b). The ISA included review of standard environmental databases and local sources; a site reconnaissance; and review of historical Sanborn Maps. No interviews with property owners or agency officials were conducted. The ISA did not include detailed surveys of the project site or environmental sampling (i.e., soil, groundwater). Available information for the project alignment and surroundings was collected and evaluated to identify Recognized Environmental Conditions (RECs). According to the ASTM Standard Practice E 1527-05, the term REC means “the presence or likely presence of hazardous substances or petroleum products on a property under conditions that indicate an existing release, a past release, or a material threat of a release of any hazardous substances or petroleum products into structures on the property or into the ground, groundwater, or surface water of the property.” The term includes hazardous substances or petroleum products even under conditions in compliance with applicable laws. The term is not intended to include *de minimis* conditions that generally would not be the subject of an enforcement action if brought to the attention of appropriate governmental agencies.

The ISA prepared for the project alignment included review of standard environmental databases that includes listings of federal and state regulatory agencies that are responsible for recording incidents of spills, soil, and groundwater contamination; and transfer, storage, or disposal facilities that handle hazardous materials. The database search results are included as an appendix to the ISA prepared for the proposed project. In summary, 36 database listed sites were identified within 0.25-mile of the project alignment. With the exception of 5 sites, the remainder of the identified sites has been determined not to present a REC, as defined by the ASTM. The following key factors were evaluated in determining if a database listed site could pose a REC: type of hazardous material; whether groundwater or only soil was impacted; San Francisco Bay RWQCB case status, type, and date of remedial actions; distance from project alignment; topographic gradient; and groundwater depth. The 5 database listed sites are all leaking underground storage tanks (LUSTs). A summary of the file review identifying the name and location of each site, the type of hazardous material found, and action to date is presented in Table 4.8-1.

A potential for contaminated groundwater from the Former Mobil/BP Station (Map ID No. 39) and Chevron Station #90030 (Map ID No. 153) within the project footprint is assumed because these sites are located in close proximity to the project and remain open status, undergoing groundwater monitoring. The Former Mobil/BP Station (Map ID No. 39) has undergone soil and groundwater remediation, and it is undergoing groundwater monitoring.



The 5 database listed sites that present an REC all contain leaking underground storage tanks (LUSTs).

This site is considered an REC because the case is still open and in review by the San Francisco Bay RWQCB. In 2009, groundwater samples taken from wells located approximately 15 feet west of the Van Ness Avenue curb measured residual contamination. Petroleum products are the potential contaminants of concern. Groundwater depths measured in these wells indicate that the water table occurs between 18.7 and 21.6 feet below the surrounding pavement surface.

Table 4.8-1: Recognized Environmental Concerns for the Van Ness Avenue BRT Project – Database Listed Sites

DATABASE LISTED SITE	PROPERTY ADDRESS	MAP ID ¹	HAZARDOUS MATERIAL
Former Mobil/ BP Station #11184	2559 Van Ness Avenue	39	(LUST, updated April 8, 2008). Underground fuel tanks were found to be leaking gasoline and other hydrocarbon constituents. Contamination has involved soil and groundwater. Post-remedial action groundwater monitoring is ongoing. The case status is open and in review.
Chevron Station #90030	1501 Van Ness Avenue, Berkeley	153	(LUST, updated April 8, 2008). A leaking underground tank with soil contamination was discovered in 1987. Groundwater was reportedly not encountered to 50 feet bgs. The abatement method was to excavate and dispose of the contaminated soil and piping with some sampling and testing. Groundwater monitoring is ongoing. The case status is open, and the site is still being assessed.
St. Clare Hotel	1332 and 1334 Van Ness Avenue	164	(LUST, updated April 8, 2008). A heating oil fuel tank was found to be leaking in 1997, and the tank was repaired. The abatement method was to excavate and dispose of the contaminated soil, and remove the floating product from the water table. The case was closed in 1997.
Former Texaco Station	851 Van Ness Avenue	209	(LUST, updated April 8, 2008). A leaking underground gasoline tank with soil and groundwater contamination was discovered in 1987. The abatement method was to excavate and dispose of the contaminated soil, and remove the floating product from the water table. The case was closed in 1994.
San Francisco Unified School District	135 Van Ness Avenue	273	(LUST, updated April 8, 2008). A leaking underground heating oil fuel tank was identified in 1998. The abatement method was to excavate and dispose of the contaminated soil, and remove the floating product from the water table. The case was closed in 1999.

¹ Locations of database listed sites are mapped in Figure 4.8-1 by Map ID number.

SOURCE: AGS, 2009b.

Chevron Station #90030 (Map ID No. 153) has undergone soil remediation and is in the process of groundwater monitoring. The potential contaminant of concern is gasoline. The most recent regulatory review took place in 2009. This site is considered an REC because the case is still open and in review by the San Francisco Bay RWQCB.

The St. Clare Hotel (Map ID 164), Former Texaco Station (Map ID 209), and San Francisco Unified School District (Map ID 273) have undergone soil and groundwater abatement, and they are of *case closed* status. Nonetheless, these sites are considered potential RECs because although they are of *case closed* status, they were closed at a time when the cleanup criteria may not have been as strict as current requirements. For this reason, and because these sites are



The Chevron Station at 1501 Van Ness Avenue has undergone soil remediation and is in the process of groundwater monitoring. The potential contaminant of concern is gasoline.

located along Van Ness Avenue and in close proximity to the project alignment, the potential for contaminated groundwater within the project footprint from these sites is assumed.

4.8.2.3 | OTHER RECOGNIZED ENVIRONMENTAL CONCERNS

Due to the long history of heavy vehicular activity along Van Ness Avenue, the soil in the medians of the avenue may be contaminated with aerially deposited lead (ADL) from the exhaust of cars burning leaded gasoline. Elevated levels of ADL in the medians of Van Ness Avenue would be considered an REC.

Similarly, due to the long built-up, urban history of Van Ness Avenue, lead-based paint (LBP) may have been used on streetscape features within the project alignment, including OCS support poles/streetlights, traffic signal poles, traffic lane striping, and other pavement markings. These streetscape features may contain LBP that exceeds limits established under Title 22, CCR, and requires disposal in a Class I disposal site. Presence of LBP in streetscape features to be demolished, removed, or otherwise disturbed is considered a potential REC.

4.8.3 | Environmental Consequences

The most prevalent potential environmental risks to the project under each build alternative (including Design Option B), and the LPA, are associated with sites of existing or former automotive businesses, gasoline stations, and other sites that have had, or still have, underground storage tanks. As shown in the records search, of particular concern are any leaks from underground tanks of gasoline or diesel fuel, oil and grease, or other hydrocarbon compounds that may have contaminated the subsurface. Other potential environmental risks include the presence of ADL in median soils and LBP in streetscape structures. In addition, as discussed in Section 4.8.1.3 and shown in Figure 4.8-1, historic fill underlies part of the project alignment, and pockets of undocumented fill may be present throughout the project alignment. Undocumented historic fill could contain contamination and could pose an environmental risk to the project. In summary, the following are considered potential RECs for the project under each build alternative:

- Five database listed LUST sites
- ADL in median soils
- LBP in streetscape structures
- Undocumented fill, which could contain contamination.

Each build alternative (including Design Option B) and the LPA (with or without the Vallejo Northbound Station Variant) would be subject to the aforementioned potential RECs. Project earthwork activities are listed in Table 4.5-1, Anticipated Construction Areas and Excavation Depths, which summarizes anticipated excavation depths and soil disturbance areas. Construction earthwork activities are common to all of the proposed build alternatives, with the exception of relocation of the underground sewer pipeline. It is anticipated that the underground sewer pipeline would be replaced in its entirety under Build Alternative 3 while under Build Alternative 4 and the LPA only a portion of the sewer pipeline would be replaced.

The No Build Alternative would not involve work in the median; therefore, it would not be subject to ADL impacts, if present. The No Build Alternative would involve the following earthwork activities listed in Table 4.5-1 that would be subject to the remaining identified, potential RECs: curb-to-curb pavement resurfacing, OCS support pole/streetlight and conduit trench replacement, and signal pole replacement.

Earthwork activities proposed under the build alternatives and No Build Alternative could be subject to identified RECs; therefore, preconstruction mitigation measures are required, as described below.

Soil in the medians of the avenue may be contaminated with aerially deposited lead (ADL) from the exhaust of cars burning leaded gasoline, and lead-based paint (LBP) may have been used on streetscape features within the project alignment.

Historic fill underlies part of the project alignment, and pockets of undocumented fill may be present throughout the project alignment. Undocumented historic fill could contain contamination and could pose an environmental risk.



Figure 4.8-1: Recognized Environmental Conditions – Hazardous Materials Database Listed Sites

4.8.4 | Avoidance, Minimization, and/or Mitigation Measures

KEY FINDINGS

All build alternatives would have the following potential RECs:

- Five database-listed LUST sites
- ADL in median soils
- LBP in streetscape structures
- Undocumented fill that could contain contamination

After the preferred alternative has been selected and prior to project construction, mitigations for these potential RECs include:

- Field surveys of identified RECs
- Regulatory file review of each REC
- Testing of median soils for ADL
- Testing of paint for LBP

If any of the above tests indicate the presence of hazardous materials, further appropriate mitigation measures in compliance with all state and federal regulations will be undertaken to ensure safe treatment of materials during construction, including updates to the Construction Implementation Plan.

The following mitigation measures are proposed for implementation after preliminary engineering of the LPA, with or without inclusion of the Vallejo Northbound Station Variant, and prior to project construction to reduce or eliminate hazardous materials-related impacts:

M-HZ-1. Phase II review, or follow-up investigation, for identified RECS will be conducted prior to construction, including:

- Field surveys of identified RECs to verify the physical locations of the REC sites with respect to the preferred build alternative project components and proposed construction earthwork, and observe the current conditions of the sites.
- A regulatory file review for each identified REC to determine the current status of the sites and, if possible, the extent of the contamination.
- If the aforementioned field survey and file review reveal a likelihood of encountering contaminated soil or groundwater during project construction, then a subsurface exploration will be conducted within the areas proposed for construction earthwork activities. The subsurface investigation will be conducted within the project limits, adjacent to, or downgradient from the REC sites. If soil profiling reveals contaminant concentrations that meet the definition of hazardous materials, then the project contractor will be required to address the management of various hazardous materials and wastes in the Construction Implementation Plan, consistent with the federal and state of California requirements pertaining to hazardous materials and wastes management.

M-HZ-2. Soils in landscaped medians that will be disturbed by project activities will be tested for ADL according to applicable hazardous material testing guidelines. If the soil contains extractable lead concentrations that meet the definition of hazardous materials, then a Lead Compliance Plan to be approved by Caltrans will be required prior to the start of construction or soil-disturbance activities. If lead levels present in surface soils reach concentrations in excess of the hazardous waste threshold, then onsite stabilization or disposal at a Class 1 landfill may be required, which will be specified in the Lead Compliance Plan.

M-HZ-3. Paint used for traffic lane striping and on streetscape features, including the OCS support poles/streetlights, will be tested for LBP prior to demolition/removal to determine proper handling and disposal methods during project construction. If lead is detected, then appropriate procedures will be included in the Construction Implementation Plan to avoid contact with these materials or generation of dust or vapors.

4.9 Hydrology and Water Quality

This section summarizes the hydrology and water quality regulatory setting; affected environment; environmental consequences; and measures to avoid, mitigate, or compensate for long-term, permanent impacts to hydrologic resources and water quality as a result of the proposed Van Ness Avenue BRT project. Construction-phase impacts and avoidance measures are presented in Section 4.15.8. Documents reviewed in support of this study include the *Water Quality Technical Report: Van Ness Avenue Bus Rapid Transit Project* (Parsons, 2013b), *Storm Water Data Report for the Van Ness Avenue BRT Project* (Parsons, 2013d), and *San Francisco Better Streets Plan* (City of San Francisco, 2010).

The LPA included in this Final EIS/EIR is a refinement of the center-running alternatives with limited left turns (Build Alternatives 3 and 4 with Design Option B), as described in Chapters 2 and 10. The environmental consequences related to hydrology and water quality under the LPA, with or without the Vallejo Northbound Station Variant, are identified as part of the analysis presented for the build alternatives in this chapter. Since the LPA configuration is a variation of the configurations analyzed for the center-running alternatives in the Draft EIS/EIR, the LPA, with or without the Vallejo Northbound Station Variant, has slightly different results for the total disturbed soil area and pervious surface area; however, the overall impact findings with the LPA are consistent with the findings for Build Alternatives 3 and 4, as presented in this subsection.

4.9.1 | Regulatory Setting

An overview of the federal, state, and local regulations and policies relevant to hydrology and water quality impacts of the proposed project operation follows.

4.9.1.1 | CLEAN WATER ACT

The CWA of 1972 is the primary federal law governing water quality of the nation's waters. Under the enforcement authority of the United States Environmental Protection Agency (EPA), the CWA was enacted “to restore and maintain the chemical, physical, and biological integrity of the Nation’s waters.” The CWA gave EPA the authority to implement pollution control programs such as setting wastewater standards for industry. The act also set water quality standards for surface waters and established the National Pollutant Discharge Elimination System (NPDES) program to protect water quality. The control of pollutant discharges is established through NPDES permits that contain effluent limitations and standards.

Implementation and enforcement of the NPDES program was delegated to the state level and is conducted through the California State Water Resources Control Board (SWRCB) and the nine RWQCBs, as discussed below. These agencies also implement the Waste Discharge Requirements (WDR) Program, which regulates discharges of waste into land under the California Water Code, as well as discharges of waste into California waters that are outside federal jurisdiction, as defined under the CWA.

4.9.1.2 | EXECUTIVE ORDER 11988: FLOODPLAIN MANAGEMENT

E.O. 11988 (Floodplain Management), which was issued by President Carter in 1977, directs all federal agencies to refrain from conducting, supporting, or allowing actions in floodplains that may cause short- or long-term adverse impacts, unless it is the only practicable alternative. The FTA requirements for compliance are outlined in the US Department of Transportation Order 5650.2. To comply, the following must be analyzed:

RESOURCES

For more information on the Clean Water Act, visit: www.epa.gov/watertrain/cwa/.

To learn more about California Water Boards, visit: www.waterboards.ca.gov/.

To learn more about the Better Streets Plan, visit: www.sf-planning.org/ftp/BetterStreets/index.htm.

- Risks of the action
- Impacts on natural and beneficial floodplain values
- Degree to which the action provides direct or indirect support for development in the floodplain
- Measures to minimize floodplain impacts and to preserve/restore any beneficial floodplain values impacted by the project

4.9.1.3 | PORTER-COLOGNE WATER QUALITY CONTROL ACT OF 1969

The Porter-Cologne Water Quality Control Act of 1969 (Porter-Cologne Act) is the major water quality control law for California that authorizes the State to implement provisions of the CWA. The Porter-Cologne Act establishes a regulatory program to protect California’s water quality and beneficial uses. Under this act, the SWRCB provides policy guidance and review for the RWQCBs, and the RWQCBs implement and enforce provisions of the Act.

The RWQCBs regulate water quality under the Porter-Cologne Act through the regulatory standards and objectives set forth in water quality control plans (referred to as Basin Plans) prepared for each region. The Basin Plans identify existing and potential beneficial uses and provide numerical and narrative water quality objectives to protect those uses. The San Francisco Bay RWQCB adopted its Basin Plan in 1995 and most recently amended the plan in December 2011.

4.9.1.4 | SAN FRANCISCO REGIONAL WATER QUALITY CONTROL BOARD

The proposed project is located within the jurisdiction of the San Francisco RWQCB. All projects within the San Francisco Region are subject to the requirements of the San Francisco RWQCB, which is a State agency with regional jurisdiction covering most of the Bay Area counties. The function of the San Francisco RWQCB is to protect and improve the quality of the natural water resources in the region, including the San Francisco Bay and the Pacific Ocean, streams that flow into the bay and ocean, and groundwater throughout the region. The San Francisco RWQCB regulates waste discharges by issuing a variety of permits that place restrictions on waste discharges, such as concentrations of certain pollutants, or the amount of flow. Permits can also require dischargers to take certain kinds of actions (e.g., installing certain technologies to treat or contain wastes, or implementing practices to manage stormwater and urban runoff). Most of these permits are implemented through local agencies. For the proposed project, the responsible agency is SFPUC. For instance, prior to releasing any construction site water, including groundwater, into the City’s CSS, a batch discharge permit is required by SFPUC, as discussed in their Keep it on Site Guide (SFPUC, 2009).

Section 401 of the CWA stipulates that any action that requires a federal license or permit and that may result in a discharge of pollutants into waters of the U.S. also requires water quality certification. Locally, this program is administered by the San Francisco RWQCB and is designed to ensure that the discharge will comply with applicable federal and State effluent limitations and water quality standards. Certification applies to construction and operation. Because the project would not affect Waters of the U.S., a 401 Water Quality Certification would not be required.

As described above under Section 4.9.1.1, the control of pollutant discharges is established through NPDES permits issued by the RWQCBs which contain effluent limitations and standards. The NPDES Permit requires that all owners of land within the state with construction activities resulting in more than 1-acre of soil disturbance (e.g., clearing, grubbing, grading, trenching, stockpile, utility relocation, temporary haul roads) comply with the California SWRCB General Construction Permit. A NOI to construct must be filed with the RWQCB at least 30 days prior to any soil-disturbing activities, as the RWQCB has enforcement responsibility for the General Construction Permit. The purpose of the permit is to ensure that the landowners or project proponents: (1) eliminate or reduce non-stormwater discharges to storm drains and receiving waters; (2) develop and implement an SWPPP; (3) inspect the water pollution controls specified in the SWPPP; and (4) monitor

DEFINITION

WATERSHED: An area of land where all of the water that is under it—or drains off of it—goes into the same outlet.

REGULATION

Because the project would not affect Waters of the U.S., a 401 Water Quality Certification would not be required.

stormwater runoff from construction sites to ensure that the Best Management Practices (BMPs) specified in the SWPPP are effective. The General Construction Permit is also discussed in Construction Impacts Section 4.15.8 of this document.

4.9.1.5 | SAN FRANCISCO BETTER STREETS PLAN

The *San Francisco Better Streets Plan* sets forth guidelines for streetscape and pedestrian design as part of a larger planning effort to create a unified set of standards, guidelines, and implementation strategies for the City's pedestrian environment. The plan requires that permits be filed with the appropriate agency if any modifications to streetscape are anticipated as part of the project (City of San Francisco, 2013). The San Francisco Better Streets Plan recognizes that Van Ness Avenue moves significant volumes of people across town in a variety of travel modes and that it serves as a commercial and cultural hub that attracts people from across the city to shop, eat, and play. Chapter 6.2 of the plan is dedicated to stormwater management tools, recommending tools that infiltrate, retain, detain, or convey stormwater. These features include permeable paving, bioretention, flowthrough and infiltration planters, swales, rain gardens, channels and runnels, infiltration trenches, and infiltration boardwalks. A separate permit and approval process has not been developed by the City for the San Francisco Better Streets Plan. The plan has been adopted and compliance with the plan design objectives will be considered through the permits and approval processes that apply to any project that would modify the streetscape.

4.9.2 | Affected Environment

4.9.2.1 | HYDROLOGIC SETTING

The northern part of the project area is located in the Central San Francisco Bay Watershed, and the southern part of the project is located in the South Bay Watershed, as shown in Figure 4.9-1. In general, runoff flows through the City's drainage system, which drains northerly and easterly to the Bay. There are currently no natural surface water bodies, wetlands, or streams in the project area. Historically, there were small creeks flowing to the San Francisco Bay, but most of the creeks were filled during development of the city. The project area is almost entirely covered with impervious surfaces, with the exception of the existing landscaped center median and some tree and landscape plantings along the sidewalks of Van Ness Avenue. Freshwater drainage in San Francisco has been almost entirely diverted to the City's combined sewer and stormwater system, referred to as the Combined Sewer System or CSS, which collects and transports sanitary sewage and stormwater runoff in the same set of pipes. The stormwater drainage is collected by a system of 23,000 catch basins located throughout the city and conveyed through the CSS, treated, and eventually discharged through outfalls and overflow structures along the San Francisco Bay shoreline. Throughout the project limits, stormwater generally flows to curbside storm drain inlets that convey runoff to the CSS.

Water treatment plants on the east and west sides of the city provide full secondary treatment for all dry-weather flow, and storage and discharge structures provide the equivalent of primary treatment for wet-weather flows when the treatment capacity of the water treatment plants is reached. Flows from these structures are discharged through CSS discharge structures located along the city's bayside and ocean waterfronts. Wet-weather flows are intermittent throughout the rainy season, and CSS discharges vary in nature and duration, depending largely on the intensity of individual rainstorms. The combined flows are conveyed to three treatment facilities located in the city: the Oceanside Wastewater Treatment Plant, the Southeast Wastewater Treatment Plant (SEWTP), and the North Point Wet Weather Facility; the latter operates only when heavy rains occur. Runoff from the project site flows through the city's drainage system, which drains northerly and easterly toward the Bay, as shown in Figure 4.9-2, and is treated in the North Point Wet Weather Facility or SEWTP before discharging to the San Francisco Bay; therefore, the receiving

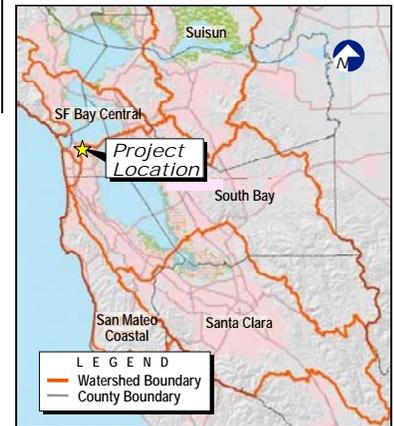


Figure 4.9-1:
Hydrologic Setting

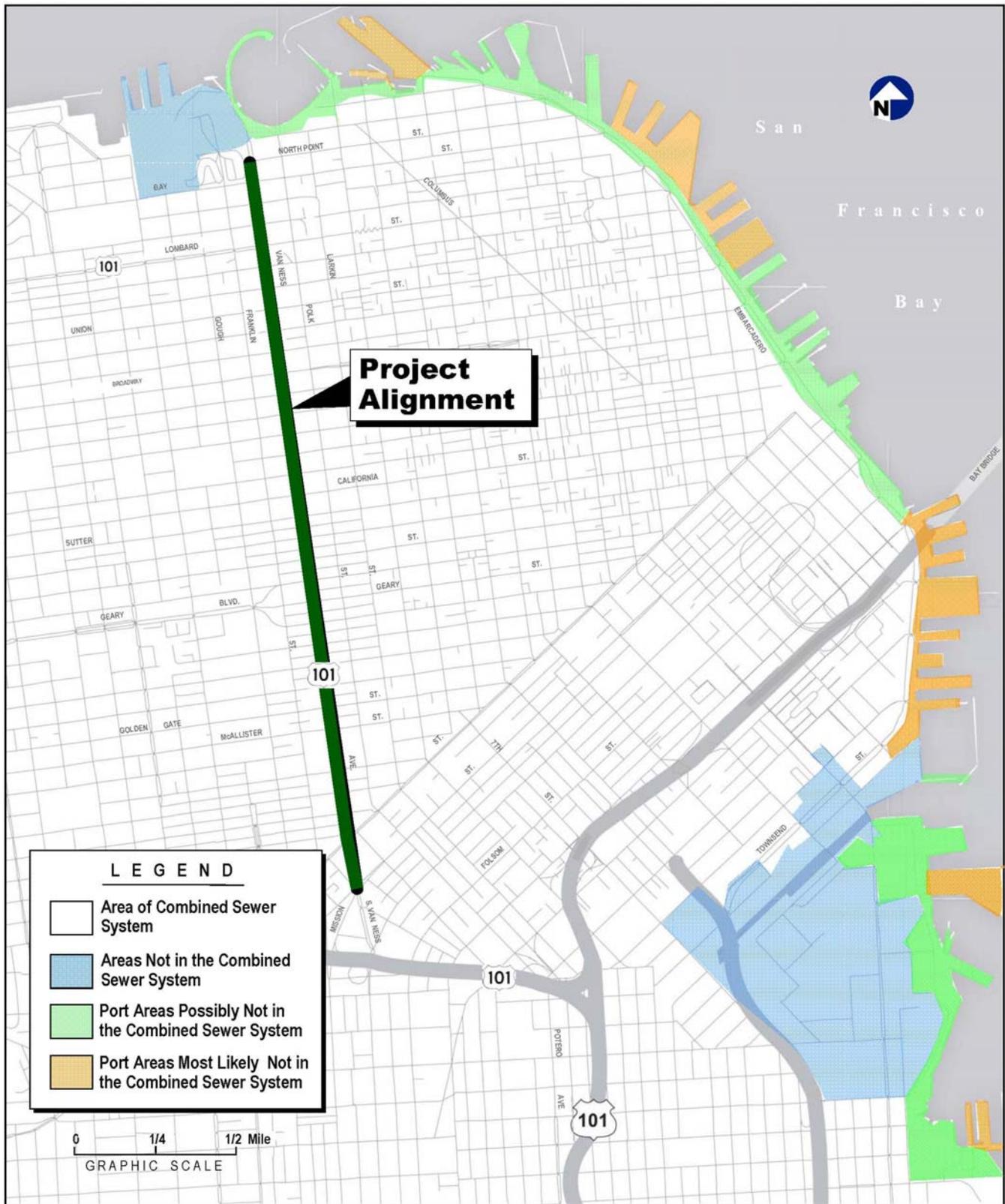


Figure 4.9-2: San Francisco Sewer System Map

water for the proposed project is the San Francisco Bay. Table 4.9-1 shows the pollutants for which Central and South San Francisco Bay is designated as impaired under Section 303(d) of the CWA.

Table 4.9-1: Federal 303(d) List of Impairments for Central and South San Francisco Bay

POLLUTANT STRESSOR	POTENTIAL SOURCE	CURRENT STATUS
Chlordane	Nonpoint source	TMDL required
DDT	Nonpoint source	TMDL required
Dieldrin	Nonpoint source	TMDL required
Dioxin compounds	Atmospheric deposition	TMDL required
Exotic species	Ballast water	TMDL required
Furan compounds	Atmospheric deposition	TMDL required
Mercury	Atmospheric deposition, industrial point sources, municipal point sources, natural sources, nonpoint source, resource extraction	Being addressed by EPA-approved TMDLs
PCBs	Unknown nonpoint source	TMDL required
Selenium	Agriculture, exotic species, industrial point sources, and natural sources	TMDL required

Note:
 TMDL – total maximum daily load; PCBs – polychlorinated biphenyls

The San Francisco Bay Basin Plan has identified the following beneficial uses for Central San Francisco Bay: industrial service and process supply, commercial fishing, shellfish harvesting, estuarine habitat, fish migration, rare and endangered species habitat, fish spawning, wildlife habitat, contact recreation, non-contact recreation, and navigation. The San Francisco Bay Basin Plan has identified the following beneficial uses for South San Francisco Bay: industrial service supply, commercial fishing, shellfish harvesting, estuarine habitat, fish migration, rare and endangered species habitat, fish spawning, wildlife habitat, contact recreation, non-contact recreation, and navigation.

4.9.2.2 | FLOODPLAINS

The terrain in the project area of San Francisco is characteristically hilly, and the Van Ness Avenue BRT project corridor crosses near the low point of one east-west ridgeline that connects Nob Hill to the east with Pacific Heights to the west. Farther north, the project corridor crosses near the western toe of Russian Hill.

No major streams exist in the project vicinity, and the project site is not mapped as a flood hazard zone by the Federal Emergency Management Agency (FEMA) or any local planning maps. Lower-lying portions of the project area could be subject to localized flooding that can occur throughout the city during periods of intense precipitation, when storm drains become clogged with debris in low-lying areas.

4.9.2.3 | GROUNDWATER SETTING

The north portion of the project site is located within the Marina Groundwater Basin, and the south portion of the project site is located within the Downtown San Francisco Basin, as shown in Figure 4.9-3. Groundwater recharge to the groundwater basins occurs from infiltration of rainfall, landscape irrigation, and leakage of water and sewer pipes. None of the geologic formations along the project corridor are considered useful aquifers due to poor overall water quality and high concentrations of undesirable minerals (AGS, 2009b).

DEFINITIONS

PERMEABLE PAVING: An alternative to standard paving to help reduce stormwater runoff volumes by reducing impervious surface and providing temporary storage and/or groundwater recharge through infiltration.

FLOW-THROUGH AND INFILTRATION PLANTERS: Stormwater facilities that double as landscape features but are designed to combine stormwater runoff control and treatment with aesthetic landscaping and architectural detail.

SWALES: Long, narrow landscaped depressions primarily used to collect and convey stormwater and improve water quality.

RAIN GARDENS: Landscaped detention or bioretention features in a street designed to provide initial treatment of stormwater runoff.

CHANNELS AND RUNNELS: Concrete- or stone-lined pathways used to convey rainwater runoff along the surface to other stormwater control measures or the city collection system.

INFILTRATION TRENCHES: Shallow subsurface linear stormwater facilities, typically 2 to 5 feet deep and installed in relatively permeable soils to provide onsite stormwater retention by collecting and recharging stormwater runoff into the ground.

INFILTRATION BOARDWALKS: Raised boardwalks placed over exposed drainage rock or amended engineered soils to allow stormwater to pass beneath a walking surface for temporary storage or infiltration into the soils below.

Source: Better Streets Plan

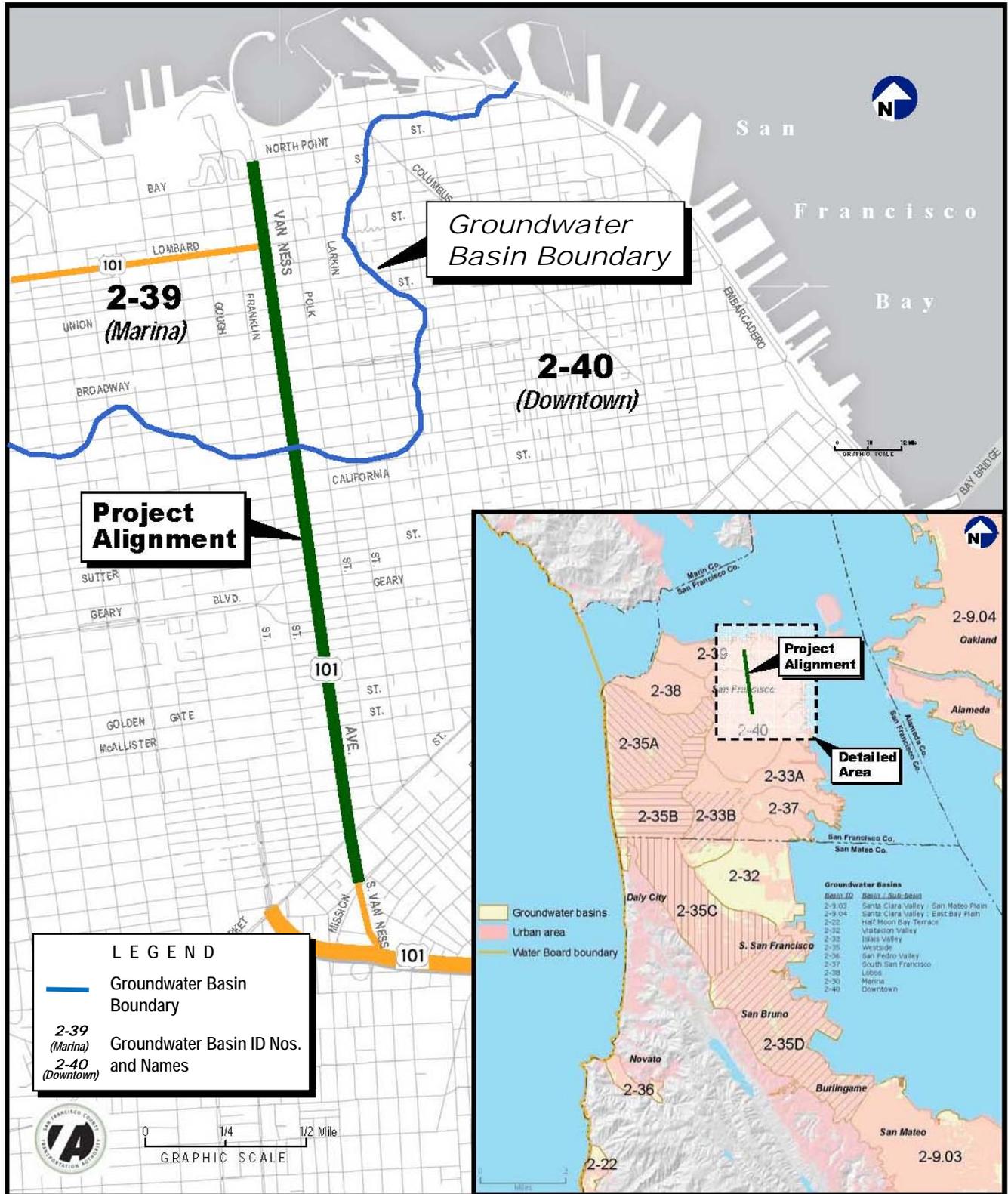


Figure 4.9-3: Regional Groundwater Basin Map

Geologic mapping indicates that the groundwater table occurs less than 20 feet bgs in most of the lower-lying areas along the project corridor where the ground elevation is less than approximately 150 feet amsl. Available monitoring well data reviewed as part of a geologic study performed for the proposed project indicates depth to groundwater ranging from 5 to 20 feet bgs in two areas: (1) along Van Ness Avenue from Mission Street northward to the vicinity of the Geary Boulevard intersection; and (2) north of the Broadway intersection to Lombard Street (AGS, 2009b). Between Geary Boulevard and the Broadway intersection, the monitoring well data indicates that either no groundwater was encountered or that depths to groundwater exceed 20 feet. In general, reported groundwater levels are expected to vary seasonally and annually based on rainfall patterns, variations in the topography distribution of impervious surfaces, and the pattern of groundwater withdrawal or localized pumping.

Groundwater flow in the Marina Groundwater Basin is generally to the north. Groundwater flow in the Downtown San Francisco Basin varies with the topography. The Environmental Database Reports (EDR) Geocheck™ Report prepared for the proposed project indicates that groundwater flow in the vicinity of Mission and Market streets is to the east (EDR, 2008). On the south-facing hillside north of the Civic Center, the flow is generally to the south or southeast, and on the north-facing hillside north of Clay Street, the flow is generally to the northwest.

The beneficial use of groundwater for the City includes municipal and domestic water supply, industrial water supply, industrial process supply, agricultural water supply, groundwater recharge, and freshwater replenishment to surface waters.

4.9.3 | Environmental Consequences

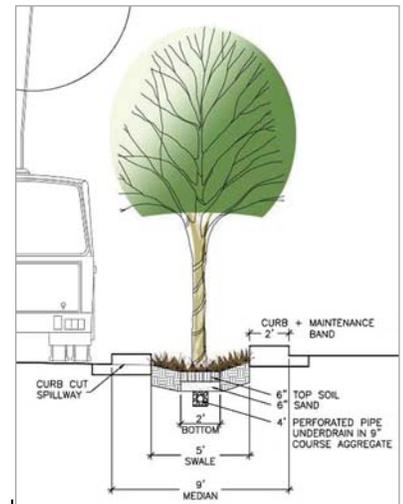
Under the rules and regulations of CEQA and NEPA, the proposed project would have significant and adverse hydrology and water quality impacts if it would result in any of the following:

- Violate any water quality standards or WDRs (for construction only);
- Substantially degrade water quality;
- 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;
- Substantially alter the existing drainage pattern of the area in a manner that would result in substantial erosion, sedimentation, or flooding within or downstream of the proposed project area;
- Create or contribute runoff that would exceed the capacity of existing or planned stormwater drainage systems; or
- Place structures within a 100-year flood hazard area that would expose people or structures to significant risk of loss, injury, or death.

4.9.3.1 | HYDROLOGIC IMPACTS

The project area is almost entirely covered with impervious surfaces, with the exception of the existing landscaped center median and some tree and landscape plantings along the sidewalks of Van Ness Avenue. Under the build alternatives, including the LPA, with or without the Vallejo Northbound Station Variant, stormwater would continue to flow towards the curbside storm drains; under Build Alternative 3, additional curb inlets at the median islands would capture surface runoff from the transitway.

City policy, as proposed in the *Better Streets Plan*, is to reduce the quantity of stormwater runoff directly into the CSS. Opportunities to reduce stormwater runoff into the CSS – and improve the quality of runoff at the same time – as presented in the *Better Streets Plan* will be investigated further during 30 percent design engineering of the preferred alternative. Each of the build alternatives presents the opportunity to incorporate some such features, though



Under Build Alternative 3, vegetated swales could potentially be incorporated in one of the center medians to capture stormwater runoff from the transitway and could potentially infiltrate some of the runoff into the ground.

feasibility still needs to be determined. For instance, under Build Alternative 3, vegetated swales could potentially be incorporated in one of the center medians. The swale (i.e., long narrow landscaped depressions primarily used to collect and convey stormwater and improve water quality) would capture runoff from the transitway and could potentially infiltrate some of the runoff into the ground. This would result in beneficial effects to groundwater recharge and reduced storm flows to the CSS. Incorporation of the vegetated swale would be considered in project final design.

Permeable paving, infiltration planters, swales, and rain gardens are *Better Streets Plan* concepts that will be considered. Under the build alternatives, runoff from station platforms and canopy structures could be directed to the landscaped median or platform planters, where feasible. Stormwater drainage and facilities would remain as described above with implementation of Design Option B under Build Alternatives 3 and 4, as well as the LPA.

The build alternatives, including the LPA, with or without the Vallejo Northbound Station Variant, would add, modify, and replace landscaping in the project corridor, each resulting in a minor, net decrease in impervious surface area and corresponding net increase in pervious surface area in the corridor. Table 4.9-2 provides the acreages of impervious and pervious surface area in the corridor for both the existing condition and with-project condition. Under the No Build Alternative, it is anticipated that pervious surface area would increase with implementation of streetscape improvements proposed in the *Better Streets Plan*, although no such improvements have been funded or scheduled for implementation at this time. For this reason, it is assumed that under the No Build Alternative no changes to stormwater facilities, drainage, or runoff volumes would occur, and this alternative is not included in Table 4.9-2.

Table 4.9-2 shows the total disturbed soil area (DSA)⁸⁶ for each build alternative, including Design Option B. As shown in Table 4.9-2, the introduction of additional landscaping under Build Alternative 2 would provide an approximate overall increase of 0.6-acre in pervious surface area over existing conditions within the project area. Similarly, Build Alternative 3 would result in an approximate increase of 0.1-acre of pervious surface area, and Build Alternative 4 would result in an approximate 0.5-acre increase in pervious surface area throughout the project limits. Implementation of Design Option B would involve removal of the existing left-turn pockets, which may allow slightly wider medians at these locations, resulting in slightly greater pervious surface area. The net increase of pervious surface area under the LPA (not shown in Table 4.9-2) would be similar to Build Alternative 3 (approximately 0.2-acre). The net increase of pervious surface area under the Vallejo Northbound Station Variant would be slightly greater than the LPA without the variant; however, it remains approximately 0.2-acre. The disturbed soil area (DSA) for the LPA would be 5.8 acres. Because there is no net increase in impervious area and the proposed project would not substantially increase impervious surface area in any one location that would significantly increase flows to a storm drain, the proposed improvements would not adversely impact the flow rate or volume entering the CSS.

There is no net increase in impervious area under any of the build alternatives, and the proposed project would not substantially increase impervious surface area in any one location that would significantly increase flows to a storm drain.

⁸⁶ The DSA includes all construction activity that disturbs native soil and fill within the project limits. This does not include routine activity to maintain existing highways (i.e., facilities), preventive maintenance to maintain highway structures, or existing functions. Asphalt concrete (AC), Portland cement concrete, aggregate base, shoulder backing, bridge decks, sidewalks, buildings, road side ditches, gutters, dikes, and culverts are all part of existing highway facilities. Construction activity in the context of NPDES stormwater and CWA is defined by EPA as “commencement of construction” or the initial disturbance of soils associated with clearing, grading, or excavating activities or other construction activities (63 CFR 7913). This does not include routine maintenance of highway facilities.” For example an AC overlay with a thin lift of shoulder backing on top of an existing facility is routine maintenance and has no DSA.

Table 4.9-2: Existing and Proposed Approximate Impervious Surface Area in the Project Corridor*

	TOTAL PROJECT AREA ² (AC)	TOTAL DSA ³ (AC)	EXISTING IMPERVIOUS (AC)	EXISTING PERVIOUS (AC)	WITH PROJECT IMPERVIOUS (AC)	WITH PROJECT PERVIOUS (AC)
Build Alternative 2	29.9	2.9	29.2	0.7	28.5	1.3
Build Alternative 3	29.9	8.1	29.2	0.7	29.1	0.8
Build Alternative 3 with Design Option B	29.9	8.4	29.2	0.7	29.1	0.8
Build Alternative 4	29.9	3.8	29.2	0.7	28.7	1.2
Build Alternative 4 with Design Option B	29.9	3.8	29.2	0.7	28.6	1.3

AC = Acres

* Acreages are approximated and may be subject to slight change as project design progresses.

In summary, the build alternatives, including the LPA, with or without the Vallejo Northbound Station Variant, would result in an approximate 0.1- to 0.6-acre increase of pervious surface (i.e., a 0.1- to 0.6-acre decrease in impervious surface) area throughout the project limits over the existing condition, depending on the alternative. These increases in pervious surface area are primarily due to the establishment of landscaped medians where existing medians are impervious surface (e.g., left-turn pocket locations that are filled in with new planted median). In addition, each build alternative, including the LPA, presents an opportunity to reduce storm flows into the CSS and improve groundwater recharge through *Better Streets Plan* concepts; however, at this stage of design, it is unclear which concepts are feasible, or where, under each alternative (including the LPA).

It is anticipated that Build Alternative 3 would offer the greatest opportunity to capture and potentially infiltrate storm runoff and reduce flows if a vegetated swale in the center median is incorporated into project design. Implementation of Design Option B under Build Alternative 3 may provide a slightly greater opportunity because it would offer larger landscaped median areas in locations where left-turn pockets are removed. As project design progresses, possibilities for including stormwater management tools specified in the *San Francisco Better Streets Plan* will be investigated. Rain gardens and infiltration plantings may be feasible for incorporation into design of the median and station platforms. Overall, the proposed project would result in beneficial impacts to storm drainage facilities along Van Ness Avenue.

Because each of the build alternatives, including the LPA, with or without the Vallejo Northbound Station Variant, would result in a reduction of stormwater runoff, the capacity of the existing or planned stormwater drainage system would not be exceeded, and the existing drainage pattern of the area would not be altered; therefore, there would be no adverse impacts to hydrology as a result of the proposed project.

The project and vicinity are not located within a floodplain or other known flood hazard zone; therefore, the proposed project is not subject to flood hazards and would not alter streams or other waterways. The No Build Alternative, build alternatives, and LPA would not result in flood hazards, although Van Ness Avenue may be subject to localized flooding when storm drains in low-lying areas become clogged during storm events. Section 4.9.4

describes avoidance and mitigation measures intended to prevent clogging of storm drains that capture runoff from the proposed bus platforms. Because the proposed project would not place structures within a 100-year flood hazard area, there would be no adverse floodplain impacts as a result of the proposed project.

4.9.3.2 | WATER QUALITY IMPACTS

The greatest potential for impacts to water quality from the proposed project would be during construction. With implementation of a Storm Water Pollution Prevention Plan (SWPPP) that identifies Construction Site BMPs that are described in the Caltrans Storm Water Quality Handbooks, Construction Site BMP Manual (Caltrans 2003), no water quality standards or WDRs would be violated; therefore, construction of the proposed project is not expected to have an adverse impact to the water quality of the San Francisco Bay. Construction-phase hydrology and water quality impacts are presented in Section 4.15.8, including compliance with the General Construction Permit.

The removal and pruning of trees in the median of Van Ness Avenue would result in the loss of tree canopy, as described in Sections 4.2 and 4.13. Tree canopies provide water quality benefits; thus there would be a period of reduced water quality until the new tree plantings grow to mature canopies. However, this impact would not be substantial due in part to an overall increase in trees in the corridor, and because this impact would subside over time as replacement trees mature. Moreover, the project alternatives, including the LPA, with or without the Vallejo Northbound Station Variant, would overall reduce impervious surface area in the corridor. The decrease in impervious area from the BRT build alternatives and resultant decrease in runoff could be considered a water quality improvement because there would be less runoff that could potentially come in contact with pollutants such as suspended solids, organic and inorganic compounds, oils and grease, and miscellaneous waste from the roadways, BRT stations, and landscaping. Additionally, because all runoff generated from within the project limits is conveyed to the CSS and eventually treated, no water quality standards or WDRs would be violated as a result of the proposed project; therefore, operation of the Van Ness Avenue BRT project is not expected to have an adverse impact to the water quality of the San Francisco Bay. Consequently, there would be no impact to the beneficial uses identified for either South or Central San Francisco Bay.

It should be noted that the overuse of herbicides and fertilizers from landscaping could increase levels of nutrients and pesticides in the surface water runoff that is conveyed to the CSS. Section 4.9.4 describes avoidance and mitigation measures intended to reduce the discharge of pollutants from the storm drain system during and after construction. With implementation of avoidance and mitigation measures specified in Section 4.9.4, operation of the proposed project would not result in adverse water quality impacts.

4.9.3.3 | GROUNDWATER IMPACTS

Most of the estimated excavation depths associated with the build alternatives, including the LPA, with or without the Vallejo Northbound Station Variant, would be relatively shallow. The deepest excavations would most likely be at the locations where new OCS support poles/streetlights are proposed at intersections where excavation would be as deep as 16 feet bgs. According to the soils information obtained for the proposed project, groundwater was not encountered within 16 feet bgs for the entirety of the project limits. Groundwater supplies would not be depleted, and there would be no net deficit in aquifer volume.

4.9.4 | Avoidance, Minimization, and/or Mitigation Measures

Impact avoidance, minimization, and mitigation measures for hydrology and water quality to be implemented during project construction are discussed in Section 4.15.8. Stormwater BMPs would be incorporated into project design and operations to the maximum extent practicable to avoid water quality impacts. Implementation of the following improvement

KEY FINDINGS

The No Build Alternative and build alternatives, including the LPA, would not result in flood hazards.

The build alternatives, including the LPA, would result in beneficial impacts to storm drainage facilities along Van Ness Avenue. With implementation of avoidance and improvement measures specified in Section 4.9.4, operation of the proposed project would not result in significant water quality impacts.

Stormwater BMPs would be incorporated into project design and operations to the maximum extent practicable.

measures and standard practices under each build alternative and design option scenario would avoid adverse impacts to stormwater quality and facilities:

IM-HY-1. Landscape areas provided by the project will be designed to minimize and reduce total runoff. The overuse of water and/or fertilizers on landscaped areas will be avoided.

IM-HY-2. Opportunities to incorporate stormwater management tools set forth in the *San Francisco Better Streets Plan* will be investigated for implementation as project design progresses. Streetscape geometry, topography, soil type and compaction, groundwater depth, subsurface utility locations, building laterals, maintenance costs and safety, and pedestrian accessibility will be major considerations in determining the feasibility of implementing stormwater management tools. Permeable paving, infiltration planters, swales, and rain gardens will be considered.

IM-HY-3. In compliance with the City Integrated Pest Management Policy (City Municipal Code, Section 300), prevention and non-chemical control methods will be employed in maintaining landscaping in the Van Ness Avenue corridor, including monitoring for pests before treating, and using the least-hazardous chemical pesticides, herbicides, and fertilizers only when needed and as a last resort.

IM-HY-4. Proposed BRT stations will be equipped with trash receptacles to minimize the miscellaneous waste that may enter the storm drain system and clog storm drains or release pollutants.

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4.10 Air Quality

This section summarizes the air quality regulatory setting; affected environment; environmental consequences; and measures to avoid, mitigate, or compensate for long-term, permanent impacts to the air quality as a result of the proposed Van Ness Avenue BRT Project. Construction-phase impacts and avoidance measures are presented in Section 4.15.10. Documents prepared in support of this section include the *Van Ness BRT Project Air Quality Impact Report and Addendum* (TAHA, 2013).

The LPA included in this Final EIS/EIR is a refinement of the center running alternatives with limited left turns (Build Alternatives 3 and 4 with Design Option B), as described in Chapters 2 and 10. The air quality effects of the LPA are identified as part of the analysis presented for the build alternatives in this chapter. There would be no substantive difference in operational air quality impacts under the LPA compared with the impacts described for Build Alternatives 3 and 4 with Design Option B in this subsection 4.10.3.

4.10.1 | Regulatory Setting

An overview of the federal, state, and local regulations and policies relevant to air quality impacts of proposed project operation follows.

4.10.1.1 | FEDERAL, STATE, AND LOCAL GOVERNING BODIES AND REGULATIONS

Air quality in the United States is governed by the federal Clean Air Act (CAA). In addition to being subject to the requirements of the CAA, air quality in California is also governed by more stringent regulations under the California Clean Air Act (CCAA). At the federal level, the CAA is administered by EPA. In California, the CCAA is administered by the California Air Resources Board (CARB) at the state level and by Air Quality Management Districts at the regional and local levels. The proposed project is located within the Bay Area Air Quality Management District (BAAQMD).

EPA is responsible for establishing the National Ambient Air Quality Standards (NAAQS), which are required under the 1977 CAA and subsequent amendments. EPA regulates emission sources that are under the exclusive authority of the federal government and establishes various emission standards, including those for vehicles sold in states other than California. Automobiles sold in California must meet the stricter emission standards established by CARB.

CARB, which became part of the California Environmental Protection Agency (CalEPA) in 1991, is responsible for meeting the state requirements of the federal CAA, administering the CCAA, and establishing the California Ambient Air Quality Standards (CAAQS). The CCAA requires all air districts in the state to endeavor to achieve and maintain the CAAQS, which are generally more stringent than the corresponding federal standards.

The BAAQMD is primarily responsible for assuring that the national and state ambient air quality standards are attained in the San Francisco Bay Area. The BAAQMD has jurisdiction over an approximately 5,600-square-mile area, commonly referred to as the Bay Area Air Basin (BAAB). The District's boundary encompasses most of the nine Bay Area counties: Alameda County, Contra Costa County, Marin County, San Francisco County, San Mateo County, Santa Clara County, Napa County, southwestern Solano County, and southern Sonoma County. The discussion of project air quality setting and effects refers primarily to conditions within the BAAB, which from both the federal and state regulatory perspectives is considered one geographic entity.



Air quality in the United States is governed by the federal Clean Air Act (CAA). Air quality in California is also governed by more stringent regulations under the California Clean Air Act (CCAA).

4.10.1.2 | TOXIC AIR CONTAMINANT REGULATIONS

Toxic air contaminants (TACs), or in federal parlance under the federal CAA, hazardous air pollutants (HAPs), are pollutants that result in an increase in mortality, a serious illness, or pose a present or potential hazard to human health. It is important to understand that TACs are not considered criteria air pollutants; thus, they are not specifically addressed through the setting of ambient air quality standards. Instead, EPA and CARB regulate HAPs and TACs, respectively, through statutes and regulations that generally require the use of the maximum or best available control technology (MACT and BACT) to limit emissions. These, in conjunction with additional rules set forth by BAAQMD, establish the regulatory framework for TACs.

Federal Hazardous Air Pollutant Program. Title III of the federal Clean Air Act Amendments (CAAA) requires EPA to promulgate national emissions standards for hazardous air pollutants (NESHAPs). The NESHAP may differ for major sources compared to area sources of HAPs (major sources are defined as stationary sources with potential to emit more than 10 tons per year [TPY] of any HAP or more than 25 TPY of any combination of HAPs; all other sources are considered area sources).

Mobile Source Air Toxics (MSAT). EPA issued a Final Rule on Controlling Emissions of HAPs from Mobile Sources (66 *Federal Register* [FR] 17229, March 29, 2001). This rule was issued under the authority in Section 202 of the CAA. In its rule, EPA examined the impacts of existing and newly promulgated mobile source control programs, including the following EPA standards and programs: reformulated gasoline program; national low-emission vehicle standards; Tier 2 motor vehicle emissions standards and gasoline sulfur control requirements; proposed heavy-duty engine and vehicle standards; and on-highway diesel fuel sulfur control requirements.

EPA concluded that no further motor vehicle emissions standards or fuel standards were necessary to further control MSATs. The agency is preparing another rule under authority of CAA Section 202(l) that will address these issues and could make adjustments to the full 21 and the primary 6 MSATs. FHWA published project-level MSAT assessment guidance in February 2006 as an air quality analysis tool for transportation projects.

State Toxic Air Contaminant Programs. California regulates TACs primarily through the Tanner Air Toxics Act (Assembly Bill [AB] 1807) and the Air Toxics Hot Spots Information and Assessment Act of 1987 (AB 2588). The Tanner Act sets forth a formal procedure for CARB to designate substances as TACs. This includes research, public participation, and scientific peer review before CARB can designate a substance as a TAC. To date, CARB has identified more than 21 TACs, and adopted EPA's list of HAPs as TACs. Most recently, diesel exhaust particulate was added to the CARB list of TACs. Once a TAC is identified, CARB then adopts an Airborne Toxics Control Measure for sources that emit that particular TAC. If there is a safe threshold for a substance at which there is no toxic effect, the control measure must reduce exposure below that threshold. If there is no safe threshold, the measure must incorporate toxic best available control technology (TBACT) to minimize emissions. None of the TACs identified by CARB have a safe threshold.

Bay Area Air Quality Management District. The BAAQMD has regulated TACs since the 1980s. At the local level, air pollution control or management districts may adopt and enforce CARB's control measures. Under BAAQMD Regulation 2-1 (General Permit Requirements), Regulation 2-2 (New Source Review), and Regulation 2-5 (New Source Review), all nonexempt sources that possess the potential to emit TACs are required to obtain permits from BAAQMD. Permits may be granted to these operations if they are constructed and operated in accordance with applicable regulations, including new source review standards and air toxics control measures. The BAAQMD limits emissions and public exposure to TACs through many programs. The BAAQMD prioritizes TAC-emitting stationary sources based on the quantity and toxicity of the TAC emissions and the proximity of the facilities to sensitive receptors. Naturally occurring asbestos (NOA) was identified as a TAC in 1986 by CARB. BAAQMD's NOA program requires that the applicable notification forms from the Air District's website be submitted by qualifying operations in accordance with the

procedures detailed in the Air Toxics Control Measures (ATCM) Inspection Guidelines Policies and Procedures. The Lead Agency shall reference BAAQMD's ATCM Policies and Procedures to determine which NOA Notification Form is applicable to the proposed project (NOA Notification Forms). The ATCM requires regulated operations engaged in road construction and maintenance activities, construction and grading operations, and quarrying and surface mining operations in areas where NOA is likely to be found, to employ the best available dust mitigation measures to reduce and control dust emissions.

In addition, the BAAQMD has adopted Regulation 11, Rule 2, which addresses asbestos demolition, renovation, manufacturing, and standards for asbestos containing serpentine. The purpose of Regulation 11, Rule 2, is to control emissions of asbestos to the atmosphere during demolition, renovation, milling, and manufacturing and establish appropriate waste disposal procedures.

4.10.1.3 | FEDERAL GREENHOUSE GAS REGULATIONS

As the federal agency responsible for implementing the CAA, EPA also has responsibility for regulating GHG emissions.

Mandatory Greenhouse Gas Reporting Rule. On September 22, 2009, EPA issued a final rule for mandatory reporting of GHGs from large GHG emissions sources in the United States. In general, this national reporting requirement will provide EPA with accurate and timely GHG emissions data from facilities that emit 25,000 metric tons or more of carbon dioxide (CO₂) per year.

Proposed Endangerment and Cause or Contribute Findings for Greenhouse Gases under the Clean Air Act. On April 23, 2009, EPA published their Proposed Endangerment and Cause or Contribute Findings for Greenhouse Gases under the CAA (Endangerment Finding) in the *Federal Register*. The Endangerment Finding is based on Section 202(a) of the CAA, which states that the Administrator (of EPA) should regulate and develop standards for “emission[s] of air pollution from any class of classes of new motor vehicles or new motor vehicle engines, which in [its] judgment cause, or contribute to, air pollution which may reasonably be anticipated to endanger public health or welfare.”

4.10.1.4 | STATE GREENHOUSE GAS REGULATIONS

AB 1493 (2002). AB 1493 requires that CARB develop and adopt, by January 1, 2005, regulations that achieve “the maximum feasible reduction of GHGs emitted by passenger vehicles and light-duty trucks and other vehicles determined by CARB to be vehicles whose primary use is noncommercial personal transportation in the State.” To meet the requirements of AB 1493, in 2004 CARB approved amendments to the CCR adding GHG emissions standards to California’s existing standards for motor vehicle emissions. Amendments to CCR Title 13, Sections 1900 and 1961 (13 CCR 1900, 1961), and adoption of Section 1961.1 (13 CCR 1961.1) require automobile manufacturers to meet fleet-average GHG emissions limits for all passenger cars, light-duty trucks within various weight criteria, and medium-duty passenger vehicle weight classes (i.e., any medium-duty vehicle with a gross vehicle weight rating less than 10,000 pounds that is designed primarily for the transportation of persons), beginning with the 2009 model year.

AB 32 (2006), California Global Warming Solutions Act. AB 32 (Chapter 488, Statutes of 2006), the California Global Warming Solutions Act of 2006, enacted Sections 38500–38599 of the California Health and Safety Code. AB 32 requires the reduction of statewide GHG emissions to 1990 levels by 2020. The required reduction will be accomplished through an enforceable statewide cap on GHG emissions. To effectively implement the statewide cap on GHG emissions, AB 32 directs CARB to develop and implement regulations that reduce statewide GHG emissions generated by stationary sources. Specific actions required of CARB under AB 32 include adoption of a quantified cap on GHG emissions that represent 1990 emissions levels along with disclosing how the cap was quantified, institution of a schedule to meet the emissions cap, and development of tracking, reporting, and

DEFINITION

TOXIC AIR CONTAMINANTS (TACs): Pollutants that result in an increase in mortality, a serious illness, or pose a present or potential hazard to human health.

DEFINITION

GREENHOUSE GASES (GHGs): These gases, produced by motor vehicle emissions (among other sources), allow visible and ultraviolet light from the sun to pass through the atmosphere, but prevent heat from escaping back out into space. This contributes to an increase in the temperature of the earth’s atmosphere, or global warming. The principal GHGs are carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), and fluorinated compounds.

enforcement mechanisms to ensure that the State achieves the reductions in GHG emissions needed to meet the cap. In addition, AB 32 states that if any regulations established under AB 1493 (2002) cannot be implemented, then CARB is required to develop additional, new regulations to control GHG emissions from vehicles.

AB 32 Climate Change Scoping Plan. In December 2008, CARB adopted its Climate Change Scoping Plan, which contains the main strategies California will implement to achieve reduction of approximately 169 million metric tons (MMT) of carbon dioxide equivalent (CO₂e), or approximately 30 percent from the State's projected 2020 emission level of 596 MMT of CO₂e under a business-as-usual scenario (this is a reduction of 42 MMT CO₂e, or almost 10 percent, from 2002 to 2004 average emissions). The Scoping Plan also includes CARB-recommended GHG reductions for each emissions sector of the State's GHG inventory.

SBX1-2 (2011). SBX1-2 requires that 33 percent of the State's energy comes from renewable sources by 2020. SBX1-2 requires California's electric utilities to reach the 33 percent goal in three compliance periods. By December 31, 2013, the utilities must procure renewable energy products equal to 20 percent of retail sales. By December 31, 2016, utilities must procure renewable energy products equal to 25 percent of retail sales, and by December 31, 2020, utilities must procure renewable energy products equal to 33 percent of retail sales and maintain that percentage in the following years.

SB 1368 (2006). SB 1368 is the companion bill of AB 32 and required the California Public Utilities Commission (CPUC) to establish a GHG emission performance standard for baseload generation from investor-owned utilities by February 1, 2007. The California Energy Commission (CEC) established a similar standard for local publicly owned utilities. These standards cannot exceed the GHG emission rate from a baseload combined-cycle natural gas fired plant. The legislation further requires that all electricity provided to California, including imported electricity, must be generated from plants that meet the standards set by CPUC and CEC.

SB 97 (2007). SB 97 (Chapter 185, Statutes of 2007; PRC, Sections 21083.05 and 21097) acknowledges climate change is a prominent environmental issue that requires analysis under CEQA. This bill directed the Governor's Office of Planning and Research (OPR) to prepare, develop, and transmit to the California Resources Agency (CRA) by July 1, 2009, guidelines for mitigating GHG emissions or the effects of GHG emissions, as required by CEQA. This bill also removes any claim of inadequate CEQA analysis of effects of GHG emissions associated with environmental review for projects funded by the Highway Safety, Traffic Reduction, Air Quality and Port Security Bond Act of 2006 (Proposition 1B) or the Disaster Preparedness and Flood Protection Bond Act of 2006 (Proposition 1E).

SB 375 (2008). SB 375, signed in September 2008, aligns regional transportation planning efforts, regional GHG reduction targets, and land use and housing allocation. As part of the alignment, SB 375 requires MPOs to adopt a Sustainable Communities Strategy (SCS) or Alternative Planning Strategy (APS) that prescribes land use allocation in that MPO's RTP. The CARB, in consultation with MPOs, is required to provide each affected region with reduction targets for GHGs emitted by passenger cars and light trucks in the region for the years 2020 and 2035. These reduction targets will be updated every 8 years, but they can be updated every 4 years if advancements in emissions technologies affect the reduction strategies to achieve the targets. The CARB is also charged with reviewing each MPO's SCS or APS for consistency with its assigned GHG emission reduction targets. If MPOs do not meet the GHG reduction targets, transportation projects located in the MPO boundaries would not be eligible for funding programmed after January 1, 2012. This bill also extends the minimum time period for the Regional Housing Needs Allocation (RHNA) cycle from 5 years to 8 years for local governments located in an MPO that meets certain requirements.

E.O. S-3-05 (2005). E.O. S-3-05 proclaimed that California is vulnerable to the impacts of climate change. The executive order declared increased temperatures could reduce snowpack in the Sierra Nevada Mountains, further exacerbate California's air quality problems, and

potentially cause a rise in sea levels. To combat those concerns, the executive order established targets for total GHG emissions that include reducing GHG emissions to the 2000 level by 2010, to the 1990 level by 2020, and to 80 percent below the 1990 level by 2050. The executive order also directed the secretary of CalEPA to coordinate a multiagency effort to reduce GHG emissions to the target levels.

E.O. S-13-08. E.O. S-13-08 directed California to develop methods for adapting to climate change through preparation of a statewide plan. The executive order directs OPR, in cooperation with the CRA, to provide land use planning guidance related to sea level rise and other climate change impacts by May 30, 2009. The order also directs the CRA to develop a State Climate Adaptation Strategy by June 30, 2009, and to convene an independent panel to complete the first California Sea Level Rise Assessment Report.

E.O. S-1-07. E.O. S-1-07 proclaimed the transportation sector as the main source of GHG emissions in California. The executive order proclaims the transportation sector accounts for more than 40 percent of statewide GHG emissions. The executive order also establishes a goal to reduce the carbon intensity of transportation fuels sold in California by a minimum of 10 percent by 2020. In particular, the executive order established a Low-Carbon Fuel Standard (LCFS) and directed the Secretary for Environmental Protection to coordinate the actions of the CEC, the CARB, the University of California, and other agencies to develop and propose protocols for measuring the “life-cycle carbon intensity” of transportation fuels.

4.10.1.5 | LOCAL GREENHOUSE GAS REGULATIONS

BAAQMD Climate Protection Program. The BAAQMD established a climate protection program to reduce pollutants that contribute to global climate change and affect air quality in the BAAB. The climate protection program includes measures that promote energy efficiency, reduce vehicle miles traveled (VMT), and develop alternative sources of energy, all of which assist in reducing emissions of GHG and in reducing air pollutants that affect the health of residents. BAAQMD also seeks to support current climate protection programs in the region and to stimulate additional efforts through public education and outreach, technical assistance to local governments and other interested parties, and promotion of collaborative efforts among stakeholders.

4.10.1.6 | NATIONAL AND STATE AMBIENT AIR QUALITY STANDARDS

State and federal standards for major air pollutants are summarized in Table 4.10-1. Primary standards were established to protect the public health. Secondary standards are intended to protect the nation’s welfare and account for air pollutant effects on soil, water, visibility, materials, vegetation, and other aspects of the general welfare. Because the CAAQS are more stringent than the NAAQS, the CAAQS are used as the standard in the air quality analysis for the Van Ness Avenue BRT Project.

Attainment Status. Under CAA and CCAA requirements, areas are designated as either attainment or nonattainment for each criterion pollutant based on whether the NAAQS or CAAQS have been achieved. Areas are designated as nonattainment for a pollutant if air quality data show that a state or federal standard for the pollutant was violated at least once during the previous 3 calendar years. Exceedances that are affected by highly irregular or infrequent events are not considered violations of a state standard and are not used as a basis for designating areas as nonattainment. Under the CCAA, the San Francisco County portion of the BAAB is designated as a nonattainment area for ozone (O₃), particulate matter less than 10 microns in diameter (PM₁₀), and particulate matter less than 2.5 microns in diameter (PM_{2.5}). Under the CAA, the San Francisco County portion of the BAAB is designated as a nonattainment area for O₃.



The transportation sector is the main source of GHG emissions in California, accounting for more than 40 percent of statewide emissions. Executive Order S-1-07 establishes a goal of reducing the carbon intensity of transportation fuels sold in California by a minimum of 10 percent by 2020.

Primary air quality standards for major air pollutants were established to protect the public health. Secondary standards are intended to protect the nation’s welfare and account for air pollutant effects on soil, water, visibility, materials, vegetation, and other aspects of the general welfare.

Table 4.10-1: State and National Ambient Air Quality Standards and Attainment Status for the Bay Area Air Basin

POLLUTANT	AVERAGING PERIOD	CALIFORNIA		FEDERAL	
		STANDARDS	ATTAINMENT STATUS	STANDARDS	ATTAINMENT STATUS
Ozone (O ₃)	1-hour	0.09 ppm (180 µg/m ³)	Nonattainment	--	--
	8-hour	0.070 ppm (137 µg/m ³)	Nonattainment	0.075 ppm (147 µg/m ³)	Nonattainment
Respirable Particulate Matter (PM ₁₀)	24-hour	50 µg/m ³	Nonattainment	150 µg/m ³	Unclassified
	Annual Arithmetic Mean	20 µg/m ³	Nonattainment	--	--
Fine Particulate Matter (PM _{2.5})	24-hour	--	--	35 µg/m ³	Nonattainment
	Annual Arithmetic Mean	12 µg/m ³	Nonattainment	15 µg/m ³	Attainment
Carbon Monoxide (CO)	8-hour	9.0 ppm (10 mg/m ³)	Attainment	9 ppm (10 mg/m ³)	Attainment/Maintenance
	1-hour	20 ppm (23 mg/m ³)	Attainment	35 ppm (40 mg/m ³)	Attainment/Maintenance
Nitrogen Dioxide (NO ₂)	Annual Arithmetic Mean	0.030 ppm (57 µg/m ³)	Attainment	53 ppb (100 µg/m ³) ¹	Attainment
	1-hour	0.18 ppm (338 µg/m ³)	--	100 ppb (188 µg/m ³) ¹	Unclassified
Sulfur Dioxide (SO ₂)	24-hour	0.04 ppm (105 µg/m ³)	Attainment	0.14 ppm (365 µg/m ³)	Attainment
	1-hour	0.25 ppm (655 µg/m ³)	Attainment	75 ppb (196 µg/m ³)	Attainment
	Annual Arithmetic Mean	--	--	0.030 ppm (80 µg/m ³)	Attainment
Lead (Pb)	30-day average	1.5 µg/m ³	Attainment	--	--
	Calendar Quarter	--	--	1.5 µg/m ³	Attainment
	Rolling 3-Month Average	--	--	0.15 µg/m ³	--
Visibility Reducing Particles	8-hour	Extinction coefficient of 0.23 per kilometer	Unclassified	No Federal Standards	
Sulfates	24-hour	25 µg/m ³	Attainment		
Hydrogen Sulfide	1-hour	0.03 ppm (42 µg/m ³)	Unclassified		
Vinyl Chloride	24-hour	0.01 ppm (26 µg/m ³)	No Information Available		

¹ EPA strengthened the NO₂ standard on January 22, 2010. EPA has not classified attainment status for the new standards; however, CARB anticipates that the BAAB will be designated as an attainment area for the new NO₂ standards. EPA is expected to issue final designations by January 22, 2012.

n/a = not available; -- = not applicable; µg/m³ = micrograms per cubic meter; ppb = parts per billion; ppm = parts per million

SOURCE: CARB, 2011, CARB 2012.

Carbon Monoxide (CO). CO, a colorless and odorless gas, interferes with the transfer of oxygen to the brain. It can cause dizziness and fatigue and can impair central nervous system functions. CO is emitted almost exclusively from the incomplete combustion of fossil fuels. Automobile exhausts release most of the CO in urban areas. CO dissipates relatively quickly, so ambient CO concentrations generally follow the spatial and temporal distributions of vehicular traffic. CO concentrations are influenced by local meteorological conditions, primarily wind speed, topography, and atmospheric stability. The BAAB is in attainment for CO at both the federal and state levels.

Ozone (O₃). O₃, a colorless toxic gas, is the chief component of urban smog. O₃ enters the blood stream and interferes with the transfer of oxygen, depriving sensitive tissues in the heart and brain of oxygen. O₃ also damages vegetation by inhibiting growth. O₃ forms in the atmosphere through a chemical reaction between reactive organic gases (ROG) and nitrogen oxides (NO_x) under sunlight. Motor vehicles are the major sources of ROG and NO_x. O₃ is present in relatively high concentrations within the BAAB. Automobiles are the single largest source of O₃ precursors in the BAAB. Under the CAA and the CCAA, the San Francisco County portion of the BAAB is designated as a nonattainment area for O₃.

Nitrogen Dioxide (NO₂). NO₂ is a reddish-brown gas that is a by-product of combustion processes. Automobiles and industrial operations are the main sources of NO₂. Aside from being a major contributor to ozone formation, NO₂ can increase the risk of acute and chronic respiratory disease. It is an eye and lung irritant, and high concentrations can cause difficulty breathing. Studies have linked short-term exposure to increased asthma symptoms, respiratory illness, more difficulty controlling asthma, and increased visits to emergency departments. In addition, NO₂ may be visible as a coloring component of a reddish-brown cloud on high pollution days, especially in conjunction with high ozone levels.

Sulfur Dioxide (SO₂). SO₂ is a product of high-sulfur fuel combustion. The main sources of SO₂ are coal and oil used in power stations, in industries, and for domestic heating. Industrial chemical manufacturing is another source of SO₂. SO₂ is an irritant gas that attacks the throat and lungs. SO₂ concentrations have been reduced to levels well below the state and national standards, but further reductions in emissions are needed to attain compliance with standards for sulfates and PM₁₀, of which SO₂ is a contributor. The BAAB is in attainment for SO₂ at both the federal and state levels.

Suspended Particulate Matter (PM₁₀ and PM_{2.5}). Particulate matter consists of very small liquid and solid particles floating in the air, which can include smoke, soot, dust, salts, acids, and metals. Respirable particulate matter (PM₁₀) refers to particulate matter less than 10 microns in diameter, approximately one-seventh the thickness of a human hair. Fine particulate matter (PM_{2.5}) refers to particulate matter that is 2.5 microns or less in diameter, roughly 1/28th the diameter of a human hair. PM₁₀ and PM_{2.5} pose a greater health risk than larger-size particles. When inhaled, these tiny particles can penetrate the human respiratory system's natural defenses and damage the respiratory tract. Major sources of PM₁₀ include motor vehicles; wood-burning stoves and fireplaces; dust from construction, landfills, and agriculture; wildfires and brush/waste burning; industrial sources; windblown dust from open lands; and atmospheric chemical and photochemical reactions. PM_{2.5} results from fuel combustion (from motor vehicles, power generation, industrial facilities), residential fireplaces, and wood stoves. In addition, PM_{2.5} can be formed in the atmosphere from gases such as SO₂, NO_x, and volatile organic compounds. In the BAAB, most particulate matter is caused by combustion, factories, construction, grading, demolition, agricultural activities, and motor vehicles. Motor vehicles are currently responsible for approximately half of the particulates in the BAAB. The San Francisco County portion of the BAAB is a nonattainment area for PM₁₀ and PM_{2.5} under the CCAA.

Lead (Pb). Prior to 1978, mobile emissions were the primary source of Pb in air. Between 1978 and 1987, the phase-out of leaded gasoline reduced the overall inventory of airborne Pb by nearly 95 percent. Currently, industrial sources are the primary source of airborne Pb.

Because the proposed project does not contain an industrial component, lead emissions were not analyzed in the air quality assessment.

Toxic Air Contaminants. In addition to the criteria air pollutants listed above, another group of pollutants, commonly referred to as TACs or HAPs, can result in health effects that can be quite severe. Many TACs are confirmed or suspected carcinogens, or they are known or suspected to cause birth defects or neurological damage. In addition, many TACs can be toxic at very low concentrations. For some chemicals, such as carcinogens, there are no thresholds below which exposure can be considered risk-free. Industrial facilities and mobile sources are significant sources of TACs. The electronics industry, including semiconductor manufacturing, has the potential to contaminate air and water due to the highly toxic chlorinated solvents commonly used in semiconductor production processes. Sources of TACs go beyond industry. Various common urban facilities also produce TAC emissions, such as gasoline stations (benzene), hospitals (ethylene oxide), and dry cleaners (perchloroethylene). Automobile exhaust also contains TACs such as benzene and 1,3-butadiene. Most recently, diesel particulate matter (DPM) was identified as a TAC by the CARB. DPM differs from other TACs in that it is not a single substance but rather a complex mixture of hundreds of substances. BAAQMD research indicates that mobile source emissions of DPM, benzene, and 1,3-butadiene represent a substantial portion of the ambient background risk from TACs in the BAAB.

Greenhouse Gases. Unlike emissions of criteria and toxic air pollutants, which have local or regional impacts, emissions of GHGs that contribute to global warming or global climate change have a broader, global impact. Global warming is a process whereby GHGs accumulating in the atmosphere contribute to an increase in the temperature of the earth's atmosphere. The principal GHGs contributing to global warming are CO₂, methane (CH₄), nitrous oxide (N₂O), and fluorinated compounds. These gases allow visible and ultraviolet light from the sun to pass through the atmosphere, but they prevent heat from escaping back out into space. Among the potential implications of global warming are rising sea levels and adverse impacts to water supply, water quality, agriculture, forestry, and habitats. In addition, global warming may increase electricity demand for cooling, decrease the availability of hydroelectric power, and affect regional air quality and public health. Like most criteria and toxic air pollutants, much of the GHG production comes from motor vehicles. GHG emissions can be reduced to some degree by improved coordination of land use and transportation planning on the city, county, and subregional level, and other measures to reduce automobile use. Energy conservation measures also can contribute to reductions in GHG emissions.

4.10.2 | Affected Environment

4.10.2.1 | CLIMATE

The BAAB is characterized by complex terrain, consisting of coastal mountain ranges, inland valleys, and bays that distort normal wind flow patterns. The area is also characterized by moderately wet winters and dry summers. San Francisco lies at the northern end of the peninsula. Because most of San Francisco's topography is below 200 feet in elevation, marine air is able to flow easily across most of the city, making its climate cool and windy.

The annual average temperature in the proposed project area, as recorded at the San Francisco Mission Dolores Station, is approximately 57.3 degrees Fahrenheit (°F). The proposed project area experiences an average winter temperature of approximately 52.3°F and an average summer temperature of approximately 60.0°F. The frequency of hot, sunny days during the summer months in the BAAB is another important factor that affects air pollution potential. Because temperatures in many of the BAAB inland valleys are so much higher than near the coast, the inland areas are especially prone to photochemical air pollution.



The Bay Area Air Basin is characterized by complex terrain, consisting of coastal mountain ranges, inland valleys, and bays that distort normal wind flow patterns.

The amount of annual precipitation can vary greatly from one part of the BAAB to another even within short distances. In general, total annual rainfall can reach 40 inches in the mountains, but it is often less than 16 inches in sheltered valleys. Total precipitation in the proposed project area averages approximately 21.1 inches annually. Precipitation occurs mostly during the winter and relatively infrequently during the summer.

Wind speeds may be strong locally in areas where air is channeled through a narrow opening, such as the Carquinez Strait, the Golden Gate, or the San Bruno gap. Annual average wind speeds range from 5 to 10 mph throughout the peninsula, with higher wind speeds usually found along the coast. At the northern end of the peninsula in San Francisco, pollutant emissions are high, especially from motor vehicle congestion; however, winds here are generally fast enough to carry the pollutants away before they can accumulate. The highest air pollutant concentrations in the Bay Area generally occur during one of the two common types of inversions, when temperature increases as altitude increases, thereby preventing air close to the ground from mixing with the air above it. As a result, air pollutants are trapped near the ground. In the winter, the BAAB frequently experiences stormy conditions with moderate to strong winds, as well as periods of stagnation with very light winds.

4.10.2.2 | AIR MONITORING DATA

The BAAQMD monitors air quality conditions at 23 locations throughout the BAAB. The closest air monitoring station to the project area is the San Francisco Arkansas Street Monitoring Station, which is approximately 1.2 miles from the intersection of Van Ness Avenue and Mission Street and 2.8 miles from the intersection of Van Ness Avenue and Lombard Street. Historical data from the San Francisco Arkansas Street monitoring station was used to characterize existing conditions within the vicinity of the proposed project area and to establish a baseline for estimating future conditions with and without the proposed Van Ness Avenue BRT project.

A summary of the data recorded at this monitoring station during the 2009 to 2011 period is shown in Table 4.10-2. The CAAQS and NAAQS for the criteria pollutants are also shown in the table. As Table 4.10-2 indicates, the air quality monitoring data from 2009 to 2011 show no exceedances of State or federal standards of any criteria pollutants.

The San Francisco Department of Public Health (SFPDH) has created a map that displays $PM_{2.5}$ concentrations resulting from vehicle emissions on City streets.⁸⁷ The map was created by SFPDH using CARB's EMFAC2007 vehicle emissions model and the EPA-approved CAL3QHCR Line Source Dispersion Model. CAL3QHCR is a Gaussian dispersion model that estimates air pollution concentrations based on physical characteristics of emissions, meteorology, topography, and receptor horizontal and vertical location. The map shows potential roadway exposure zones, which means those areas within the City and County of San Francisco that, by virtue of their proximity to freeways and major roadways, may exhibit high $PM_{2.5}$ concentrations attributable to local roadway traffic sources. Based on dispersion model analysis, the Van Ness Avenue corridor currently has a relatively greater level of road traffic air pollution and associated air pollution health risks.



A BAAQMD air monitoring station.

⁸⁷ City and County of San Francisco Department of Public Health Environmental Health Section, *Proportion of Streets with Annual Average Daily $PM_{2.5}$ Emissions $0.2 \mu g/m^3$ or Greater*, 2011.

Table 4.10-2: 2009-2011 Ambient Air Quality Data in Project Vicinity

POLLUTANT	POLLUTANT CONCENTRATION AND STANDARDS	NUMBER OF DAYS ABOVE STATE STANDARD		
		2009	2010	2011
Ozone (O ₃)	Maximum 1-hr Concentration (ppm)	0.07	0.08	0.07
	Days > 0.09 ppm (State 1-hr standard)	0	0	0
	Maximum 8-hr Concentration (ppm)	0.06	0.05	0.05
	Days > 0.07 ppm (State 8-hr standard)	0	0	0
	Days > 0.075 ppm (Federal 8-hr standard)	0	0	0
	Carbon Monoxide (CO)	Maximum 1-hr concentration (ppm)	3	1.8
Days > 20 ppm (State 1-hr standard)		0	0	0
Days > 35 ppm (Federal 1-hr standard)		0	0	0
Maximum 8-hr concentration (ppm)		2.9	1.4	1.2
Days > 9.0 ppm (State 8-hr standard)		0	0	0
Days > 9.0 ppm (Federal 8-hr standard)		0	0	0
Nitrogen Dioxide (NO ₂)	Maximum 1-hr Concentration (ppm)	0.06	0.09	0.09
	Days > 0.18 ppm (State 1-hr standard)	0	0	0
	Days > 0.100 (Federal 1-hr standard)	0	0	0
Respirable Particulate Matter (PM ₁₀)	Maximum 24-hr concentration (µg/m ³)	36.0	40	46
	Estimated Days > 50 µg/m ³ (State 24-hr standard)	0	0	0
	Estimated Days > 150 µg/m ³ (Federal 24-hr standard)	0	0	0
Fine Particulate Matter (PM _{2.5})	Annual Arithmetic Mean (µg/m ³)		11	10
	Exceed State Standard (12 µg/m ³)	* / a /	No	No
	Exceed Federal Standard (15 µg/m ³)		No	No
Sulfur Dioxide ³	Maximum 24-hr Concentration (ppm)			
	Days > 0.04 ppm (State 24-hr standard)	* / a /	* / a /	* / a /
	Days > 0.14 ppm (Federal 24-hr standard)			

* / a / Insufficient data.

SOURCE: BAAQMD, 2013; CARB, 2013.

4.10.2.3 | SENSITIVE RECEPTORS

The following categories of people, as identified by the CARB, are considered most sensitive to air pollution: children under 14, the elderly over 65, athletes, and people with cardiovascular and chronic respiratory diseases. Locations that may contain a high concentration of these sensitive population groups are called sensitive receptors and include residential areas, hospitals, child-care facilities, elder care facilities, elementary schools, athletic facilities, playgrounds, and parks. Sensitive receptors that were identified on and near the Van Ness Avenue corridor include residential areas, schools, parks, retirement homes, and religious institutions. Public health research has found that the proximity and amount of vehicle traffic are associated in a statistically significant way with several adverse respiratory health outcomes – particularly in the sensitive receptors described above – including impairment of lung function in children, lung cancer, and asthma incidence or prevalence.

4.10.3 | Environmental Consequences

4.10.3.1 | METHODOLOGY AND SIGNIFICANCE CRITERIA

Regional operational emissions were quantified based on the VMT calculated for the proposed project using transportation models. Automobile emissions were quantified using light-duty emission factors obtained from the CARB EMFAC2011 Motor Vehicle Emissions Inventory Model. The on-road mobile source calculations assumed a systemwide vehicle speed of 11 mph based on the average speed for the Van Ness Avenue corridor as provided by SFCTA. The same methodology was used to quantify GHG emissions from automobiles, and the CO₂ emission rates were obtained from EMFAC2011.

Certain land uses and industrial operations are more likely to cause odor emissions; hence, the discussion of operational odor emissions is based on land uses and their estimated odor potential.

Regional transportation conformity was analyzed by conducting research to check if the proposed project was included in a conforming RTP or Transportation Improvement Plan (TIP) with substantially the same design concept and scope as that of the proposed project. Project-level conformity was analyzed by determining if the proposed project would cause localized exceedances of CO, PM_{2.5}, and/or PM₁₀ standards, or if it would interfere with “timely implementation” of Transportation Control Measures (TCMs) called out in the State Implementation Plan (SIP).

The BAAQMD developed CEQA Guidelines to assist local jurisdictions and lead agencies in complying with the requirements of CEQA regarding potentially adverse impacts to air quality. These CEQA Guidelines were updated in June 2010 to include reference to thresholds of significance adopted by the BAAQMD Board on June 2, 2010. The Guidelines were further updated in May 2011. On March 5, 2012, the Alameda County Superior Court issued a judgment finding that the BAAQMD had failed to comply with CEQA when it adopted the thresholds of significance. The court did not determine whether the thresholds of significance were valid on the merits, but found that the adoption of the thresholds of significance was a project under the definition provided by CEQA. The court issued a writ of mandate ordering the BAAQMD to set aside the thresholds of significance and cease dissemination of them until the BAAQMD had complied with any environmental review required by CEQA. The BAAQMD has appealed the Alameda County Superior Court’s decision. The appeal is currently pending in the Court of Appeal of the State of California, First Appellate District.

In view of the court’s order, the BAAQMD no longer recommends that the thresholds of significance from the CEQA Guidelines (updated May 2011) be used as a generally applicable measure of a project’s significant air quality impacts. Lead agencies may determine appropriate air quality thresholds of significance based on substantial evidence in the record. Lead agencies may rely on the CEQA Guidelines (updated May 2011) for assistance in calculating air pollution emissions, obtaining information regarding the health impacts of air pollutants, and identifying potential mitigation measures. Lead agencies may continue to rely on the BAAQMD’s 1999 thresholds of significance and may continue to make determinations regarding the significance of an individual project’s air quality impacts based on the substantial evidence in the record for that project.

SFCTA, as the lead CEQA agency, has determined that the proposed project would cause a significant impact if:

- Operations would cause a net increase in emissions;
- Increased traffic would generate CO concentrations at study intersections that exceed the State 1- and 8-hour standards shown in Table 4.10-1;
- Operations would result in carcinogenic risk that exceeds 10 persons in one million;
- Operations would create an odor nuisance;
- Project alternatives would not be consistent with the BAAQMD air quality plans; and/or
- Operations would cause a net increase in GHG emissions.

NEPA Adverse Impact Criteria. According to the CEQ regulations (40 CFR §§ 1500-1508), the determination of a significant impact is a function of context and intensity. Context means that the significance of an action must be analyzed in several contexts, such as society as a whole (i.e., human, national), the affected region, the affected interests, and the locality. Both short- and long-term effects are relevant. Intensity refers to the severity of impact. To determine significance, the severity of the impact must be examined in terms of the type, quality, and sensitivity of the resource involved; the location of the proposed project; the duration of the effect (i.e., short- or long-term), and other considerations of context. Adverse impacts will vary with the setting of the proposed action and the surrounding area.

4.10.3.2 | CEQA OPERATIONAL PHASE IMPACTS

Regional Operational Emissions – 2035

Regional operational emissions were estimated using EMFAC2011 emission rates. The citywide average vehicle speed was assumed to be 20 mph. Table 4.10-3 shows the net change in emissions for each of the build alternatives compared to the 2035 No Build Alternative.⁸⁸ The LPA, including the Vallejo Northbound Station Variant, as a refinement of the two center-running build alternatives, would also not result in a net change in emissions compared to the 2035 No Build Alternative. In addition, each alternative, including the LPA and the No Build Alternative, would replace current electric buses with new electric buses, and replace current diesel buses with lower-emitting diesel hybrid buses.

Table 4.10-3: Estimated Net Operational Emissions – 2035

	ROG	NOx	PM10	PM2.5
BUILD ALTERNATIVE 2 VS. NO BUILD ALTERNATIVE				
Pounds Per Day	(7)	(22)	(9)	(1)
Net Emissions Increase?	No	No	No	No
Tons Per Year	(1)	(4)	(2)	(1)
Net Emissions Increase?	No	No	No	No
BUILD ALTERNATIVES 3 & 4 (WITHOUT DESIGN OPTION B) VS. NO BUILD ALTERNATIVE				
Pounds Per Day	(8)	(24)	(10)	(4)
Net Emissions Increase?	No	No	No	No
Tons Per Year	(1)	(4)	(2)	(1)
Net Emissions Increase?	No	No	No	No
BUILD ALTERNATIVES 3 & 4 (WITH DESIGN OPTION B) VS. NO BUILD ALTERNATIVE				
Pounds Per Day	(1)	(4)	(2)	(1)
Net Emissions Increase?	No	No	No	No
Tons Per Year	(<1)	(1)	(<1)	(<1)
Net Emissions Increase?	No	No	No	No

SOURCE: TAHA, 20132.

Alternative 1: No Build (Baseline Alternative). The No Build Alternative assumes no BRT service. This alternative considers projected demographic and land use characteristics in addition to proposed traffic signal infrastructure for real-time traffic management improvements expected to be implemented independent of the Van Ness Avenue BRT Project by the near-term horizon year 2015, or long-range horizon year 2035. It is important to note that the No Build Alternative would neither increase nor decrease bus service on Van Ness Avenue; however, the proposed bus engine technology changes would reduce emissions below existing conditions.

⁸⁸ The 2035 No Build Alternative accounts for traffic growth by year 2035 without the BRT project.



Build Alternative 2: Side-Lane BRT with Street Parking. Under this alternative, as shown in Table 4.10-3, regional operational emissions would be reduced in the air basin compared to the No Build Alternative; therefore, the alternative would result in a beneficial impact under CEQA.

Build Alternative 3: Center-Lane BRT with Right-Side Boarding and Dual Medians. Under this alternative (both with and without Design Option B), as shown in Table 4.10-3, regional operational emissions would be reduced in the air basin compared to the No Build Alternative; therefore, the alternative would result in a beneficial impact under CEQA.

Build Alternative 4: Center-Lane BRT with Left-Side Boarding and Single Median. Under this alternative (both with and without Design Option B), as shown in Table 4.10-3, regional operational emissions would be reduced in the air basin compared to the No Build Alternative; therefore, the alternative would result in a beneficial impact under CEQA.

LPA: Center-Lane BRT with Right-Side Boarding /Single Median and Limited Left Turns. The LPA, including the Vallejo Northbound Station Variant, is a refinement of center-running build alternatives, Build Alternatives 3 and 4 with Design Option B, and the net change in VMT would be similar for the LPA (with or without the Vallejo Northbound Station Variant) and the center-running alternatives (source: SF-CHAMP); thus, the net change in operational emissions for year 2035 would be similar to the changes presented in Table 4.10-3 for Build Alternatives 3 and 4 with Design Option B.

Regional Operational Emissions – Existing Plus Project (2007)

Existing plus Project emissions were estimated using the same methodology employed for 2035 emissions. Emissions are presented for Existing plus Project Conditions, consistent with the traffic analysis prepared for this project in which the 2015 Build scenarios are compared with the existing condition (CHS Consulting Group, 2013). Table 4.10-4 shows the net change in emissions for each of the build alternatives compared to the 2007 Existing Conditions.

Table 4.10-4: Estimated Net Operational Emissions – 2007

	ROG	NOx	PM10	PM2.5
BUILD ALTERNATIVE 2 VS. EXISTING CONDITIONS				
Pounds Per Day	(81)	(248)	(24)	(12)
Net Emissions Increase?	No	No	No	No
Tons Per Year	(15)	(45)	(4)	(2)
Net Emissions Increase?	No	No	No	No
BUILD ALTERNATIVES 3 & 4 (WITHOUT DESIGN OPTION B) VS. EXISTING CONDITIONS				
Pounds Per Day	(82)	(249)	(24)	(12)
Net Emissions Increase?	No	No	No	No
Tons Per Year	(15)	(45)	(4)	(2)
Net Emissions Increase?	No	No	No	No
BUILD ALTERNATIVES 3 & 4 (WITH DESIGN OPTION B) VS. EXISTING CONDITIONS*				
Pounds Per Day	(68)	(208)	(20)	(10)
Net Emissions Increase?	No	No	No	No
Tons Per Year	(12)	(38)	(4)	(2)
Net Emissions Increase?	No	No	No	No

*The LPA would have similar emissions to Build Alternatives 3 and 4 with Design Option B.

SOURCE: TAHA, 2013.

Build Alternative 2: Side-Lane BRT with Street Parking. Under this alternative, as shown in Table 4.10-4, regional operational emissions would be reduced in the air basin compared to existing conditions; therefore, the alternative would result in a beneficial impact under CEQA.

Build Alternative 3: Center-Lane BRT with Right-Side Boarding and Dual Medians. Under this alternative (both with and without Design Option B), as shown in Table 4.10-4, regional operational emissions would be reduced in the air basin compared to existing conditions; therefore, the alternative would result in a beneficial impact under CEQA.

Build Alternative 4: Center-Lane BRT with Left-Side Boarding and Single Median. Under this alternative (both with and without Design Option B), as shown in Table 4.10-4, regional operational emissions would be reduced in the air basin compared to existing conditions; therefore, the alternative would result in a beneficial impact under CEQA.

LPA: Center-Lane BRT with Right-Side Boarding /Single Median and Limited Left Turns. The LPA, including the Vallejo Northbound Station Variant, is a refinement of center-running build alternatives, Build Alternatives 3 and 4 with Design Option B, and the net change in VMT would be similar for the LPA, the Design Variant, and the center-running alternatives (source: SF-CHAMP); thus, the net change in operational emissions would be similar to the changes presented in Table 4.10-4 for Build Alternatives 3 and 4 with Design Option B.

Localized Carbon Monoxide Emissions

Emissions and ambient concentrations of CO have decreased dramatically in the BAAB with the introduction of the catalytic converter in 1975. There have been no exceedances of the State or federal standards for CO since 1991. The BAAB is currently designated as an attainment area for the CAAQS and NAAQS for CO; however, elevated localized concentrations of CO still require consideration in the environmental review process. Occurrences of localized CO concentrations, known as hotspots, are often associated with heavy traffic congestion, which most frequently occurs at signalized intersections of high-volume roadways.

Occurrences of localized CO concentrations, known as hotspots, are often associated with heavy traffic congestion and most frequently occur at signalized intersections of high-volume roadways. The BAAQMD has completed technical analyses that indicate that there is no potential for CO hotspots to occur when:

- The project traffic would not increase traffic volumes at affected intersections to more than 44,000 vehicles per hour; and
- The project traffic would not increase traffic volumes at affected intersections to more than 24,000 vehicles per hour where vertical and/or horizontal mixing is substantially limited (e.g., tunnel, parking garage, bridge underpass, natural or urban street canyon, below-grade roadway). The fact that the Van Ness Avenue BRT study area is a highly developed urban area with multi-story buildings and contains streets with canyon-like air dispersion characteristics, means that this criterion may be applied to certain blocks along Van Ness Avenue and some of its parallel streets.

The proposed project would not increase traffic volumes at any intersection in the traffic study area (including Van Ness Avenue and five parallel streets: Gough, Franklin, Polk, Larkin, and Hyde) to a total of more than 24,000 vehicles per hour, and would therefore be consistent with the criteria above.

Further analysis of CO concentrations is not required. Localized CO concentrations would result in less-than-significant impacts. Under the No Build Alternative, the same updates in the bus fleet would occur, and no changes to operating schedules would occur. Because of the cleaner running fleet, and no increases in use, this alternative would result in a less-than-significant impact under CEQA.

Parallel Street Traffic Volumes and Pollutant Concentrations

The proposed project is anticipated to cause some automobiles to divert away from Van Ness Avenue and make their trip on a parallel street (e.g., Franklin Street) within the corridor, as described in Section 3.1.3.2. Increased congestion on parallel streets could increase localized pollutant concentrations. Pollutant concentrations were modeled using CALINE4 for 3,443 vehicles on Franklin Street. This volume includes project baseline traffic volumes and then considers increased traffic looking ahead to year 2035 in a “with project,” or BRT scenario. The wind speed in CALINE4 was set conservatively at the lowest level allowable level to represent potential stagnant wind conditions associated with high-rise apartments and narrow streets. As shown in Table 4.10-5, the concentrations along Franklin Street would be well below the State standards after implementation of the BRT in year 2035 traffic conditions.

Table 4.10-5: Localized Operational Concentrations, 2035 with BRT

POLLUTANT	CONCENTRATION AT NEAREST SENSITIVE RECEPTOR	STATE STANDARD	SIGNIFICANT IMPACT?
CO (1-Hour)	0.5 ppm	20 ppm	No
CO (8-Hour)	0.35 ppm	9.0 ppm	No
NO ₂ (1-Hour)	<0.009 ppm	0.18 ppm	No
PM ₁₀ (24-Hour)	14 µg/m ³	50 µg/m ³	No
PM ₁₀ (Annual)	2.8 µg/m ³	20 µg/m ³	No
PM _{2.5} (Annual)	1.2 µg/m ³	12 µg/m ³	No

SOURCE: TAHA., 2013.

Idle Emissions

An additional analysis was undertaken to specifically address air impacts from potential increases in vehicle idling and associated air emissions (TAHA, 2013). The build alternatives, including the LPA, would convert two mixed-travel lanes to bus-only lanes (i.e., one lane each in NB and SB directions) and reduce left-turn opportunities along Van Ness Avenue. This would potentially increase vehicle idling and associated air emissions. An idle emissions analysis was completed using the CAL3QHC dispersion model at intersections that would experience the highest vehicle delay in the 2035 horizon year. This was identified as the Gough Street/Hayes Street intersection with a PM peak-hour volume of 3,954 PM vehicles and an average delay of 195 seconds per vehicle. CAL3QHC incorporates methods for estimating queue lengths and the contribution of emissions from idling vehicles. The model permits the estimation of total air pollution concentrations from both moving and idling vehicles. It is a reliable tool for predicting concentrations of inert air pollutants near signalized intersections. Because idle emissions account for a substantial portion of the total emissions at an intersection, the model is relatively insensitive to traffic speed, a parameter difficult to predict with a high degree of accuracy on congested urban roadways. The model calculates CO and PM concentrations. One-hour CO concentrations were converted into 8-hour concentrations using conversion factors established by EPA. One-hour PM concentrations were converted into 24-hour and annual concentrations using conversion factors established by EPA. Consistent with SF-CHAMP, the analysis assumed that heavy-duty vehicles represent 2 percent of vehicle volumes, and the emission rates were adjusted accordingly. As shown in Table 4.10-6, the idle emissions would be well below the State standards after implementation of the BRT in year 2035 traffic conditions.

Toxic Air Contaminants

The purpose of the proposed project is to improve transit operations along Van Ness Avenue by constructing within the ROW to allow operation of BRT. Each alternative, including the LPA, has been determined to generate minimal air quality impacts and has not been linked with any special TAC concerns. As such, no project build alternative, including the LPA, would result in any increases in traffic volumes, vehicle mix, basic project location, or any other factor that would cause an increase in TAC emissions of the proposed project compared to that of the No Build Alternative. In addition, updating the vehicle fleet from diesel buses to diesel hybrid buses as part of the No Build Alternative (Alternative 1) would further reduce DPM versus existing conditions.

Table 4.10-6: Idle Emissions, 2035 with BRT

POLLUTANT	SIDEWALK CONCENTRATIONS	STATE STANDARD	SIGNIFICANT IMPACT?
CO (1-Hour)	0.1 ppm	20 ppm	No
CO (8-Hour)	0.07 ppm	9.0 ppm	No
PM ₁₀ (24-Hour)	4 µg/m ³	50 µg/m ³	No
PM ₁₀ (Annual)	0.8 µg/m ³	20 µg/m ³	No
PM _{2.5} (Annual)	0.3 µg/m ³	12 µg/m ³	No

SOURCE: TAHA, 2013.

Specifically regarding TACs and Van Ness Avenue, the proposed project would not increase congestion on Van Ness Avenue (see Section 3.3 of this EIS/EIR). In addition, updating the vehicle fleet from diesel buses to diesel hybrid buses as part of the No Build Alternative (Alternative 1) would further reduce DPM versus existing conditions; hence, TAC emissions would result in a less-than-significant impact along Van Ness Avenue for each alternative under CEQA.

Increased congestion on parallel streets has the potential to increase exposure to TAC emissions. An assessment was completed both for the segment with greatest incremental increases in annual average daily traffic and the highest total amount of annual average daily traffic (TAHA, 2013). The greatest incremental change in parallel street traffic between the No Build Alternative and build alternatives would be along Franklin Street north of Market Street under either center lane configured alternative (Build Alternative 3 and 4, with or without Design Option B) including the LPA. The total average daily traffic along this segment would be 29,419 vehicles in 2035 and the incremental increase of daily traffic as a result of the proposed project would be 8,612 vehicles. The BAAQMD has published screening tables for assessing mobile source PM_{2.5} concentrations and cancer risk from surface streets. The screening tables indicate that, at a receptor distance of 50 feet, approximately 30,000 annual average daily vehicles would generate an annual PM_{2.5} concentration of 0.147 µg/m³. As shown in Table 4.10-7, the project-related incremental increase would be responsible for approximately 0.043 µg/m³, or 29 percent, of the annual PM_{2.5} exposure. The lifetime cancer risk associated with 30,000 annual average daily vehicles (similar to the 29,419 vehicles at this intersection) would be 3.56 persons in one million. The project-related incremental increase (approximately 29 percent of the total) would be responsible for approximately 1.0 person in one million of the increase in cancer risk. The project PM_{2.5} concentration (0.043 µg/m³) is approximately 0.4 percent of the annual PM_{2.5} State standard and one-tenth (1/10) the project-level threshold (1 person) for cancer risk of 10 persons in one million.

Table 4.10-7: Toxic Air Contaminant Concentrations on Parallel Streets, 2035 with BRT

SCENARIO	CONCENTRATION AT NEAREST SENSITIVE RECEPTOR	THRESHOLD	SIGNIFICANT IMPACT?
GREATEST INCREMENTAL CHANGE IN TRAFFIC VOLUME (FRANKLIN STREET NORTH OF MARKET STREET)			
Annual PM _{2.5} – Project Specific	0.043 µg/m ³	12 µg/m ³	No
Health Risk – Project Specific	1.0 Person	10 Persons	No
HIGHEST DAILY TRAFFIC VOLUME (FRANKLIN STREET NORTH OF GEARY STREET)			
Annual PM _{2.5} – Project Specific	0.025 µg/m ³	12 µg/m ³	No
Health Risk – Project Specific	0.6 Person	10 Persons	No

SOURCE: TAHA, 2013.

The highest parallel street traffic volume would be 47,823 average daily annual vehicles along Franklin Street north of Geary Street under both center lane configured alternatives (Build Alternatives 3 and 4) and the LPA. The project contribution along this segment would be 4,486 annual average daily vehicles in 2035. The screening tables indicate that, at a receptor distance of 50 feet, approximately 50,000 annual average daily vehicles would generate an annual PM_{2.5} concentration of 0.267 µg/m³. The project-related incremental increase would be responsible for approximately 0.025 µg/m³, or 9 percent, of the annual PM_{2.5} exposure. The lifetime cancer risk associated with 50,000 annual average daily vehicles would be 6.49 persons in one million. The 9 percent project-related incremental increase would be responsible for approximately 0.60 person in one million of the cancer risk. The project PM_{2.5} concentration (0.025 µg/m³) would be approximately 0.2 percent of the annual PM_{2.5} State standard and one-tenth (1/10) the project-level threshold for cancer risk (0.60 person) of 10 persons in one million.

Overall, the increase in PM_{2.5} concentration would not be a significant percent of the State standard and the lifetime cancer risk would be less than the project-level threshold of 10 persons in one million for cancer risk. TAC emissions on parallel streets would result in a less-than-significant impact for each build alternative, including the LPA, under CEQA.

KEY FINDING

All of the build alternatives would reduce ROG, NO_x, PM₁₀, and PM_{2.5} emissions compared to the No Build Alternative. Due to the reduction in automobile VMT and replacement of the bus fleet with cleaner vehicles, each build alternative would result in a beneficial impact under NEPA.

Odor Emissions

The proposed project would not include any land use or activity that typically generates adverse odors, and it would result in a less-than-significant odor impact for each alternative under CEQA.

4.10.3.3 | NEPA OPERATIONAL PHASE IMPACTS

Regional Operational Emissions

Table 4.10-3 shows the net change in emissions for each of the build alternatives compared to the 2035 No Build Alternative. Each alternative, including the No Build Alternative and LPA, would replace current electric buses with new electric buses, and replace current diesel buses with lower-emitting diesel hybrid buses.

Alternative 1: No Build (Baseline Alternative). This alternative would not include a BRT service and considers projected demographic and land use characteristics in addition to proposed traffic signal infrastructure for real-time traffic management improvements; however, the bus improvements associated with each alternative would still be implemented. These improvements include replacing the current electric buses with new electric buses, and replacing the current diesel buses with lower-emitting diesel hybrid buses.

Build Alternative 2: Side-Lane BRT with Street Parking. As indicated in Table 4.10-3, this alternative would reduce ROG, NO_x, PM₁₀, and PM_{2.5} emissions compared to the No Build Alternative. Due to the reduction in automobile VMT, and replacement of the bus fleet with cleaner vehicles, Build Alternative 2 would result in a beneficial impact under NEPA.

Build Alternative 3: Center-Lane BRT with Right-Side Boarding and Dual Medians. As indicated in Table 4.10-3, this alternative would reduce ROG, NO_x, PM₁₀, and PM_{2.5} emissions compared to the No Build Alternative. Under this alternative, the automobile VMT would be reduced, and the bus fleet would be replaced with cleaner vehicles. Build Alternative 3 (both with and without Design Option B) would result in a beneficial impact under NEPA.

Build Alternative 4: Center-Lane BRT with Left-Side Boarding and Single Median. As indicated in Table 4.10-3, this alternative would reduce ROG, NO_x, PM₁₀, and PM_{2.5} emissions compared to the No Build Alternative. Under this alternative, the automobile VMT would be reduced, and the bus fleet would be replaced with cleaner vehicles. Build Alternative 4 (both with and without Design Option B) would result in a beneficial impact under NEPA.

LPA: Center-Lane BRT with Right-Side Boarding /Single Median and Limited Left Turns. The LPA, including the Vallejo Northbound Station Variant, is a refinement of center-running build alternatives, Build Alternatives 3 and 4 with Design Option B, and the net change in VMT would be similar for the LPA, the Design Variant, and the center-running alternatives (source: SF-CHAMP); therefore, the net change in operational emissions would be similar to the changes presented for Build Alternatives 3 and 4 with Design Option B in Table 4.10-4. As with Build Alternatives 3 and 4 with Design Option B, the automobile VMT would be reduced under the LPA versus the No Build Alternative (Alternative 1) and the bus fleet would be replaced with cleaner vehicles versus existing conditions. The LPA would result in a beneficial impact under NEPA.

Localized Carbon Monoxide Emissions

Because of similar vehicles to the No Build Alternative and lower VMT for autos, the build alternatives would not result in any increases in emissions, including CO and particulate matter. In addition, the build alternatives would lower overall VMT; hence, none of the alternatives would result in an adverse impact under NEPA.

The proposed project would replace each electric coach currently in the vehicle fleet with newer coaches and replace each diesel coach with a diesel hybrid coach. These diesel hybrid coaches have lower emissions when compared to their standard diesel counterparts used in existing conditions. In addition, compared to the No Build Alternative, each build alternative, including the LPA, would reduce VMT in San Francisco. Because of cleaner vehicles and lower overall VMT, the proposed project would not result in any increases in emissions, including CO and particulate matter; hence, none of the build alternatives, including the LPA, would result in an adverse impact under NEPA.

Under the No Build Alternative, the same updates to the bus fleet would occur, and no changes to operating schedules would occur. Because of the cleaner running fleet and no increases in use, this alternative would not result in an adverse impact under NEPA.

Toxic Air Contaminants

The purpose of the proposed project is to improve transit operations along Van Ness Avenue by providing exclusive lanes for a BRT service. Each alternative, including the LPA, has been determined to generate minimal air quality impacts for CAAA criteria pollutants and has not been linked with any special MSAT concerns. As such, no alternative, including the LPA, would result in an increase in traffic volumes on Van Ness Avenue, vehicle mix, basic project location, or any other factor that would cause an increase in MSAT impacts of the proposed project compared to that of the No Build Alternative. As explained in Section 4.10.3.2, while increased traffic volumes and congestion on parallel streets has the potential to increase exposure to toxic air contaminants, analysis of the parallel street with the highest traffic volumes under Build Alternatives 3 and 4, and under the LPA, shows that TAC emissions on parallel streets would be well below BAAQMD project-level and cumulative level thresholds for mobile source PM_{2.5} concentrations from surface streets. In addition to

this, changing the vehicle fleet from diesel buses to diesel hybrid buses would further reduce DPM versus existing conditions.

Moreover, EPA regulations for vehicle engines and fuels will cause overall MSAT emissions to decline significantly over the next several decades. None of the alternatives would result in an adverse TAC impact under NEPA.

Odor Emissions

The proposed project would not include any land use or activity that typically generates adverse odors, and none of the alternatives would result in an adverse odor impact under NEPA.

4.10.4 | Avoidance, Minimization, and/or Mitigation Measures

No adverse impacts from project operation are anticipated; therefore, no minimization or mitigation measures are recommended. Construction period avoidance, minimization and/or mitigation measures are described in Section 4.15.9.

4.10.5 | Transportation Conformity Impacts

Transportation conformity is required under CAA Section 176(c) (42 U.S.C. 7506(c)) to ensure that federally supported highway and transit project activities are consistent with the purpose of the SIP. Conformity to the purpose of the SIP means that transportation activities will not cause new air quality violations, worsen existing violations, or delay timely attainment of the relevant NAAQS. EPA's transportation conformity rule (40 CFR 51.390 and Part 93) establishes the criteria and procedures for determining whether transportation activities conform to the SIP. Under the criteria, transportation projects must demonstrate conformity on regional and local levels.

The proposed project was included in the regional emissions analysis completed by MTC for the conforming Transportation 2035 Plan. The design concept and scope of the proposed project have not changed significantly from what was analyzed in the Transportation 2035 Plan. This analysis found that the plan and, therefore, the individual projects contained in the plan, are conforming projects, and will have air quality impacts consistent with those identified in the SIP for achieving the NAAQS. Furthermore, FHWA determined the Transportation 2035 Plan to conform to the SIP in May 2009.

The proposed project is also included in the federal 2011 TIP. FHWA/FTA determined the TIP to conform to the SIP on December 14, 2010. The proposed project is consistent with regional conformity guidelines.

The California Project-Level Carbon Monoxide Protocol (CO Protocol) was used to conduct a CO analysis for the proposed project. Part of the CO analysis includes the screening procedure found at Level 2 of the flow chart in Figure 3 in the CO Protocol. First, the proposed project would not significantly contribute to cold start percentages because no additional land uses are proposed that would add vehicle trips to the area. Second, the proposed project does not propose any additional land uses in the area and, as a result, would not generate any additional trips. The project would reduce regional VMT, especially vehicle trips located in and near the project corridor. Third, the proposed project would not impede the flow of traffic in the project area. The traffic study states that in 2015, the average travel speed for most of the streets in the traffic study area under the build alternatives, including the LPA, would remain approximately the same (generally \pm 0.3-mph) as the No Build Alternative, and no segment would see the speed decrease by more than 0.9-mph). Fourth, the proposed project would not move traffic closer to any sensitive receptors in the region. Although Design Option Center B does not add significantly enough additional traffic volumes on Franklin/Gough to be measurable from an emissions

DEFINITION

Transportation conformity means that transportation activities will not cause new air quality violations, worsen existing violations, or delay timely attainment of the relevant National Ambient Air Quality Standards (NAAQS).

KEY FINDING

The proposed project is consistent with regional conformity guidelines.

perspective, eliminating left turns could increase traffic volumes along certain roadway segments parallel to Van Ness Avenue, such as Franklin Street. As discussed in Section 4.10.3.2 (Localized Emissions), the project would not result in a localized CO hot spot. The proposed project satisfies all of the conditions of Level 2 of the CO Protocol in order to be screened out; therefore, the proposed project would not have the potential for causing or worsening violation of the NAAQS for CO.

Qualitative particulate matter hotspot analysis is required under the EPA Transportation Conformity rule for Projects of Air Quality Concern (POAQC). Projects that are not POAQC are not required to complete a detailed particulate matter hotspot analysis. According to the EPA Transportation Conformity Guidance, the following types of projects are considered POAQC:

- New or expanded highway projects that have a significant number of or significant increase in diesel vehicles (defined as greater than 125,000 Annual Average Daily Traffic (AADT) and 8 percent or more of such AADT is diesel truck traffic);
- Projects affecting intersections that are at LOS D, E, or F, with a significant number of diesel vehicles, or that that will change to LOS D, E, or F because of increased traffic volumes from a significant number of diesel vehicles related to the project;
- New bus and rail terminals and transfer points that have a significant number of diesel vehicles congregating at a single location;
- Expanded bus and rail terminals and transfer points that significantly increase the number of diesel vehicles congregating at a single location; or
- Projects in or affecting locations, areas, or categories of sites that are identified in the PM_{2.5} or PM₁₀ implementation plan or implementation plan submission, as appropriate, as sites of possible violation.

The proposed project is not considered a POAQC because it does not meet the definition of a POAQC as defined in EPA's Transportation Conformity Guidance. The proposed project would not increase the percentage of diesel vehicles on the roadway, does not involve a bus or rail terminal that significantly increases diesel vehicles, and is not identified in the SIP as a possible PM_{2.5} or PM₁₀ violation site. A particulate matter hotspot analysis is not required.

4.10.6 | Avoidance, Minimization, and/or Mitigation Measures

No avoidance, minimization, and/or mitigation measures pertaining to transportation conformity are required for the proposed project.

4.10.7 | Greenhouse Gas Emissions

4.10.7.1 | GREENHOUSE GAS EMISSIONS – 2035

The largest source of GHG emissions are from automobiles. Public transportation projects generally reduce the amount of cars driving on the road by providing the public with alternative means of transportation. Less cars on the road leads to less sources of pollution. Because of the higher capacity of buses and the updated fleet associated with the proposed project, buses are able to transport higher quantities of people while producing fewer emissions than the cars they are replacing. This results in a reduction in GHG emissions. Total gross GHG emissions are shown for each build alternative in Table 4.10-8. The total gross GHG emissions under the LPA would be the same as presented for Build Alternatives 3 and 4 with Design Option B in Table 4.10-8. Table 4.10-9 shows the net difference in citywide VMT and CO_{2e} for each alternative. The total Citywide GHG emissions under the LPA would be the same as presented for Build Alternatives 3 and 4 with Design Option B in Table 4.10-9.

Table 4.10-8: Estimated Gross Citywide Greenhouse Gas Emissions – 2035

SCENARIO	VMT	CARBON DIOXIDE EQUIVALENT (METRIC TONS PER YEAR)
2035 Baseline	11,965,507	2,341,923
Build Alternative 2	11,891,952	2,327,527
Build Alternatives 3 and 4 without Design Option B	11,887,251	2,326,607
Build Alternatives 3 and 4 with Design Option B*	11,953,541	2,339,581

*The LPA would have the similar VMT and greenhouse gas emissions as Build Alternatives 3 and 4 with Design Option B

SOURCE: TAHA, 2013.

Table 4.10-9: Estimated Net Citywide Greenhouse Gas Emissions – 2035

SCENARIO	NET INCREASE IN VMT	CARBON DIOXIDE EQUIVALENT (METRIC TONS PER YEAR)
Baseline versus Build Alternative 2	(73,555)	(14,396)
Net Increase in GHG Emissions?		No
Baseline versus Build Alternatives 3 and 4 without Design Option B	(78,256)	(15,316)
Net Increase in GHG Emissions?		No
Baseline versus Build Alternatives 3 and 4 with Design Option B*	(11,966)	(2,342)
Net Increase in GHG Emissions?		No

*The LPA would have the similar VMT and greenhouse gas emissions as Build Alternatives 3 and 4 with Design Option B

SOURCE: TAHA, 2013.

Alternative 1: No Build (Baseline Alternative)

The No-Build Alternative would not include a BRT service; however, the bus improvements associated with each alternative would still be implemented. These improvements include replacing the current electric buses with new electric buses and replacing the current diesel buses with lower-emitting diesel hybrid buses. Because of these improvements, GHG emissions would be reduced below existing conditions. This would result in a beneficial global warming impact.

Build Alternative 2: Side-Lane BRT with Street Parking

As shown in Table 4.10-9, Build Alternative 2 would decrease automobile VMT and associated GHG emissions compared to baseline conditions by 14,396 metric tons per year. Build Alternative 2 would result in less GHG emissions than baseline conditions, and it would cause a beneficial global warming impact.

Build Alternative 3: Center-Lane BRT with Right-Side Boarding and Dual Medians

As shown in Table 4.10-9, Build Alternative 3 would decrease automobile VMT and associated GHG emissions compared to baseline conditions by 15,316 metric tons per year. Build Alternative 3 would result in less GHG emissions than baseline conditions, and it would cause a beneficial global warming impact.

KEY FINDING

Bus fleet improvements under all alternatives include replacing the current electric buses with new electric buses and replacing the current diesel buses with lower-emitting diesel hybrid buses. In addition, the build alternatives, including the LPA, would lower overall VMT; hence, GHG emissions would be reduced below existing conditions, resulting in a beneficial global warming impact.

Center-Lane Alternative Design Option B. As shown in Table 4.10-9, Design Option B under Build Alternative 3 would decrease automobile VMT and associated GHG emissions compared to baseline conditions by 2,342 metric tons per year. Design Option B under Build Alternative 3 would result in less GHG emissions than baseline conditions, and it would cause a beneficial global warming impact.

Build Alternative 4: Center-Lane BRT with Left-Side Boarding and Single Median

As shown in Table 4.10-9, Build Alternative 4 would decrease automobile VMT and associated GHG emissions by the same amount as Build Alternative 3, causing a beneficial global warming impact.

Center-Lane Alternative Design Option B. As shown in Table 4.10-9, Build Alternative 4 with incorporation of Design Option B automobile VMT would be the same as for Build Alternative 3. GHG emissions, displayed in Table 4.10-9, would be reduced in the Air Basin. Design Option B under Build Alternative 4 would cause a beneficial global warming impact.

LPA: Center-Lane BRT with Right-Side Boarding /Single Median and Limited Left Turns

Because the LPA, including the Vallejo Northbound Station Variant, is a refinement of center-running build alternatives, Build Alternatives 3 and 4 with Design Option B, the LPA would decrease automobile VMT and associated GHG emissions compared to baseline conditions, and this ton per year decrease would be the same as presented for Build Alternatives 3 and 4 with Design Option B in Table 4.10.9. The LPA would have a beneficial effect on global warming.

4.10.7.2 | GREENHOUSE GAS EMISSIONS – EXISTING PLUS PROJECT (2007)

Total gross GHG emissions for Existing plus Project conditions are shown in Table 4.10-10. Table 4.10-11 shows the net difference in citywide VMT and CO_{2e} for each alternative.

Build Alternative 2: Side-Lane BRT with Street Parking

As shown in Table 4.10-11, Build Alternative 2 would decrease automobile VMT and associated GHG emissions compared to baseline conditions by 32,894 metric tons per year. Build Alternative 2 would result in less GHG emissions than baseline conditions, and it would cause a beneficial global warming impact.

Table 4.10-10: Estimated Gross Citywide Greenhouse Gas Emissions – 2007

SCENARIO	VMT	CARBON DIOXIDE EQUIVALENT (METRIC TONS PER YEAR)
Existing Conditions	10,100,425	2,076,273
Build Alternative 2	9,940,405	2,043,378
Build Alternatives 3 and 4 without Design Option B	9,939,510	2,043,194
Build Alternatives 3 and 4 with Design Option B*	9,965,954	2,048,630

*The LPA would have the similar VMT and greenhouse gas emissions as Build Alternatives 3 and 4 with Design Option B

SOURCE: TAHA, 2013.

Table 4.10-11: Estimated Net Citywide Greenhouse Gas Emissions – 2007

SCENARIO	NET INCREASE IN VMT	CARBON DIOXIDE EQUIVALENT (METRIC TONS PER YEAR)
Existing versus Build Alternative 2	(160,020)	(32,894)
Net Increase in GHG Emissions?		No
Existing versus Build Alternatives 3 and 4 without Design Option B	(160,915)	(33,078)
Net Increase in GHG Emissions?		No
Existing versus Build Alternatives 3 and 4 with Design Option B*	(134,471)	(27,642)
Net Increase in GHG Emissions?		No

*The LPA would have the similar VMT and greenhouse gas emissions as Build Alternatives 3 and 4 with Design Option B

SOURCE: TAHA, 2013.

Build Alternative 3: Center-Lane BRT with Right-Side Boarding and Dual Medians

As shown in Table 4.10-11, Build Alternative 3 would decrease automobile VMT and associated GHG emissions compared to baseline conditions by 33,078 metric tons per year. Build Alternative 3 would result in less GHG emissions than baseline conditions, and it would cause a beneficial global warming impact.

Center-Lane Alternative Design Option B. As shown in Table 4.10-11, Design Option B under Build Alternative 3 would decrease automobile VMT and associated GHG emissions compared to baseline conditions by 27,642 metric tons per year. Design Option B under Build Alternative 3 would result in less GHG emissions than baseline conditions, and it would cause a beneficial global warming impact.

Build Alternative 4: Center-Lane BRT with Left-Side Boarding and Single Median

As shown in Table 4.10-11, Build Alternative 4 would decrease automobile VMT and associated GHG emissions by the same amount as Build Alternative 3, causing a beneficial global warming impact.

Center-Lane Alternative Design Option B. As shown in Table 4.10-11, Build Alternative 4 with incorporation of Design Option B automobile VMT would be the same as for Build Alternative 3. GHG emissions, displayed in Table 4.10-11, would be reduced in the Air Basin. Design Option B under Build Alternative 4 would cause a beneficial global warming impact.

LPA: Center-Lane BRT with Right-Side Boarding /Single Median and Limited Left Turns. The LPA, including the Vallejo Northbound Station Variant, is a refinement of center-running build alternatives, Build Alternatives 3 and 4 with Design Option B, and automobile VMT under the LPA would be the same as for Build Alternatives 3 and 4 with Design Option B, displayed in Table 4.10-11. Thus, the LPA would cause a reduction in GHG emissions in the Air Basin, resulting in a beneficial global warming impact.

4.10.8 | Avoidance, Minimization, and/or Mitigation Measures

No avoidance, minimization, and/or mitigation measures pertaining to GHG emissions and global warming are required for the proposed project.

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4.11 Noise and Vibration

This section summarizes the noise and vibration regulatory setting, affected environment, environmental consequences, and measures to mitigate impacts as a result of the proposed Van Ness Avenue BRT project. Construction-phase impacts and avoidance measures are presented in Section 4.15-10. The No Build Alternative serves as the future (2035) baseline for considering net project noise impacts for the purposes of this analysis. Differences in noise impacts between Build Alternatives 3 and 4 are expected to be negligible. Accordingly, impacts along Van Ness Avenue are evaluated for Build Alternative 2 and Build Alternatives 3 and 4 combined. Noise impacts from traffic diverted onto adjacent streets are evaluated only for the worst-case build alternative and worst-case design variation, whichever condition would divert the most traffic to those streets.

The LPA included in this Final EIS/EIR is a refinement of the center running alternatives with limited left turns (Build Alternatives 3 and 4 with Design Option B), as described in Chapters 2 and 10. The noise and vibration effects of the LPA, with or without the Vallejo Northbound Station Variant, are identified as part of the analysis presented for the build alternatives in this chapter. There would be no notable difference in noise and vibration impacts under the LPA compared with the impacts described for Build Alternatives 3 and 4 with Design Option B in this subsection.

4.11.1 | Terminology

Noise is usually defined as sound that is undesirable, because it interferes with speech communication and hearing, or is otherwise annoying (i.e., unwanted sound). Under certain conditions, noise may cause hearing loss, interfere with human activities, and in various ways may affect people's health and well being, which is cause for an analysis of noise. Studies used by the San Francisco Department of Public Health have shown that exposure to high levels of noise, including road traffic in certain circumstances, has a causal influence on some negative health outcomes such as high blood pressure and ischemic heart disease.

Sound pressure level (L_p) can vary over an extremely large range of amplitude. L_p describes the level of noise measured at a receiver at any moment in time and is read directly from a sound-level meter. The decibel (dB) is the accepted standard unit for measuring the amplitude of sound. When describing sound and its effect on a human population, A-weighted (dBA) sound pressure levels are typically used to account for the response of the human ear. The term "A-weighted" refers to a filtering of the noise signal in a manner corresponding to the way that the human ear perceives sound. The A-weighted noise level has been found to correlate well with people's judgments of the noisiness of different sounds, and it has been used for many years as a measure of community noise. Figure 4.11-1 illustrates typical A-weighted sound pressure levels for various noise sources.

Community noise levels usually change continuously during the day. The equivalent continuous A-weighted sound pressure level (L_{eq}) is normally used to describe community noise. The L_{eq} is the equivalent steady-state A-weighted sound pressure level that would contain the same acoustical energy as the time-varying A-weighted sound pressure level during the same time interval. The maximum sound pressure level (L_{max}) is the greatest instantaneous sound pressure level observed during a single noise measurement interval. The sound exposure level (SEL) describes a receiver's cumulative noise exposure from a single noise event. It is represented by the total A-weighted sound energy during the event, normalized to a 1-second interval.

Another descriptor, the day-night average sound pressure level (L_{dn}), was developed to evaluate the total daily community noise environment. The L_{dn} is a 24-hour average sound pressure level with a 10-dB time-of-day weighting added to sound pressure levels in the nine

DEFINITIONS

DECIBEL (dB): The accepted standard unit for measuring the amplitude of sound.

SOUND PRESSURE LEVEL (L_p): The level of noise measured at a receiver at any moment in time.

A-WEIGHTED: Filtering a noise signal in a manner corresponding to the way that the human ear perceives sound.

EQUIVALENT CONTINUOUS NOISE LEVEL (L_{eq}): The steady-state A-weighted sound pressure level normally used to describe community noise. L_{eq} contains the same acoustical energy as the time-varying A-weighted sound pressure level during the same time interval, because community noise levels usually change continuously during the day.

DAY-NIGHT AVERAGE SOUND PRESSURE LEVEL (L_{dn}): A 24-hour average sound pressure level with a 10-dB time-of-day weighting added to sound pressure levels in 9 nighttime hours. This adjustment is an effort to account for the increased sensitivity to nighttime noise events.

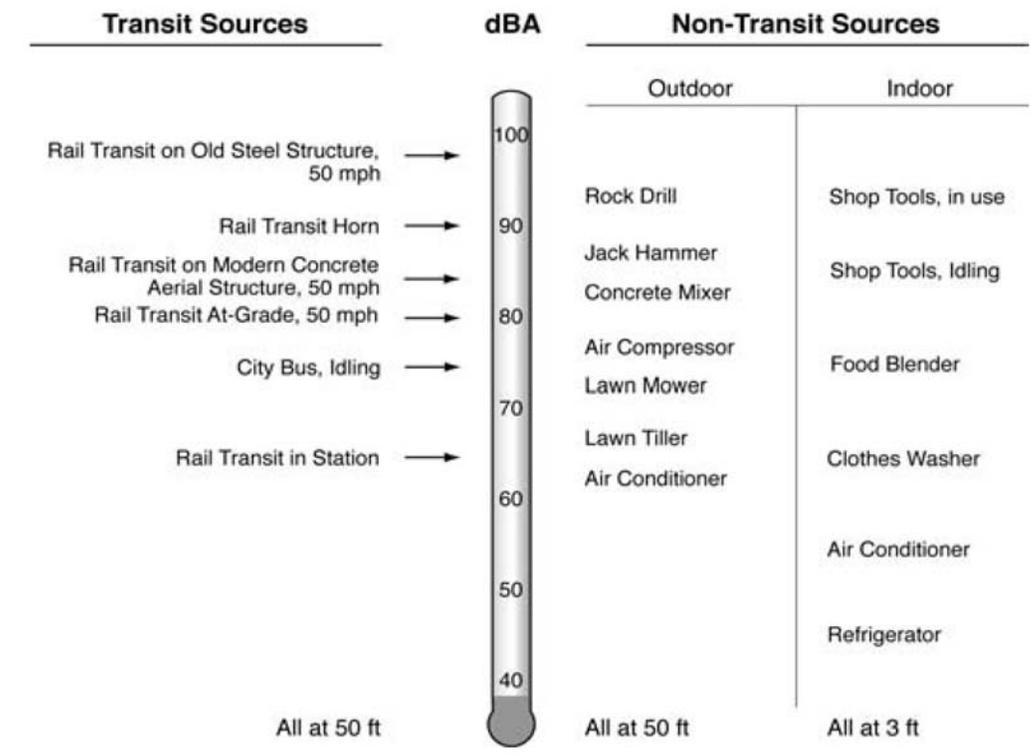
MAXIMUM SOUND PRESSURE LEVEL (L_{max}): The greatest instantaneous sound pressure level observed during a single noise measurement interval.

SOUND EXPOSURE LEVEL (SEL): A receiver's cumulative noise exposure from a single noise event.

nighttime hours from 10:00 p.m. to 7:00 a.m. This nighttime 10-dB adjustment is an effort to account for the increased sensitivity to nighttime noise events. FTA uses L_{dn} and L_{eq} to evaluate BRT noise impacts in surrounding communities.

Vibration is an oscillatory motion that can be described in terms of displacement, velocity, or acceleration. Displacement, in the case of a vibrating floor, is simply the distance that a point on the floor moves away from its static position. The velocity represents the instantaneous speed of the floor movement, and acceleration is the rate of change of the speed. The response of humans, buildings, and equipment to vibration is normally described using velocity or acceleration. In this analysis, velocity will be used in describing ground-borne vibration.

Figure 4.11-1: Typical A-Weighted Sound Levels



Source: FTA, 2006.

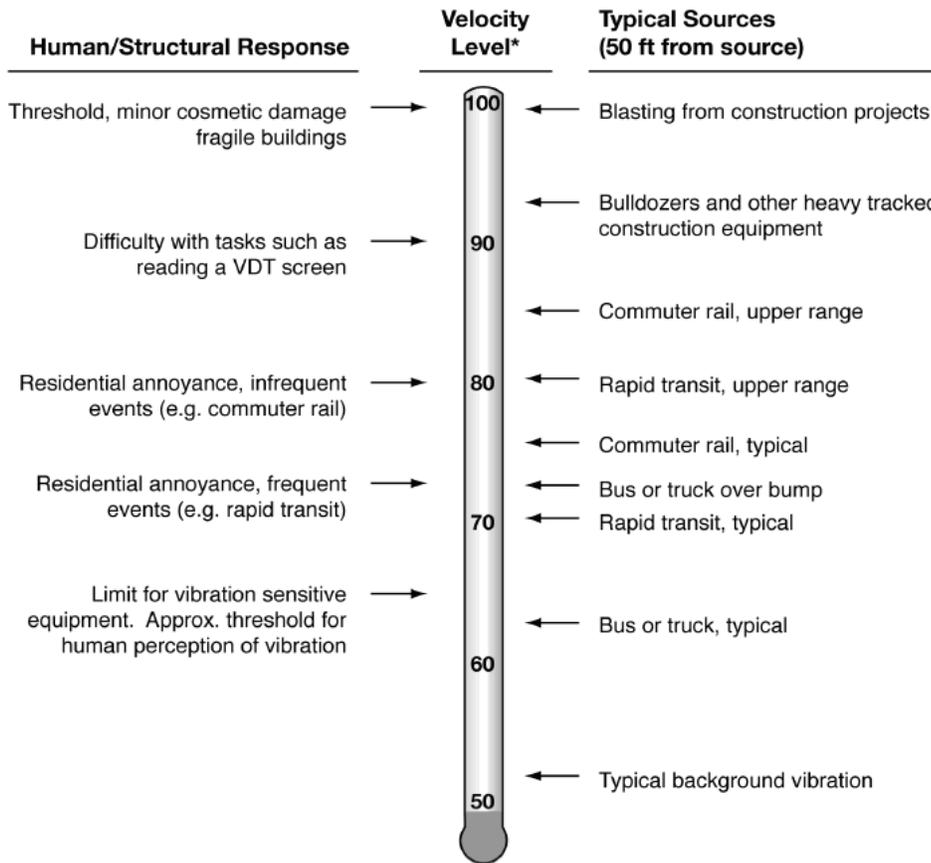
Vibration amplitudes are usually expressed as either peak particle velocity (PPV) or the root mean square (RMS) velocity. The PPV is defined as the maximum instantaneous peak of the vibration signal. The RMS of a signal is the average of the squared amplitude of the signal. Although PPV is appropriate for evaluating the potential for building damage, it is not suitable for evaluating human response. Because it takes some time for the human body to respond to vibration signals, RMS amplitude is more appropriate to evaluate human response to vibration than PPV. For sources such as trucks or motor vehicles, peak vibration levels are typically 6 to 14 dB higher than RMS levels. FTA uses the abbreviation “VdB” for vibration decibels to reduce the potential for confusion with sound decibel.

The RMS VdB is used to describe human annoyance criteria and impacts and uses a reference quantity of 1 micro-inch per second. Decibel notation acts to compress the range of numbers required in measuring vibration. Figure 4.11-2 illustrates common vibration sources and the human and structural responses to ground-borne vibration. As shown in Figure 4.11-2, the threshold of perception for human response is approximately 65 VdB; however, human response to vibration is not usually significant unless the vibration exceeds 70 VdB. Vibration tolerance limits for sensitive instruments, such as magnetic resonance

imaging (MRI) or electron microscopes, could be much lower than the human vibration perception threshold.

Similar to the noise descriptors, L_{eq} and L_{max} can be used to describe the average vibration and the maximum vibration level observed during a single vibration measurement interval.

Figure 4.11-2: Typical Levels of Ground-borne Vibration



* RMS Vibration Velocity Level in VdB relative to 10^{-6} inches/second

Source: FTA, 2006.

4.11.2 Human Reaction to Noise

The effects of environmental noise on people are generally undesirable. These include psychological effects, such as annoyance, and physiological effects, such as hearing impairment and sleep disturbance. Among the cognitive effects on children, reading, attention, problem solving, and memory are most influenced by noise. Prolonged exposure to high levels of noise can cause hearing impairment, although most cases have been found to be related to occupational noise exposure at levels much higher than ranges typically associated with community exposure to transportation or industrial sources. Research has correlated exposure to environmental noise with physiological changes in blood pressure, sleep, digestion, and other stress-related disorders.⁸⁹

⁸⁹ U.S. Department of Transportation, Research and Special Programs Administration, John A. Volpe National Transportation Systems Center – Environmental Measurement and Modeling Division, DTS-34. *General Health Effects of Transportation Noise*, Final Report, June 2002.

4.11.3 | Regulatory Setting

This section presents the guidelines, criteria, and regulations used to assess noise and vibration impacts associated with the proposed project. Because SFCTA, the lead agency under CEQA, is developing the proposed project in cooperation with FTA, noise and vibration impact evaluation is conducted using the criteria set forth by FTA and the City of San Francisco.

4.11.3.1 | FTA NOISE IMPACT CRITERIA

The criteria in the federal *Transit Noise and Vibration Impact Assessment* guidelines (FTA, 2006) were used to assess existing ambient noise levels and future (2035) noise impacts from BRT operations. They are founded on well-documented research on community reaction to noise and are based on change in noise exposure using a sliding scale. The amount that transit projects are allowed to change the overall noise environment is reduced with increasing levels of existing noise. The noise metrics applied by FTA to three categories of land use are summarized in Table 4.11-1.

Table 4.11-1: Land Use Categories and Metrics for Transit Noise Impact Criteria

LAND USE CATEGORY	NOISE METRIC, DBA	DESCRIPTION OF LAND USE CATEGORY
1	Outdoor $L_{eq}(h)^*$	Tracts of land where quiet is an essential element in their intended purpose. This category includes lands set aside for serenity and quiet, and such land uses as outdoor amphitheatres and concert pavilions, as well as National Historic Landmarks with significant outdoor use. Also included are recording studios and concert halls.
2	Outdoor L_{dn}	Residences and buildings where people normally sleep. This category includes homes, hospitals, and hotels where a nighttime sensitivity to noise is assumed to be of utmost importance.
3	Outdoor $L_{eq}(h)^*$	Institutional land uses with primarily daytime and evening use. This category includes schools, libraries, theaters, and churches where it is important to avoid interference with such activities as speech, meditation, and concentration on reading material. Places for meditation or study associated with cemeteries, monuments, museums, campgrounds and recreational facilities can also be considered to be in this category. Certain historical sites and parks are also included.

Note: * L_{eq} for the noisiest hour of transit-related activity during hours of noise sensitivity.

Source: FTA, 2006.

L_{dn} is used to characterize noise exposure for residential areas and hotels (Category 2). The maximum 1-hour L_{eq} during the period that the facility is in use is used for other noise-sensitive land uses such as school buildings and parks (Categories 1 and 3). The noise impact criteria for human annoyance are based on a comparison of the existing outdoor noise levels and the future outdoor noise levels from a proposed transit project. They incorporate activity interference caused by the transit project alone and annoyance due to the change in the noise environment caused by the project. There are two levels of impact included in the FTA criteria, as shown in Figure 4.11-3. The interpretations of these two levels of impact are summarized as follows:

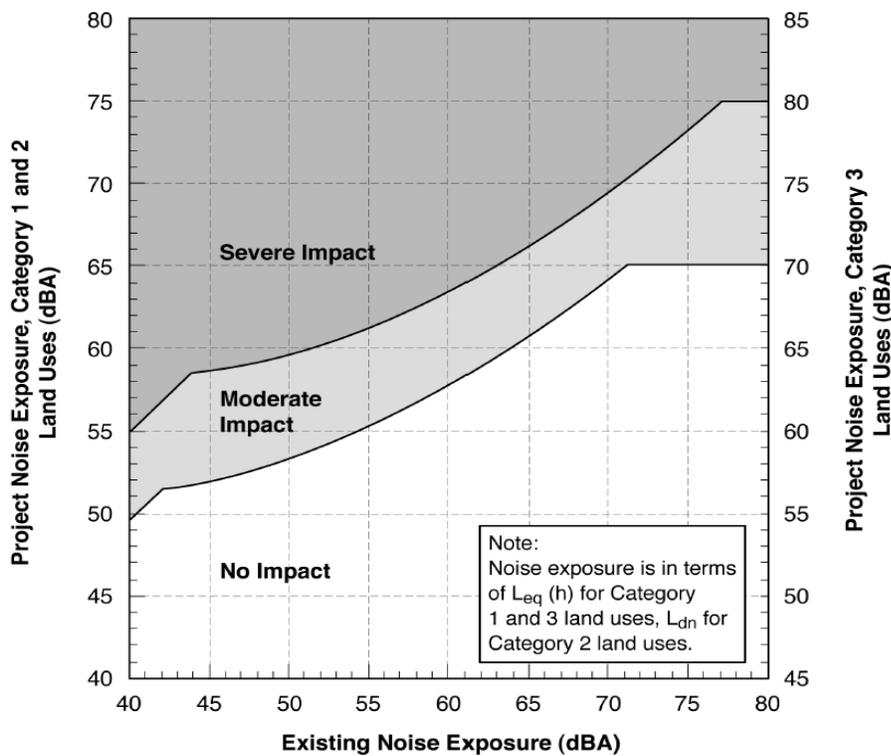
- **Severe Impact.** Project noise above the upper curve is considered to cause Severe Impact because a significant percentage of people would be highly annoyed by the new noise. This curve flattens out at 80 dB for Category 1 and 2 land use, a level associated with an unacceptable living environment.
- **Moderate Impact.** The change in the cumulative noise level is noticeable to most people, but it may not be sufficient to cause strong, adverse reactions from the community. In this transitional area, other project-specific factors must be considered to determine the magnitude of the impact and the need for mitigation, such as the existing level,

predicted level of increase over existing noise levels, and the types and numbers of noise-sensitive land uses affected.

The horizontal axis in Figure 4.11-3 is the existing L_{dn} or L_{eq} without any project-related noise. The vertical axis on the left side is the L_{dn} at residential land uses caused by a project, whereas the axis on the right side is the L_{eq} at school, park, and recreational land use. Figure 4.11-3 illustrates that a project L_{dn} of 61 dBA at a Category 2 receiver would be considered as a “moderate impact” if the existing L_{dn} at a selected residence is 65 dBA. If the project noise level reaches an L_{dn} of 67 dBA, the project noise level would be considered as a “severe impact” to the Category 2 receiver.

For residential land use, the noise criteria are to be applied outside the building locations at noise-sensitive areas with frequent human use, including outdoor patios, decks, pools, and play areas. If no such areas exist, the criteria should be applied near building doors and windows. For parks and other significant outdoor use, the criteria are to be applied at the property lines; however, for locations where land use activities are solely indoors, noise impact may be less significant if the outdoor-to-indoor reduction is greater than for typical buildings (approximately 25 dB with windows closed). Thus, if it can be demonstrated that there will only be indoor activities, mitigation may not be needed.

Figure 4.11-3: Noise Impact Criteria for Transit Projects



Source: FTA, 2006

4.11.3.2 | CITY NOISE IMPACT CRITERION

The Transportation Noise Section of the San Francisco General Plan Environmental Protection Element addresses transportation noise issues from a comprehensive local land use planning perspective. The plan objectives include:

- Objective 9: Reduce transportation-related noise.
- Objective 10: Minimize the impact of noise on affected areas.
- Objective 11: Promote land uses that are compatible with various transportation noise levels.

For residential land uses, it establishes the L_{dn} /CNEL range of 65 to 70 dBA as the transition between what are normally referred to as “conditionally acceptable” and “normally unacceptable” exposures.

The generally accepted threshold for a clearly perceptible sound increase from stationary objects is 5 dB. “Section 2909. Noise Limits” from the City’s municipal code (San Francisco, 2008) includes a 5-dB increase threshold for stationary objects. Accordingly, if this criterion was applied to the proposed project, an impact would occur if either project-generated noise along Van Ness Avenue or increased traffic volumes on parallel facilities such as Franklin and Gough streets resulted in a 5-dB or greater noise increase. The City does not specify a threshold for evaluating transportation noise. Nonetheless, the 5-dB increase was used as another factor in evaluating the noise effects of the BRT project on Van Ness Avenue, as described in Section 4.11.5.⁹⁰

4.11.3.3 | FTA VIBRATION IMPACT CRITERIA

The criteria in the *Transit Noise and Vibration Impact Assessment* (FTA, 2006) were used to evaluate vibration impacts from project construction and BRT operations. The evaluation of vibration impacts can be divided into two categories: (1) human annoyance, and (2) building damage. Generally, human annoyance criteria are used to assess potential impacts associated with operational vibration, whereas building damage criteria are used to estimate vibration impacts due to construction activities.

DEFINITIONS

HUMAN ANNOYANCE CRITERIA: Used to assess potential impacts associated with operational vibration.

BUILDING DAMAGE CRITERIA: Used to estimate vibration impacts due to construction activities.

Human Annoyance Criteria

The ground-borne vibration impact criteria describe human response to vibration and potential interference related to the operation of vibration sensitive equipment. The criteria for acceptable ground-borne vibration are expressed in terms of RMS velocity levels in VdB and are based on the maximum levels for a single event (L_{max}). Table 4.11-2 presents the criteria for various land use categories, as well as the frequency of events.

Table 4.11-2: Ground-Borne Vibration Impact Criteria for Human Annoyance

LAND USE CATEGORY	GROUND-BORNE VIBRATION IMPACT LEVELS (VdB RE 1 MICRO-IN/SEC)		
	FREQUENT EVENTS ¹	OCCASIONAL EVENTS ²	INFREQUENT EVENTS ³
<u>Category 1:</u> Buildings where vibration would interfere with interior operations.	65 VdB ⁴	65 VdB ⁴	65 VdB ⁴
<u>Category 2:</u> Residences and buildings where people normally sleep.	72 VdB	75 VdB	80 VdB
<u>Category 3:</u> Institutional land uses with primarily daytime use.	75 VdB	78 VdB	83 VdB

Notes:

1. “Frequent Events” is defined as more than 70 vibration events of the same source per day. Most rapid transit projects fall into this category.
2. “Occasional Events” is defined as between 30 and 70 vibration events of the same source per day. Most commuter trunk lines have this many operations.
3. “Infrequent Events” is defined as more than 30 vibration events of the same kind per day. This category includes most commuter rail branch lines.
4. This criterion limit is based on levels that are acceptable for most moderately sensitive equipment, such as optical microscopes. Vibration-sensitive manufacturing or research will require detailed evaluation to define the acceptable vibration levels. Ensuring lower vibration levels in a building often requires special design of the HVAC systems and stiffened floors.

Source: FTA, 2006.

⁹⁰ The FTA Transit Noise and Vibration Impact Assessment (FTA, 2006) methodology and thresholds are the established method for evaluating noise and vibration impacts of transit improvements such as the proposed project. No transportation noise threshold has been established by the City of San Francisco.

Sensitive receivers within the project boundary include residences, hotels, and schools. These fall under Category 2, places where people normally sleep, and Categories 1 and 3, performance spaces and institutional land uses with primarily daytime use. Because the number of proposed operations is 215 per weekday, FTA classifies the proposed service under “Frequent Events.”

Building Damage Criteria

Construction activities can result in varying degrees of ground vibration, depending on the equipment and method employed. The vibration associated with typical transit construction is not likely to damage building structures, but it could cause cosmetic building damage. Normally, vibration resulting from a BRT vehicle pass-by would not cause building damage.

Vibrations generated by surface transportation and construction activities are mainly in the form of surface or Raleigh waves. Studies have shown that the vertical component of transportation-generated vibrations is the strongest, and that PPV correlates best with building damage and complaints. Table 4.11-3 summarizes the construction vibration limits shown in FTA guidelines for structures located near the ROW of a transit project.

Table 4.11-3: Construction Vibration Damage Criteria

BUILDING CATEGORY	PPV (IN/SEC)	APPROXIMATE LV*
I. Reinforced-concrete, steel, or timber (no plaster)	0.5	102
II. Engineered concrete and masonry (no plaster)	0.3	98
III. Non-engineered timber and masonry buildings	0.2	94
IV. Buildings extremely susceptible to vibration damage	0.12	90

Note:

* RMS velocity in decibels (VdB) re: 1 micro-inch per second.

Source: FTA, 2006.

4.11.3.4 | CITY CONSTRUCTION NOISE ORDINANCES

Construction impacts to sensitive neighborhoods, although temporary in nature, can affect occupants of nearby buildings and/or compromise building structures. The City of San Francisco has jurisdiction over the construction noise of the proposed project, which lies within the limits of the city. Noise levels during construction are regulated under Article 29 of the San Francisco Municipal Code (San Francisco, 2008). These noise restrictions are summarized as follows:

- **Daytime (7:00 a.m. to 8:00 p.m.).** Construction activities are permitted provided that operation of any powered construction equipment, regardless of age or date of acquisition, does not emit noise at a level in excess of 80 dBA when measured at a distance of 100 feet. Impact tools and equipment are exempt from this restriction if they are equipped with intake and exhaust mufflers recommended by the manufacturers thereof, and approved by the Director of Public Works.
- **Nighttime (8:00 p.m. to 7:00 a.m.).** Non-emergency construction activities are not permitted during nighttime hours if the resulting noise level is more than 5 dB in excess of the ambient noise at the nearest property line unless express permission has been granted by the Director of Public Works.

Daytime construction activities are permitted provided that operation of any powered construction equipment does not emit noise at a level in excess of 80 dBA when measured at a distance of 100 feet.

Non-emergency nighttime construction activities are not permitted if the resulting noise level is more than 5 dB in excess of the ambient noise at the nearest property line.

4.11.4 | Affected Environment

The proposed BRT follows Van Ness Avenue through the core of the north-of-Market-Street area. Van Ness Avenue is a principal arterial that provides interstate, interregional, and intraregional travel and goods movement, and forms part of US 101. The proposed BRT would be implemented along an approximately 2-mile stretch of Van Ness Avenue

(including a one-block portion of South Van Ness Avenue). Characteristics of neighborhoods shift from public and commercial uses in the southern portion of the proposed alignment, mixed residential-commercial in the middle portion, to multi-family residential in the northern portion. Most of these multi-family buildings have commercial uses, such as office space or various stores, on the ground level.

The San Francisco Traffic Noise Map estimates day-night average noise levels (L_{dn}) within City limits. It focuses on noise from roadway traffic, considering vehicle volumes, types, speeds, and temporal (time of day) distributions.⁹¹ Figure 4.11-4(a) shows that the highest sustained existing noise levels within the City (in terms of L_{dn}) tend to follow freeway and major surface street corridors. Figure 4.11-4(b) demonstrates that existing L_{dn} values along the proposed project corridor can exceed 70 dBA close to the travel lanes and typically at the nearest roadway-facing building facades; the same is true for parallel Franklin and Gough streets. In the context of land use planning in California, such levels are normally considered unacceptable for residential development. L_{dn} values exceeding 70 dBA are experienced along freeways and along the major arterials that tend to be most concentrated within the northeast portion of the City. Within the remainder of the City, only a very small proportion of residential properties distant from the freeways are exposed to noise from surface street traffic generating L_{dn} values exceeding 70 dBA.

The noise environment in the vicinity of the Van Ness Avenue corridor is comprised of automobile, truck, and bus pass-by noise with intervals of motor vehicle horn noise, as well as clatter from street-level pedestrian and commercial activities. Noise-sensitive receivers along Van Ness Avenue that may be affected by the project include single- and multi-family residences and assisted living facilities (the latter two often positioned above first-story street-side commercial uses), churches, and hotels. Along and between Franklin and Gough streets, a larger proportion of solely residential buildings are present, as well as schools, churches, hotels, and two small museums. In addition, there are several parks and playfields along Gough Street.

Noise monitoring was conducted at various sites along Van Ness Avenue to assess the existing noise conditions throughout noise-sensitive regions in the project area. These sites are shown in Figure 4.11-5. Noise measurements were taken within the project limits between August 4 and 6, 2008. The monitoring sites include noise-sensitive locations, such as residences, a concert hall, and a hotel. The primary objectives of the measurements are to evaluate the existing noise environment and determine the appropriate impact criteria per FTA guidelines.

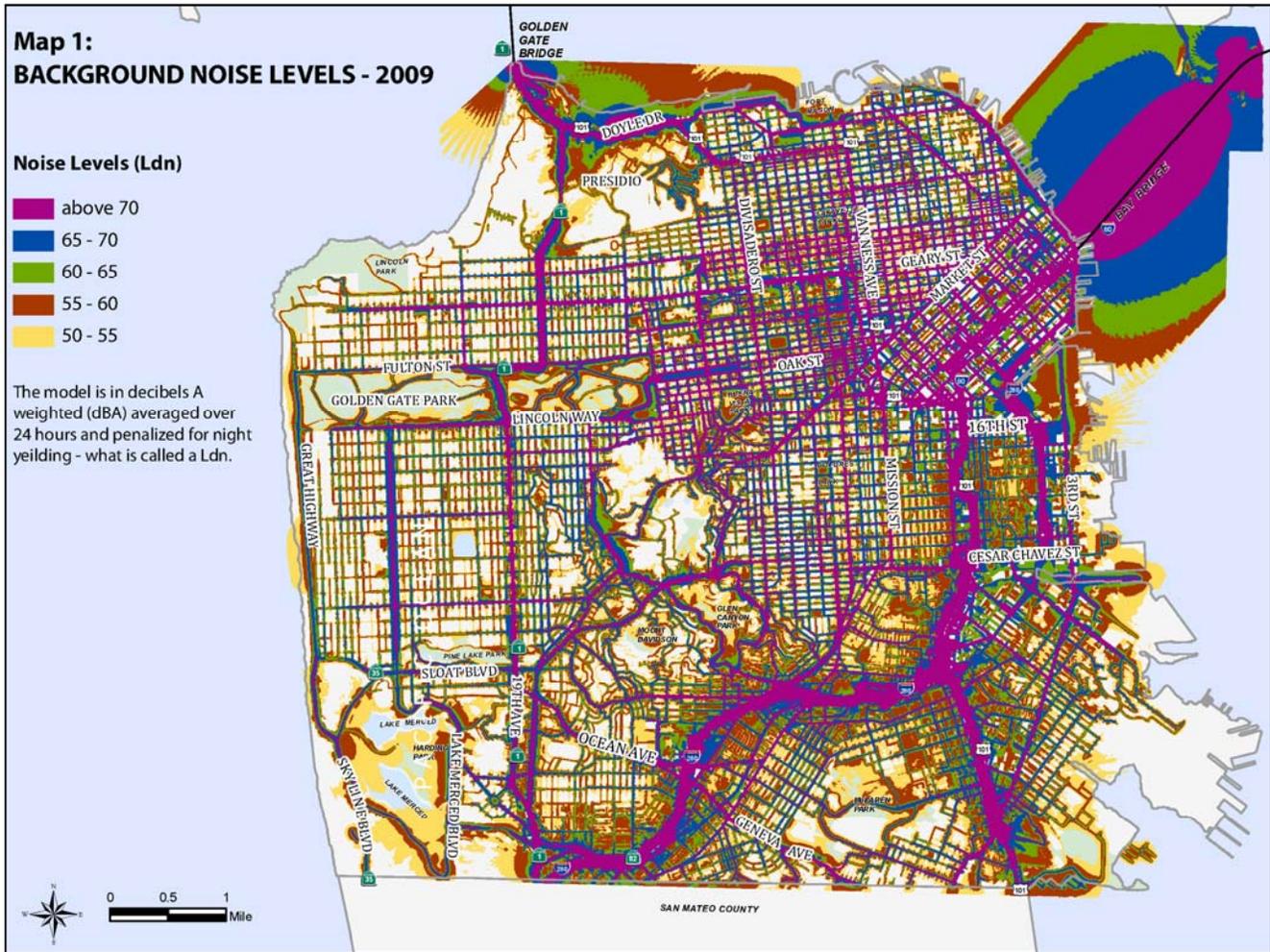
Short-term noise measurements were conducted at 10 sites for a duration of 20 minutes each, and a long-term measurement was conducted at one location for a total of 49 hours. At each short-term site, at least two measurements were performed, each at a different time of day. Multiple measurements were performed at each short-term site because only one suitable and available long-term measurement site was identified; therefore, more than one set of short-term noise measurements were needed to determine the existing noise levels accurately. L_{dn} at the long-term measurement location was calculated by using hourly measured noise levels. At short-term locations, L_{dn} levels were estimated by comparing two to three separate short-term noise-level measurements to results obtained from the long-term measurement location that was in progress concurrently. Measured noise levels were typical for a dense urban environment, with short-term L_{eq} values ranging from the mid 60s to mid 70s dBA. L_{dn} values measured at the long-term site and estimated at the short-term sites were in the 70s dBA.

No significant vibration sources exist along the project corridor. Typical automobile, truck, and bus pass-bys along local roadways would be the only perceptible vibration source.

No significant vibration sources exist along the project corridor. Typical automobile, truck, and bus pass-bys along local roadways would be the only perceptible vibration source.

⁹¹ San Francisco Department of Public Health – Program on Health, Equity and Sustainability. “Noise Model”, accessed October 31, 2012. (<http://www.sfpbes.org/elements/24-elements/tools/105-noise-model>).

Figure 4.11-4: Background Noise Levels Modeled by the San Francisco Department of Public Health (2009)

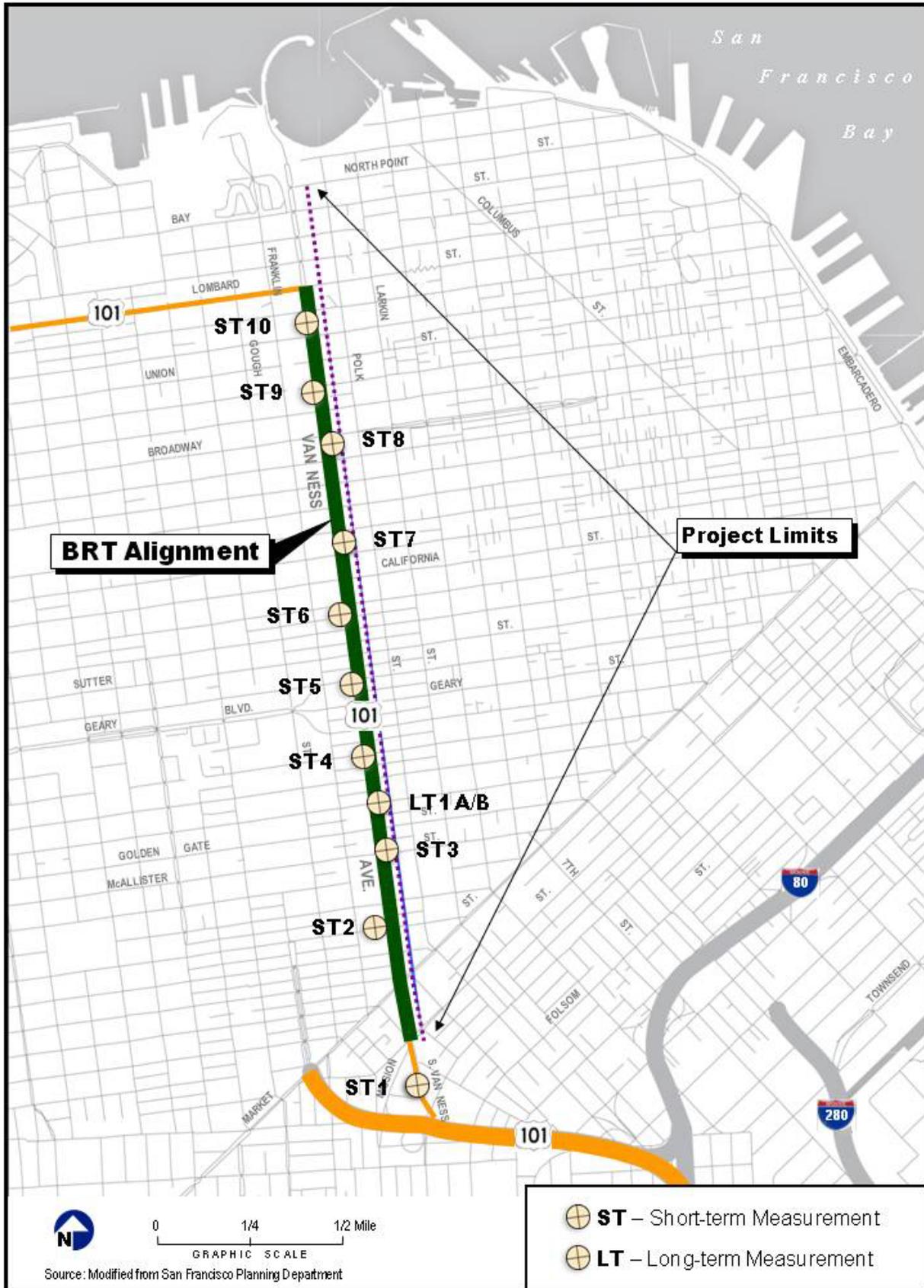


(a) Citywide View



Source: San Francisco DPH, 2012.

Figure 4.11-5: Noise Measurement Locations



4.11.5 | Environmental Consequences

According to Section 6.6.1 of the FTA Manual for Transit Noise and Vibration Impact Assessment (FTA, 2006), “In general, it is better to measure existing noise than to compute or estimate it.” Accordingly, this analysis applies a measurement-based approach used to establish baseline conditions. The *FTA Noise Impact Assessment Spreadsheet*⁹² was used, consistent with the federal *Transit Noise and Vibration Impact Assessment* guidelines (FTA, 2006), to assess the contribution of BRT operations to future transportation noise levels. For the parallel streets receiving traffic diverted from Van Ness Avenue, a spreadsheet was used to predict traffic noise level increases associated with predicted changes in traffic volumes. Specifically, the spreadsheet calculated the decibel-level increases associated with ratios of traffic volumes for different analysis scenarios. Consistent with the traffic study (CHS, 2013), 2035 traffic volumes were used for purposes of assessing future operational noise impacts on Van Ness Avenue, and on key parallel routes (Franklin and Gough streets).

The build alternatives, including the LPA (with or without the Vallejo Northbound Station Variant), propose construction of a dedicated bus lane, whereas the No Build Alternative is the no-build baseline case. Build Alternative 2 would provide a dedicated bus lane in the rightmost travel lane of Van Ness Avenue in both the NB and SB directions. Build Alternatives 3 and 4 and the LPA (with or without the Vallejo Northbound Station Variant) would convert the existing landscaped median and portions of two inside traffic lanes for a dedicated bus lane.

4.11.5.1 | OPERATIONAL NOISE ALONG VAN NESS AVENUE

Along Van Ness Avenue, future BRT operations would represent a new category of noise source under the project build alternatives, including the LPA; however, the elimination of two mixed-flow lanes as part of the project would reduce general automobile traffic capacity along the project corridor, tending to redirect some traffic to alternative routes. In addition, the total number of motor vehicle trips in the area is expected to decrease under the project alternatives due to the enhanced transit offered as an alternative mode of transportation to the automobile. Consistent with FTA guidelines, only the additional noise from BRT operations was considered in the analysis; this approach produced conservative impact results.

According to the proposed BRT service schedule, there would be headways of 3.5 minutes during peak hours, 5 minutes during midday hours, and 10 to 20 minutes during evening and nighttime hours. Service would begin at 6:00 a.m. and end at midnight.

The proposed future BRT vehicle fleet is expected to include some combination of diesel hybrid and electric-powered vehicles; however, to assure a conservative analysis, noise modeling was performed using FTA’s diesel bus option because diesel buses would be the noisiest. Project buses were assumed to operate at the posted speed limit of 25 mph. In practice, the operating speed would vary in the vicinity of proposed passenger stations as the bus approaches and departs from a station; however, speeds would not be expected to exceed the speed limit. In addition, while BRT travel between stations would be enhanced by TSP and signal optimization, travel speeds for any given bus trip would still be affected at some intersections due to red lights.

BRT noise levels were calculated using the operation schedule, speed, and distance of the proposed project limits. Distances to the centerline of the nearest BRT lane were 17 to 122 feet (varying by receiver and alternative). The calculated noise levels were then compared to the “Moderate Impact” and “Severe Impact” criteria, established according to the ambient noise conditions. Tables 4.11-4 and 4.11-5 provide the results of the calculations at the sensitive receivers and the degree of impact. Noise impacts from Build Alternatives 3 and 4 would be same; therefore, they are presented in one table. Using FTA methodology, predicted noise impacts for the LPA, with or without the Vallejo Northbound Station Variant, are the same as those presented in Table 4.11-5 for Build Alternatives 3 and 4, with

⁹² http://www.fta.dot.gov/documents/Noise_Impact_Assessment_Spreadsheet.xls

or without Design Option B.⁹³ Calculation results demonstrate no anticipated noise impacts along Van Ness Avenue from the proposed BRT service.

Predicted noise level increases were also compared with the City's 5-dB increase threshold for stationary objects. The final columns of Tables 4.11-4 and 4.11-5 show that the predicted increases remain well below that criterion. Again, the City does not specify a threshold for evaluating transportation noise; however, the 5-dB increase criterion is considered for this project as a means to address BRT noise effects at the local level.

4.11.5.2 | OPERATIONAL NOISE ON PARALLEL STREETS

Some of the traffic along Van Ness Avenue would be redistributed to alternative routes under the project alternatives, including the LPA (with or without the Vallejo Northbound Station Variant). Franklin and Gough streets are expected to attract more of the traffic redirected from Van Ness Avenue under the project alternatives than any other routes. The worst-case traffic noise levels were calculated using traffic volumes representing LOS C conditions. When peak-hour volumes exceed LOS C volumes, LOS C traffic flow represents loudest hour conditions. As traffic volumes increase such that LOS deteriorates to levels below C, travel speeds tend to decrease sufficiently to lower traffic noise levels relative to LOS C conditions.

Along segments of these two roadways paralleling Van Ness Avenue, future (2035) traffic noise levels under the build alternatives are predicted to be zero to 1.5 dB higher than future no-project noise levels. Relative to existing traffic noise levels, future project traffic noise levels would increase by zero to 2.2 dB. Typically a noise level change of 3 dB or less is not noticeable. These predicted changes are independent of distance from the indicated roadways, although the noise levels themselves would vary with distance from the roadways. These levels are below the 5-dB threshold derived from the City Noise Ordinance for fixed objects. Accordingly, no mitigation measures are required for operational noise impacts on Franklin and Gough streets.

4.11.5.3 | OPERATION VIBRATION IMPACTS

Significant vibration impacts from rubber-tire-fitted vehicles are extremely rare. This is because rubber-tire-fitted vehicles are not as massive as railway vehicles. They are additionally typically well isolated by the vehicle suspension design and rubber tires, which act as a highly effective barrier to vibration transmission from the vibration-generating carriage and the main propagation medium for vibration excitation, the ground; therefore, potential vibration impact from rubber-tire-fitted vehicles, such as those used in BRT projects, can be reasonably dismissed (FTA, 2006).

4.11.6 | Avoidance, Minimization, and/or Mitigation Measures

The No Build Alternative and the build alternatives, including the LPA (with or without the Vallejo Northbound Station Variant), are not expected to have adverse noise and vibration effects. Vibration impact due to BRT operation is dismissed due to the typical operational characteristics and vehicle design of BRT vehicles; however, roadway surface defects, such as pot holes, would elevate BRT pass-by noise and vibration. Thus, it is recommended that the following improvement measure is implemented:

IM-NO-1. Upkeep of roadway surface will be maintained throughout project operation to avoid increases in BRT noise and vibration levels.

⁹³ The FTA methodology for evaluating operational noise impacts focuses on the predicted increment to existing baseline noise levels from operational changes associated with project-specific vehicles – in this case, the proposed future introduction of BRT vehicles. No substantive differences in the noise-generating characteristics of BRT operations (e.g., speeds, headways, operational hours, and vehicles) are expected between Alternatives 3 and 4, either with or without this design option. Differences in distances from passing BRT vehicles to receivers would be negligible between Alternatives 3 and 4, and this design option would not alter the distances under either alternative.

Calculation results demonstrate no anticipated noise impacts along Van Ness Avenue from the proposed BRT service.

Significant vibration impacts from rubber-tire-fitted vehicles are extremely rare. Potential vibration impacts from rubber-tire-fitted vehicles, such as those used in BRT projects, can be reasonably dismissed.

Table 4.11-4: Operational Noise Levels for Build Alternative 2

RECEIVER NUMBER	LAND USE CATEGORY	DISTANCE TO BUS LANE NB/SB, FEET	EXISTING NOISE LEVEL L _{DN} (Leq) ² , DBA	CRITERIA, MODERATE / SEVERE, DBA	PROJECT NOISE LEVEL, L _{DN} (Leq) ² , DBA	CUMULATIVE NOISE, L _{DN} (Leq) ² , DBA	INCREASE IN CUMULATIVE NOISE, DB	NOISE IMPACT FTA CRITERIA	NOISE IMPACT CITY CRITERION ¹
R2	2	17 / 82	75	66-73 / >73	62	75	0	No	No
R3	1	110 / 45	(70)	65-69 / >69	(56)	(70)	0	No	No
R4	3	18 / 83	(70)	70-74 / >74	(62)	(71)	1	No	No
R5	1	154 / 88	(70)	65-69 / >69	(52)	(70)	0	No	No
R6	2	28 / 93	74	66-72 / >72	59	74	0	No	No
R7	3	102 / 34	(69)	69-74 / >74	(57)	(69)	0	No	No
R8	3	19 / 84	(69)	69-74 / >74	(61)	(70)	1	No	No
R9	2	23 / 88	77	66-74 / >74	60	77	0	No	No
R10	2	96 / 30	76	66-74 / >74	59	76	0	No	No
R11	1	89 / 33	(71)	66-70 / >70	(58)	(71)	0	No	No
R12	2	21 / 84	76	66-74 / >74	61	76	0	No	No
R13	2	113 / 50	72	66-71 / >71	56	72	0	No	No
R14	3	16 / 81	(70)	70-74 / >74	(62)	(71)	1	No	No
R15	2	94 / 29	75	66-73 / >73	59	75	0	No	No
R16	2	22 / 87	77	66-74 / >74	60	77	0	No	No
R17	2	23 / 88	77	66-74 / >74	60	77	0	No	No
R18	2	93 / 28	77	66-74 / >74	59	77	0	No	No
R19	3	24 / 90	(72)	71-76 / >76	(60)	(72)	0	No	No
R20	3	91 / 26	(72)	71-76 / >76	(59)	(72)	0	No	No
R21	2	97 / 32	72	66-71 / >71	58	72	0	No	No
R22	2	28 / 94	72	66-71 / >71	59	72	0	No	No
R23	3	96 / 30	(67)	68-72 / >72	(58)	(68)	1	No	No
R24	2	23 / 88	76	66-74 / >74	60	76	0	No	No
R25	2	94 / 27	76	66-74 / >74	59	76	0	No	No
R26	3	103 / 39	(71)	71-75 / >75	(57)	(71)	0	No	No
R27	2	19 / 85	75	66-73 / >73	61	75	0	No	No
R28	2	90 / 24	75	66-73 / >73	60	75	0	No	No
R29	2	90 / 24	75	66-73 / >73	60	75	0	No	No

Notes:

- Category 1 – Includes recording studios and concert halls; Category 2 – Includes residences and hotels; Category 3 – Includes schools, theatres, and churches.
- Noise levels shown within parentheses represent 1-hour L_{eq}. L_{eq} is applied rather than L_{dn} for Category 1 or Category 3 land uses. The L_{eq} values provided here represent 1-hour periods corresponding to the times of future (2035) peak BRT operations.
- The City criterion applicable to CEQA analysis is a 5-dB increase.

Table 4-11-5: Operational Noise Levels for Build Alternatives 3 and 4 and the LPA

RECEIVER NUMBER	LAND USE CATEGORY	DISTANCE TO BUS CENTER LANE, FEET	EXISTING NOISE LEVEL L _{DN} (Leq) ² , DBA	CRITERIA, MODERATE / SEVERE, DBA	PROJECT NOISE LEVEL, L _{DN} (Leq) ² , DBA	CUMULATIVE NOISE, L _{DN} (Leq) ² , DBA	INCREASE IN CUMULATIVE NOISE, DB	NOISE IMPACT FTA CRITERIA	NOISE IMPACT CITY CRITERION ¹
R2	2	47	75	66-73 / >73	58	75	0	No	No
R3	1	78	(70)	65-69 / >69	(54)	(70)	0	No	No
R4	3	50	(70)	70-74 / >74	(57)	(70)	0	No	No
R5	1	122	(70)	65-69 / >69	(51)	(70)	0	No	No
R6	2	61	74	66-72 / >72	56	74	0	No	No
R7	3	60	(69)	69-74 / >74	(55)	(69)	0	No	No
R8	3	58	(69)	69-74 / >74	(56)	(69)	0	No	No
R9	2	59	77	66-74 / >74	56	77	0	No	No
R10	2	64	76	66-74 / >74	56	76	0	No	No
R11	1	63	(71)	66-70 / >70	(56)	(71)	0	No	No
R12	2	55	76	66-74 / >74	57	76	0	No	No
R13	2	79	72	66-71 / >71	55	72	0	No	No
R14	3	51	(70)	70-74 / >74	(57)	(70)	0	No	No
R15	2	59	75	66-73 / >73	56	75	0	No	No
R16	2	53	77	66-74 / >74	57	77	0	No	No
R17	2	53	77	66-74 / >74	57	77	0	No	No
R18	2	58	77	66-74 / >74	57	77	0	No	No
R19	3	56	(72)	71-76 / >76	(56)	(72)	0	No	No
R20	3	59	(72)	71-76 / >76	(56)	(72)	0	No	No
R21	2	64	72	66-71 / >71	56	72	0	No	No
R22	2	62	72	66-71 / >71	56	72	0	No	No
R23	3	62	(67)	68-72 / >72	(56)	(67)	0	No	No
R24	2	56	76	66-74 / >74	57	76	0	No	No
R25	2	59	76	66-74 / >74	56	76	0	No	No
R26	3	69	(71)	71-75 / >75	(55)	(71)	0	No	No
R27	2	53	75	66-73 / >73	57	75	0	No	No
R28	2	55	75	66-73 / >73	57	75	0	No	No
R29	2	62	75	66-73 / >73	56	75	0	No	No

Notes:

- Category 1 – Includes recording studios and concert halls; Category 2 – Includes residences and hotels; Category 3 – Includes schools, theatres, and churches.
- Noise levels shown within parentheses represent 1-hour Leq. Leq is applied rather than Ldn for Category 1 or Category 3 land uses. The Leq values provided here represent 1-hour periods corresponding to the times of future (2035) peak BRT operations.
- The City criterion applicable to CEQA analysis is a 5dB increase.
- Operational noise levels under Build Alternatives 3 and 4 would not change with or without incorporation of the Design Option B (i.e., elimination of left turns), nor would they change for the LPA.

4.12 Energy

This section addresses the impact of the proposed project on transportation-related energy consumption. The energy analysis considers the long-term direct impacts related to energy consumption for the future horizon year 2035. Direct energy consumption includes the fuel required for passenger vehicles (i.e., automobiles, vans, and light trucks), heavy trucks (i.e., three or more axles), and transit buses. The LPA included in this Final EIS/EIR is a refinement of the center-running alternatives with limited left turns (Build Alternatives 3 and 4 with Design Option B), as described in Chapters 2 and 10. The energy effects of the LPA, with or without the Vallejo Northbound Station Variant, are identified as part of the analysis presented for the build alternatives in this chapter. There would be no difference in such impacts under the LPA compared with the impacts described for Build Alternatives 3 and 4 with Design Option B in this subsection.

DEFINITIONS

INDIRECT ENERGY CONSUMPTION: Energy consumed in construction and maintenance.

DIRECT ENERGY CONSUMPTION: Fuel required to operate passenger vehicles, heavy trucks, and transit buses.

4.12.1 | Regulatory Setting

This section provides an overview of the federal, state, and local regulations and polices relevant to energy usage and impact analysis associated with proposed project operation.

4.12.1.1 | NATIONAL ENVIRONMENTAL POLICY ACT [42 U.S.C. SECTION 4321 ET SEQ.]

NEPA requires the consideration of potential environmental effects, including potential effects to public utilities and energy, in the evaluation of any proposed federal agency action. NEPA also obligates federal agencies to consider the environmental consequences and costs in their projects and programs as part of the planning process. General NEPA procedures are set forth in the CEQ regulations 40 CFR 1500.

4.12.1.2 | CALIFORNIA ENVIRONMENTAL QUALITY ACT [SECTION 21000 ET SEQ.] AND CEQA GUIDELINES [SECTION 15000 ET SEQ.]

CEQA requires state and local agencies to identify the significant environmental impacts of their actions, including potential significant impacts to public utilities and energy, and to avoid or mitigate those impacts, when feasible. CEQA Guidelines call for project sponsors to analyze whether a proposed project would “encourage activities which result in the use of large amounts of fuel, water, or energy; or use fuel, water, or energy in a wasteful manner,” as summarized in Chapter 6, in which case the project would be considered to have a significant energy impact.

4.12.1.3 | ENERGY MANAGEMENT FOR TRANSIT VEHICLES UNDER THE SAN FRANCISCO GENERAL PLAN

Policy 12.1 of the San Francisco General Plan sets forth guidelines for incorporating energy management practices into building, facility, and fleet maintenance and operations. This policy provides *de facto* fleet energy management practices for operating and maintaining the vehicle fleet owned and operated by the City and County of San Francisco. The practices are intended to reduce unnecessary fuel usage. This project should follow those practices.

4.12.2 | Affected Environment

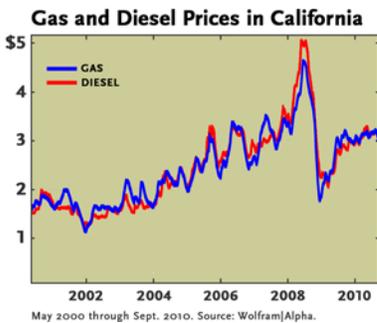
Existing transportation energy consumption in the Van Ness Avenue corridor includes the fuel required for passenger vehicles (i.e., automobiles, vans, and light trucks), heavy trucks (i.e., three or more axles), and transit buses.

Most motor vehicles in the Van Ness Avenue corridor depend on gasoline and diesel fuel. The exception is transit vehicles: More than half of Muni’s transit fleet uses electrical power for operation.

A mix of natural gas, electricity, gasoline, and diesel fuel provide the energy source for transportation in the Van Ness Avenue corridor. Passenger vehicles primarily utilize gasoline as fuel, where heavy trucks primarily utilize diesel fuel. Natural gas can be used by motor vehicles (i.e., passenger and heavy truck), but it is commonly a fuel used in heating facilities and manufacturing or processing. Electricity can also be used for motor vehicles; however, most motor vehicles in the Van Ness Avenue corridor depend on gasoline and diesel fuel. The exception is transit vehicles. Trolley buses, cable cars, streetcars, and light rail vehicles, which comprise more than half of Muni’s transit fleet, use electrical power for operation (FTA, 2008). Muni’s electric fleet operates with power that is generated at the SFPUC Hetch Hetchy hydroelectric facility in the Sierra foothills and is distributed via a long-distance transmission system to customers in San Francisco and the Peninsula. Under City agreements, Hetch Hetchy provides power to Muni, which is transmitted to the electric fleet through Muni’s traction power substations and OCS.

Existing transit service on Van Ness Avenue is provided by Muni bus lines 47 and 49, their corresponding Owl night bus services,⁹⁴ and by Golden Gate Transit bus lines 70, 80, and 93. Line 47 is comprised of 40-foot-long diesel motor coaches. Line 49 is comprised of 60-foot-long electric trolleybuses. Both bus lines originate and terminate at Muni maintenance yards located within San Francisco. The Golden Gate Transit bus fleet in the corridor operates on diesel fuel.

Transit operating costs are affected by fuel prices. SFMTA is affected by market fluctuations in purchasing fuel. The petroleum fuel market is quite volatile, and it is not possible to accurately forecast fuel prices even a few months into the future. For example, diesel and gasoline fuel prices have fluctuated considerably over the past 10 years, peaking in 2008.⁹⁵ As of August 2010, diesel and gasoline prices in California average approximately \$3.19 and \$3.17 per gallon, respectively. In 2010, a kilowatt-hour of electricity in California costs approximately 10.97 cents per kilowatt-hour.



4.12.3 | Environmental Consequences

The following section compares estimated energy use under the different alternatives to determine whether any of the alternatives could encourage activities that would use or waste large amounts of energy.

4.12.3.1 | INDIRECT VERSUS DIRECT ENERGY CONSUMPTION

The proposed build alternatives, including the LPA (with or without the Vallejo Northbound Station Variant), would require energy to construct, operate, and maintain. Energy consumed in construction and maintenance is referred to as indirect energy usage. Construction includes that energy used by construction equipment and other activities at the worksite, in addition to the energy used to manufacture the equipment, materials, and supplies and to transport them to the worksite. Energy for maintenance includes that for day-to-day upkeep of equipment and systems, as well as the energy embedded in any replacement equipment, materials, and supplies. Indirect energy needs for construction of the proposed project would not be substantial, and indirect energy needs for maintenance would not change from the existing conditions; therefore, none of the build alternatives would have a significant effect on indirect energy consumption.

Energy consumed in the operation of transportation systems is typically referred to as direct energy consumption. This includes energy used by vehicles transporting people or goods (i.e., propulsion energy), plus energy used to operate facilities such as stations and station amenities, maintenance shops, yards, and other system elements. Over the life of a transportation project, direct energy consumption is usually the largest component of the

⁹⁴ Late night 47 and 49 services are provided by the 20 Owl.

⁹⁵ Diesel and gasoline fuel prices in California in 2000 were \$1.99 and \$1.79 per gallon, respectively. Peak price in the last 10 years (year 2008) was \$4.90 and \$4.40 per gallon, respectively.

project’s total energy use. Vehicle propulsion energy can amount to 60 percent of the total energy consumption related to a transportation project (Caltrans, 1983). In the current energy environment, the ongoing energy requirements of new activities, including their long-term impacts on energy supplies, are of chief concern; therefore, from an energy conservation standpoint, direct energy impacts are of greater importance than indirect energy impacts. For these reasons, the energy analysis for this environmental document focuses on direct rather than indirect energy requirements because no changes to indirect energy consumption are expected with the project, whereas the project could potentially affect direct energy consumption from the transportation sector.

4.12.3.2 | ENERGY IMPACTS

By providing dedicated lanes for transit, the proposed BRT build alternatives, including the LPA (with or without the Vallejo Northbound Station Variant), would separate transit from auto traffic, thereby improving transit speeds and reliability. The frequency of existing transit service and hence transit VMT under all project build alternatives would remain the same as under the No Build Alternative; however, the improved transit performance (i.e., improved speed and reliability) and experience provided by the proposed BRT build alternatives would attract riders to the BRT service, resulting in mode shift for some drivers of motor vehicles to transit, thereby reducing the number of autos and auto VMT in San Francisco as presented in Table 4.12-1. These changes in travel behavior results in decreases in travel by less energy-efficient modes (i.e., autos) and greater travel by a more energy-efficient mode (i.e., BRT buses).

Table 4.12-1: Annual Year 2035 Countywide Energy Use for the Project Alternatives

ALTERNATIVE	ANNUAL AUTO VEHICLE MILES TRAVELED ²	POWER CONSUMED (GALLONS OF GASOLINE) ³	CHANGE IN FUEL CONSUMPTION (GALLONS OF GASOLINE)	ENERGY EQUIVALENT IN BTUS (MILLIONS) ⁴
No Build Alternative ¹	3,828,962,240	114,868,867		14,358,608
Build Alternative 2	3,805,424,640	114,162,739	(706,128)	14,270,342
	Difference from No Build Alternative			-0.61%
Build Alternatives 3 & 4	3,803,920,320	114,117,610	(751,258)	14,264,701
	Difference from No Build Alternative			-0.65%
Build Alternatives 3 & 4 with Design Option B) ⁵	3,825,133,120	114,753,994	(114,874)	14,344,249
	Difference from No Build Alternative			-0.10%

BTUs = British Thermal Units

Notes:

- ¹ No Build Alternative forms basis for comparison for other alternatives.
- ² Transit (i.e., rail and bus) vehicle miles traveled (VMT) in the county assumed to be the same under the No Build Alternative and all of the build alternatives. Project impacts only automobile VMT.
- ³ Autos/small trucks use gasoline. Gallons of gasoline consumed per mile of travel equals 0.03 gallons per mile.
- ⁴ BTUs in one gallon of gasoline = 125,000.
- ⁵ The LPA, with or without the Vallejo Northbound Station Variant, would have the same energy use as Build Alternatives 3 and 4 with Design Option B.

Source: U.S. Department of Energy, 2008c.

In addition to the estimated annual VMT, Table 4.12-1 shows the annual power consumption of the project alternatives in 2035. Because the proposed build alternatives do not affect the transit VMT, they are anticipated to have little to no effect on transit energy supply and consumption (i.e., electricity and diesel fuel supply). The project would also have little to no effect on heavy-truck traffic; therefore, only automobile VMT and automobile power consumption are presented. Auto/light-truck fuel usage is expressed in terms of gallons of gasoline. Energy consumption is presented in gallons of gasoline and BTUs, or British thermal units. BTU is a standard measure of energy content. A gallon of gasoline is equivalent to approximately 125,000 BTUs (U.S. Department of Energy, 2008).

KEY FINDING

Each build alternative, including the LPA, would have a minor beneficial effect on energy consumption. The potential benefit of the proposed project for energy would result from a decrease in automobile VMT countywide. The proposed project would not have an effect on electricity or diesel fuel supply.

As shown in Table 4.12-1, each build alternative would result in a slight reduction in energy consumption compared with the No Build Alternative. Build Alternatives 3 and 4 with Design Option B would also lead to a similar reduction in energy consumption compared to the No Build Alternative.

Implementation of Build Alternative 2 would reduce gasoline consumption by 706,000 gallons, which translates to approximately 0.60 percent in energy savings compared to the No Build Alternative. Build Alternatives 3 and 4 are identical in terms of their effect on energy consumption and would save 751,000 gallons of gasoline annually (energy savings of 0.65 percent). Build Alternatives 3 and 4 with Design Option B (the LPA) would save 115,000 gallons of gasoline annually. This translates to a 0.1 percent reduction in energy consumption. Implementation of Build Alternatives 3 and 4 with Design Option B (the LPA) would involve removal of the existing left-turn pockets, which would lead to automobiles traveling more miles than under the other build scenarios, leading to slightly lesser energy savings. The LPA would result in the same energy savings as Build Alternatives 3 and 4 with Design Option B. In summary, each build alternative, including the LPA (with or without the Vallejo Northbound Station Variant), would have a minor beneficial effect on energy consumption. The slight benefit of the proposed project for energy would result from a decrease in automobile VMT countywide. The proposed project would not have an effect on electricity or diesel fuel supply.

4.12.4 | Avoidance, Minimization, and/or Mitigation Measures

The proposed project would have very slight beneficial impacts on regional energy consumption; therefore, no avoidance, minimization, or mitigation measures are required.

4.13 Biological Environment

This section summarizes the regulatory setting; affected environment; environmental consequences; and measures to avoid, mitigate, or compensate for long-term, permanent impacts to biological resources as a result of the proposed project. Construction-phase impacts and avoidance measures are presented in Section 4.15.13, Construction Impacts. Documents providing background for this section include the *Van Ness Avenue Bus Rapid Transit Natural Resources Technical Memorandum* (GANDA, 2009), Article 16 Urban Forestry Ordinance of the Public Works Code and the Van Ness Area Plan (SFGOV, 2007).

Preparation of the *Van Ness Avenue Bus Rapid Transit Natural Resources Technical Memorandum* included review of the California Natural Diversity Database (CNDDDB) San Francisco north 7.5-minute United States Geological Survey (USGS) topographic quadrangle map, which encompasses the project area, in addition to the United States Fish and Wildlife Service (USFWS) database of threatened and endangered species for San Francisco County (USFWS, 2008). Previous biological surveys conducted in the project vicinity were also reviewed, in addition to relevant literature searches (GANDA, 2009). Surveys of the project area by a qualified biologist were conducted on November 13, 2007, and June 10, 2009.

The LPA included in this Final EIS/EIR is a refinement of the center running alternatives with limited left turns (Build Alternatives 3 and 4 with Design Option B), as described in Chapters 2 and 10. The environmental consequences of the proposed project with the LPA, with or without the Vallejo Northbound Station Variant, for biological resources are identified as part of the analysis presented for the build alternatives in this chapter. Because the LPA configuration is a variation of the center running alternatives in the Draft EIS/EIR, the LPA has different effects relative to tree removal and replanting opportunities presented for the build alternatives. However, the overall impact findings with the LPA fall within the range of the findings for Build Alternatives 3 and 4, as presented in this subsection.

4.13.1 | Regulatory Setting

The following discussion summarizes environmental laws and regulations governing biological resources relevant to the proposed project.

4.13.1.1 | FEDERAL REGULATIONS

Clean Water Act Section 401

Section 401 of the federal CWA requires the issuance of a water quality certification or waiver thereof for all nationwide or individual permits issued by the United States Army Corps of Engineers (USACE) under Section 404 of the CWA. Issuance of water quality certification (or waiver) is considered a discretionary action, requiring review under the California Environmental Quality Act (CEQA). The RWQCB considers impacts on all waters of the U.S. and wetlands identified in the project area during the CEQA review process and issues water quality certification. Thus, Section 401 of the CWA is implemented by the San Francisco RWQCB, as discussed in Section 4.13.1.2.

Federal Endangered Species Act of 1973, as Amended (Public Law 93-295)

The Federal Endangered Species Act (FESA) of 1973 mandates as federal policy that all federal agencies should work towards conservation of species of fish, wildlife, and plants in danger of or threatened with extinction. USFWS has jurisdiction over plants, wildlife, and resident fish, while the National Oceanic and Atmospheric Administration (NOAA) Fisheries has jurisdiction over anadromous fish, marine fish, and marine mammals. Federal

RESOURCES

More information on federal and state environmental laws and regulations:

**CLEAN WATER ACT
SECTION 401**
www.epa.gov/wetlands/regs/se401.html

**FEDERAL ENDANGERED
SPECIES ACT OF 1973,
as Amended (Public Law 93-295)**
www.fws.gov/Endangered/ESA/content.html

MIGRATORY BIRD TREATY ACT
www.fws.gov/pacific/migratorybirds/mbta.htm

**EXECUTIVE ORDER 13112 –
INVASIVE SPECIES**
www.invasivespeciesinfo.gov/laws/execorder.shtml

**CALIFORNIA ENDANGERED
SPECIES ACT OF 1984**
www.dfg.ca.gov/habcon/cesa

PORTER-COLOGNE ACT
ceres.ca.gov/wetlands/agencies/swrcb.html

agencies that fund, authorize, or carry out actions that “may affect” a listed species and its habitat, must consult with USFWS and/or NOAA Fisheries according to the provisions in Section 7(a) of the FESA to ensure that the federal agencies’ actions do not jeopardize the continued existence of a listed species or adversely modify critical habitat for listed species. USFWS is authorized to permit the taking of listed species “if such taking is incidental to, and not the purpose of carrying out otherwise lawful activities” [16 U.S.C. 1539 and Section 10(a)(1)(B) of FESA]. For federal actions, an incidental take may be authorized pursuant to Section 7 consultation with the issuance of a Biological Opinion by USFWS and/or NOAA Fisheries. For non-federal (i.e., state and private) actions, Section 10 of the FESA requires the issuance of an “incidental take” permit before any action that would potentially take any individual of an endangered or threatened species. The permit requires preparation and implementation of a Habitat Conservation Plan that would offset the take of listed species that may occur through specific mitigation measures.



The incidental take of birds, active nests, eggs, and nestlings without a special circumstance permit is prohibited by the Migratory Bird Treaty Act.

Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) (16 U.S.C., Section. 703, Supplement. I, 1989) provides protection for most birds (common and listed) by prohibiting the incidental take of birds, active nests, eggs, and nestlings without a special circumstance permit issued by USFWS. Activities that cause abandonment of a nest and/or loss of reproductive effort are also considered non-permitted take and are prohibited by the MBTA. Inactive nests are not protected by the MBTA and may be removed during the non-nesting season. Exclusionary structures (e.g., netting or plastic sheeting) may be used to discourage the construction of nests by birds within the project construction zone.

Executive Order 13122 –Invasive Species

E.O. 13122, signed in 1999, requires federal agencies to work cooperatively to prevent and control the spread of invasive plants and animals. FHWA and Caltrans have issued guidance requiring that NEPA and CEQA analysis for a proposed action include an analysis of the probability of the action to cause or promote the introduction or spread of invasive species. If analysis indicates that disturbances caused by the action have the potential to promote the introduction or spread of invasive species, then all feasible and prudent measures must be taken to minimize this likelihood.

4.13.1.2 | STATE REGULATIONS

California Endangered Species Act of 1984 (Sections 2050-2098 of the California Fish and Game Code)

The California Endangered Species Act (CESA) is intended to conserve and enhance endangered species and their habitats and requires that state agencies cannot approve any action under their jurisdiction when the action would result in the extinction of endangered and threatened species, or destroy habitat essential to their continued existence, if reasonable and prudent alternatives exist. The CESA requires that a lead agency conduct an endangered species consultation with the California Department of Fish and Wildlife (CDFW) if the proposed action could affect a state-listed species. CDFW then prepares a written finding on whether the proposed action would jeopardize the listed species or destroy essential habitat. In the case of an affirmative finding, CDFW presents alternatives to avoid jeopardy. Under Section 2081 of the California Fish and Game Code (CFG), CDFW may authorize take of endangered, threatened, or candidate species through issuance of permits or memorandum of understanding.

Since 1978, CDFW has produced three reports that address wildlife “Species of Special Concern” in California. Many of the species included in those reports do not have federal-or state-listed or candidate status, but they are believed to be declining in abundance and/or

distribution within the state. CDFW Species of Special Concern do not have any legal protection status; however, because they are considered declining species, they are usually informally protected.

Porter-Cologne Water Quality Control Act of 1969 (Porter-Cologne Act)

The Porter-Cologne Water Quality Control Act of 1969 (Porter-Cologne Act) is the major water quality control law for California. The Act authorizes the State to implement the provisions of the CWA. The Porter-Cologne Act establishes a regulatory program to protect the water quality of the state and the beneficial uses of state waters. Under this act, the SWRCB provides policy guidance and review for the RWQCBs, and the RWQCBs implement and enforce the provisions of the Act. Section 401 of the CWA stipulates that any action that requires a federal license or permit and that may result in a discharge of pollutants into waters of the U.S. also requires water quality certification. Locally, this program is administered by the San Francisco RWQCB and is designed to ensure that the discharge will comply with applicable federal and state effluent limitations and water quality standards. Certification applies to both construction and operation.

4.13.1.3 | TREE PROTECTION LEGISLATION

Tree Protection Legislation – Article 16 Urban Forestry Ordinance

City ordinance provides for protection of certain trees as set forth in Article 16 Urban Forestry Ordinance of the Public Works Code. The City considers “protected trees” as street trees, significant trees, and landmark trees. Removal of any of these requires a permit. Moreover, if any project activity is to occur within the tree drip line, then a Tree Protection Plan prepared by an International Society of Arboriculture (ISA) certified arborist is to be submitted to the Planning Department for review and approval. Protected trees are defined as follows:

- **Landmark Trees.** Landmark Trees have the highest level of protection in the City. These trees meet criteria for age, size, shape, species, location, historical association, visual quality, or other contribution to the City’s character and have been found worthy of Landmark status after Urban Forestry Council and Board of Supervisors public hearings. Temporary landmark status is also afforded to nominated trees currently undergoing the public hearing process. The SFDPW maintains the official “Landmark Tree Book” with all designated Landmark Trees in San Francisco.
- **Significant Trees.** Significant Trees are located within 10 feet of the property edge of the sidewalk and are above 20 feet in height, or have a canopy greater than 15 feet in diameter, or have a trunk diameter greater than 12 inches at breast height.
- **Street Trees.** Street Trees are trees within the public ROW. Street Trees may be maintained by either the adjacent property owner or the City.

Removal of a protected tree by a City department such as SFMTA requires approval from SFDPW, which involves posting a tree removal notice for up to 30 days. If objection to removal is received, then the removal is scheduled for a public hearing before the SFDPW Director, who will in turn issue a final decision.

4.13.2 | Affected Environment

The project corridor is wholly developed with little or no indigenous vegetation. There are no wetlands, seasonal or perennial watercourses, or riparian areas within the project area. The Van Ness Avenue corridor is considered a major storm water catch basin in San Francisco, which is discussed in Section 4.9, Hydrology and Water Quality. Existing vegetation in the corridor consists of predominately non-native ornamental trees and shrubs planted along the sidewalks and within the median strip. Most of these plantings feature



Existing vegetation consists of predominately non-native ornamental trees and shrubs planted along the sidewalks and within the median strip.

ornamental species not native to California such as Eucalyptus trees, including Desert Gum (*Eucalyptus rudis*), Silver Dollar Gum (*Eucalyptus polyanthemus*), and Beautiful Leaf Eucalyptus (*Eucalyptus calophylla*). Other planted species include Linden (*Tilia* sp.) and London Plane Tree (*Platanus x acerifolia*). Plantings along the median are mostly colorful, hearty plants, such as Lily of the Nile (*Agapanthus* sp.) and other ornamental varieties (SFGOV, 2007).

Planted trees and shrubs in landscaped areas can provide marginal suitable refuge for several bird species during seasonal nesting and migration periods. Several bird and raptor species are known to occur within San Francisco, including Anna's hummingbird (*Calypte anna*), house finch (*Carpodacus mexicanus*), Brewer's blackbird (*Euphagus cyanocephalus*), mourning dove (*Zenaida macroura*), American crow (*Corvus brachyrhynchos*), red-tailed hawk (*Buteo jamaicensis*), Cooper's hawk (*Accipiter cooperii*), and peregrine falcon (*Falco peregrinus*). The peregrine falcon is a California state endangered species known to nest on buildings in urban settings, including San Francisco. Peregrine falcons have been regularly observed perched on the California State Automobile Association (CSAA) building located at 100 Van Ness Avenue, and they have been photographed at City Hall. There is no record or evidence that peregrine falcons or other raptors have nested on these or any other buildings along Van Ness Avenue (GANDA, 2009).

A search of the CNDDDB database for the San Francisco north 7.5-minute quadrangle map provided a list of 12 special-status animals. None of the animals listed are known to occur within the project corridor. Of the 12 records reported, only 2 monarch butterfly (*Danaus plexippus*) overwintering sites are known to occur within 1-mile of the project. One site at Telegraph Hill and another near Fort Mason are the nearest occurrences, but they are outside the project area. Other special-status animal records reported by the CNDDDB include California red-legged frog (*Rana aurora draytonii*), western pond turtle (*Clemmys marmorata*), and American badger (*Taxidea taxus*). All of these records are located in Golden Gate Park and are more than 1.5 miles from the project area.

One median tree, a 17-foot-tall Cork Oak (*Quercus suber*), located at the intersection of Jackson Street and Van Ness Avenue, was planted as part of an Arbor Day celebration on March 14, 2006, and was dedicated to civil rights pioneer Rosa Parks. Although this tree does not qualify as a landmark or significant tree per County ordinance, it may warrant special consideration in planning and may be a candidate for relocation in accordance with Article 16 Urban Forestry Ordinance of the Public Works Code.

KEY FINDINGS

- The build alternatives, including the LPA (with or without the Vallejo Northbound Station Variant), would not affect Waters of the U.S. or require Section 401 Water Quality Certification.
- No native plant assemblage or biotic community would be disturbed during operation of the project or under the No Build Alternative.
- The removal of existing trees and shrubs is not significant because each build alternative would include replacement planting.

4.13.3 | Environmental Consequences

The project corridor does not include wetlands, water bodies, or riparian habitat; therefore, the build alternatives, including the LPA (with or without the Vallejo Northbound Station Variant), would not affect Waters of the U.S. or require Section 401 Water Quality Certification. In addition to its own storm water management program, the City of San Francisco is required by federal, state, and local laws to implement programs that reduce the discharge of pollutants to the local storm drain system, as discussed in Section 4.9, Hydrology and Water Quality (SFPUC, 2007).

The project area has no special-status biological resources or protected habitats that could be impacted by the build alternatives, including the LPA (with or without the Vallejo Northbound Station Variant), and to a lesser extent the No Build Alternative. Thus, no native plant assemblage or biotic community would be disturbed during operation of the project or under the No Build Alternative. Nonetheless, median and sidewalk vegetation along Van Ness Avenue provides habitat for nesting birds, which are protected by the MBTA. Operation of the build alternatives, including Design Option B and the LPA, would not increase disturbance to migratory birds and active bird nests during the nesting season. Similarly, operation under the No Build Alternative would not increase disturbance to migratory birds and active bird nests. Potential disturbance to migratory birds during project construction is discussed in Section 4.15.11, Construction Impacts, because project

construction under all of the build alternatives, including the LPA, would result in removal of existing trees. The extent of tree removal differs under each build alternative and the LPA, and detailed information on reasons for tree removal and their condition is presented in Section 4.4, Aesthetics/Visual Resources. Section 4.4 also describes the planting opportunities under each build alternative, including the LPA. The impact from the removal of existing trees and shrubs would be alleviated under each build alternative, including the LPA, with replacement planting. Increased sidewalk and median tree plantings over existing conditions would result in long-term, beneficial effects to biological resources, with improvements growing over time as plantings mature. Although tree removal impacts of the proposed project do not result in significant biological impacts, incorporation of a median design plan previously described in Section 4.4.4 as mitigation measures M-AE-3 and M-AE-4, in addition to measures IM-BI-1 through IM-BI-2 described below, would reduce impacts from tree removal.

4.13.4 | Avoidance, Minimization, and/or Mitigation Measures

Potential disturbance to migratory birds during project construction and tree removal permitting is discussed in Section 4.15.11, Construction Impacts. To minimize impacts from removal of existing trees and landscaping, the following improvement measures and permit requirements would be incorporated into project design for each build alternative, including Design Option B and the LPA, with or without inclusion of the Vallejo Northbound Station Variant:

IM-BI-1. In compliance with local tree protection policies, mature trees shall be preserved and incorporated into the project landscape plan as feasible. Planting of replacement trees and landscaping will be incorporated into the landscape plan as feasible (also refer to M-AE-3).

IM-BI-2. Have a certified arborist complete a preconstruction tree survey to identify protected trees that could be impacted by the proposed project, and to determine the need for tree removal permits and tree protection plans under San Francisco Public Works Code requirements.

IM-BI-3. In compliance with the Executive Order on Invasive Species, E.O. 13112, the landscaping included in the proposed project will not use species listed as noxious weeds.

A preconstruction tree survey conducted by a certified arborist will be completed to identify protected trees that could be impacted by the proposed project and to determine the need for tree removal permits and tree protection plans.

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4.14 Environmental Justice

This subsection examines if project implementation would result in disproportionately high or adverse human health or environmental effects on minority or low-income populations relative to the larger area/community of comparison.

The LPA included in this Final EIS/EIR is a refinement of the center-running alternatives with limited left turns (Build Alternatives 3 and 4 with Design Option B), as described in Chapters 2 and 10. The environmental consequences related to environmental justice under the LPA, with or without the Vallejo Northbound Station Variant, are identified as part of the analysis presented for the build alternatives in this chapter. There would be no difference in such impacts under the LPA compared with the impacts described for the build alternatives in this subsection.

4.14.1 | Regulatory Setting

In response to concerns over environmental impacts in minority and low-income populations, the Executive Office of the President of the United States established a formal federal policy on environmental justice in February 1994 with Executive Order (EO) 12898 (*Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*). This executive order calls on federal agencies to identify and address any disproportionately high and adverse human health or environmental effects of federal programs, policies, and activities on minority populations and low-income populations. The general principles under EO 12898 are as follows:

- Avoid, minimize, or mitigate disproportionately high and adverse human health and environmental effects, including social and economic effects, on minority and low-income populations.
- Ensure the full and fair participation of all potentially affected communities in the transportation decision-making process.
- Prevent the denial of, reduction in, or significant delay in the receipt of benefits by minority and low-income populations.

In April 1997, the U.S. Department of Transportation (DOT) issued an Order on Environmental Justice (DOT Order 5610.2), establishing procedures for its operating administrations, including FTA, to comply with EO 12898 and to promote environmental justice principles as part of its mission. Order 5610.2 stresses the importance of addressing environmental justice concerns early in the development of a program, policy, or activity. It requires where relevant, appropriate, and practical, that information be obtained on the population served and/or affected, including information on race, color, or national origin and income level and that steps be taken to guard against disproportionately high and adverse impacts on protected populations.

Beginning with the Van Ness Avenue BRT Feasibility Study undertaken in 2006, SFCTA involved and sought input from the general public to understand transit needs in the Van Ness Avenue corridor and identify alternative BRT improvements to meet those needs. That public involvement process, which will continue through completion of the EIS/EIR and design/construction, has been all-inclusive, based on outreach to all of the affected communities, which include people of diverse incomes, ethnicities, and languages in the study area.

Impacts and benefits of transportation projects to neighborhoods and the region result from the physical placement and operation of such transportation facilities. This environmental justice analysis examines whether adverse effects across all environmental resource areas are experienced disproportionately by, and are higher for, areas with a concentration of minority and/or low-income populations.

DEFINITIONS
(AS DEFINED BY THE
U.S. CENSUS 2000)

MINORITY: People of the following Census-defined races or ethnicities: Black, Asian, American Indian and Alaskan Native, Native Hawaiian or Other Pacific Islander, and Hispanic.

LOW-INCOME: Households whose household income is at, or below, the U.S. Department of Health and Human Services (HHS) poverty guidelines. The HHS poverty guidelines for the 2000 U.S. Census were \$8,240 for a single-person household and \$2,820 for each additional household occupant.

4.14.2 | Affected Environment

For purposes of EO 12898, the U.S. DOT Order addresses persons belonging to the following focused populations:

- **Minority:** People of the following Census-defined races or ethnicities: Black, Asian, American Indian and Alaskan Native, Native Hawaiian or Other Pacific Islander, and Hispanic.
- **Low-income:** Households whose household income is at, or below, the U.S. Department of Health and Human Services (HHS) poverty guidelines.

U.S. Census 2000 data were used to identify the location of minority populations and low-income populations within the Van Ness Avenue BRT study area.⁹⁶ Information was collected at the Census Block Group level, which is an aggregate of Census Blocks. Census Block Groups data were used to identify the location of minority populations, as was done for determining income levels. Because the Census Bureau must protect the privacy of individuals, all household income data is released in units no smaller than the Block Group, rather than by Block, which is the smallest geographic unit used by the Census Bureau for collecting and reporting demographic data.

The study area has a population that is socioeconomically and ethnically diverse, as summarized in Section 4.2, Community Impacts, and presented in Table 4.14-1 (majority/minority populations are highlighted in grey for emphasis). Approximately 43 percent of all study area residents are members of minority populations (i.e., non-white), compared with an approximate 56 percent minority population in the City and County of San Francisco. Figure 4.14-2 on page 4.14-9 shows the location of these block groups.

Table 4.14-1: 2000 U.S. Census Block Group Analysis

STUDY AREA LOCATION	POPULATION	% MINORITY	AVERAGE HOUSEHOLD SIZE	MEDIAN HOUSEHOLD INCOME	HHS POVERTY LINE
Census Tract 102, Block Group 1	1,316	16.4%	1.7	\$99,252	\$13,034
Census Tract 102, Block Group 2	1,929	14.0%	1.5	\$86,639	\$12,470
Census Tract 102, Block Group 3	1,043	20.6%	1.5	\$61,150	\$12,470
Census Tract 109, Block Group 1	1,081	26.8%	1.7	\$90,711	\$13,034
Census Tract 109, Block Group 2	1,754	34.4%	1.8	\$66,959	\$13,316
Census Tract 109, Block Group 3	1,671	27.6%	1.5	\$49,214	\$12,470
Census Tract 110, Block Group 1	868	48.6%	1.8	\$46,875	\$13,316
Census Tract 110, Block Group 2	2,095	70.0%	2.3	\$34,081	\$14,726
Census Tract 110, Block Group 3	2,066	59.1%	2.0	\$49,063	\$13,880
Census Tract 110, Block Group 1	2,241	54.4%	1.9	\$39,792	\$13,598
Census Tract 110, Block Group 2	2,280	51.4%	1.8	\$30,148	\$13,316
Census Tract 110, Block Group 3	1,038	47.1%	1.6	\$44,191	\$12,752
Census Tract 120, Block Group 1	1,965	44.7%	1.4	\$25,696	\$12,188
Census Tract 120, Block Group 2	2,007	52.3%	1.6	\$25,524	\$12,752
Census Tract 122, Block Group 1	2,641	56.5%	1.8	\$31,674	\$13,316
Census Tract 122, Block Group 2	2,082	70.0%	1.9	\$24,811	\$13,598
Census Tract 122, Block Group 3	2,312	58.2%	1.6	\$30,426	\$12,752

⁹⁶ As of August 2011, the U.S. Census Bureau has not released its income data from the 2010 census at a Block Group level.

Table 4.14-1: 2000 U.S. Census Block Group Analysis

STUDY AREA LOCATION	POPULATION	% MINORITY	AVERAGE HOUSEHOLD SIZE	MEDIAN HOUSEHOLD INCOME	HHS POVERTY LINE
Census Tract 124, Block Group 1	1,867	65.3%	1.8	\$22,303	\$13,316
Census Tract 124, Block Group 2	2,785	75.3%	2.0	\$21,937	\$13,880
Census Tract 124, Block Group 3	1,220	50.7%	1.5	\$16,098	\$12,470
Census Tract 124, Block Group 4	749	37.1%	1.3	\$37,875	\$11,906
Census Tract 124, Block Group 5	1,567	53.2%	1.7	\$13,252	\$13,034
Census Tract 129, Block Group 1	1,308	17.1%	1.6	\$66,360	\$12,752
Census Tract 129, Block Group 2	1,253	22.6%	1.6	\$74,313	\$12,752
Census Tract 129, Block Group 3	1,275	18.7%	1.6	\$68,646	\$12,752
Census Tract 129, Block Group 4	1,005	16.7%	1.5	\$51,818	\$12,470
Census Tract 130, Block Group 1	1,148	21.3%	1.6	\$80,068	\$12,752
Census Tract 130, Block Group 2	976	15.0%	1.7	\$119,492	\$13,034
Census Tract 131, Block Group 1	1,703	17.4%	1.5	\$82,464	\$12,470
Census Tract 131, Block Group 2	1,913	20.2%	1.5	\$77,287	\$12,470
Census Tract 131, Block Group 3	1,522	20.0%	1.6	\$67,368	\$12,752
Census Tract 131, Block Group 4	1,329	17.4%	1.6	\$108,608	\$12,752
Census Tract 151, Block Group 1	1,626	27.0%	1.4	\$51,638	\$12,188
Census Tract 151, Block Group 2	794	46.1%	1.4	\$68,393	\$12,188
Census Tract 152, Block Group 1	1,746	34.1%	1.5	\$41,602	\$12,470
Census Tract 155, Block Group 1	1,507	42.9%	1.4	\$46,452	\$12,188
Census Tract 159, Block Group 1	2,054	58.7%	1.9	\$38,913	\$13,598
Census Tract 160, Block Group 1	2,026	39.8%	1.4	\$48,375	\$12,188
Census Tract 161, Block Group 1	946	93.7%	2.4	\$34,773	\$15,008
Census Tract 161, Block Group 1	676	38.9%	1.5	\$37,050	\$12,470
Census Tract 162, Block Group 2	896	46.1%	1.7	\$40,721	\$13,034
Census Tract 162, Block Group 3	930	41.1%	1.8	\$40,820	\$13,316
Census Tract 168, Block Group 1	816	37.6%	1.6	\$42,133	\$12,752
Census Tract 168, Block Group 2	921	32.7%	1.6	\$45,000	\$12,752
Census Tract 176, Block Group 13	1,946	64.7%	1.8	\$25,595	\$13,316
Census Tract 176, Block Group 14	254	45.7%	1.6	\$42,000	\$12,752
Census Tract 177, Block Group 2	1,621	66.8%	2.7	\$57,083	\$15,854
Census Tract 201, Block Group 1	871	50.4%	1.7	\$38,317	\$13,034
Census Tract 201, Block Group 2	1,604	78.2%	2.5	\$20,110	\$15,290
Census Tract 201, Block Group 3	1,534	84.4%	2.9	\$24,773	\$16,418
Census Tract 202, Block Group 1	1,222	45.8%	1.9	\$56,400	\$13,598
Census Tract 202, Block Group 2	2,348	54.4%	2.0	\$36,818	\$13,880
Census Tract 126, Block Group 1	1,095	13.6%	1.5	\$75,181	\$12,470
<i>San Francisco City and County</i>	<i>776,733</i>	<i>56.4%</i>	<i>2.4</i>	<i>\$55,221</i>	<i>\$15,008</i>
<i>California</i>	<i>33,871,648</i>	<i>53.4%</i>	<i>2.9</i>	<i>\$47,493</i>	<i>\$16,418</i>

Source: U.S. Census 2000

The HHS poverty guidelines for the 2000 U.S. Census were \$8,240 for a single-person household and \$2,820 for each additional household occupant. Using the above federal guidance definitions, there are no Census Block Groups, as defined by the federal CEQ,⁹⁷ within the study area with a predominantly low-income population. Both San Francisco and the study area far exceed the HHS poverty threshold guidelines, with median incomes of \$55,221 and \$47,493, respectively. Though the median income of all the affected Block Groups exceeds the poverty level, field observations indicate a greater presence of homeless people in the southern portion of the corridor, namely near the Civic Center and Market Street vicinities (Parsons, 2011). There are several government-funded and other community resource centers in this area serving low-income and mentally ill populations. In addition, using the 2000 U.S. Census poverty thresholds, a number of Census Block Groups were identified as having a meaningfully greater proportion (i.e., more than 10 percent greater) of households with incomes below the poverty threshold than the City of San Francisco as a whole. Figure 4.14-1 on page 4.14-8 shows these low-income groups using the 2000 U.S. Census poverty thresholds.

4.14.3 | Environmental Consequences

A proposed project would result in environmental justice impacts if project implementation would create disproportionately high or adverse human health or environmental effects on minority or low-income populations relative to the larger area/community of comparison. To determine whether the proposed project would result in environmental justice impacts, the project's adverse effects on minority and low-income populations are compared to the proposed project's adverse effects on non-minority and non-low-income populations to identify any disproportionate effects.

Analysis of each environmental factor presented in Sections 3.1 through 4.15 of this EIS/EIR includes detailed discussion of the affected environment, environmental consequences, and avoidance, minimization, and mitigation measures for each project alternative. All potentially significant, adverse effects – with the exception of impacts to traffic circulation – can be minimized or mitigated through implementation of measures identified in each section. A brief summary of the impacts associated with each environmental factor with respect to environmental justice is provided below.

4.14.3.1 | LAND USE

As explained in Sections 4.1 and 4.16, no changes or adverse effects to existing land uses or planned development would occur with construction or operation of any of the proposed build alternatives, including the LPA; therefore, no related, disproportionate, adverse effects on minority and low-income populations would result.

4.14.3.2 | COMMUNITY IMPACTS

As described in Section 4.2, the construction and operation of any of the build alternatives, including the LPA, with or without the Vallejo Northbound Station Variant, would not result in changes to community character or cohesiveness or affect the daily activities or participation levels of any minority or low-income population group. The displacement of colored, on-street parking could adversely affect adjacent commercial and residential properties. Colored parking removal is distributed throughout the corridor and is not

⁹⁷ The federal Council on Environmental Quality (CEQ) provides policy guidance for implementation of NEPA. The CEQ *Environmental Justice Guidance under NEPA* (December 10, 1997) states that minority populations should be identified when either of two criteria exists:

1. The minority population of the affected area exceeds 50 percent, or
2. The population percentage of the affected area is meaningful greater than the minority population percentage in the general population or other appropriate unit of geographical analysis.

It has become acceptable in planning studies that “meaningful greater” is represented by 10 percent or greater. In the analysis conducted for the Van Ness Avenue BRT Project, Census Block Groups are compared against the San Francisco City and County-wide averages.

concentrated in a low-income or minority community; thus, the effects from changes in colored parking would not be experienced by low-income and minority groups in a disproportionately high or adverse manner.

Construction planning would minimize nighttime construction in residential areas. Such considerations would be part of the public information procedures outlined in the TMP, which would include translation of all notices and announcements in Spanish and Chinese. Notices about construction would be mailed, as well as posted along the corridor, to maximize distribution of information to potentially affected people, including minority and low-income populations.

4.14.3.3 | GROWTH

As explained in Sections 4.3, none of the proposed project build alternatives, including the LPA (with or without the Vallejo Northbound Station Variant), are expected to result in unplanned growth in the corridor or larger region. Though the project is not expected to contribute to more growth scenario, current ABAG projections do forecast a 20 percent increase in the number of households to be formed in the City and County of San Francisco between 2000 and 2035. None of the project alternatives would change this forecast rate of growth. With or without the project, the same level of population growth, new housing, and commercial developments are anticipated to occur along the Van Ness Avenue corridor area over time. Because the project alternatives are not expected to alter the rate of growth in the corridor, they would not have growth-related, disproportionately high and adverse effects on minority or low-income areas of the corridor.

4.14.3.4 | AESTHETICS/VISUAL RESOURCES

As described in Section 4.4, the proposed build alternatives, including the LPA (with or without the Vallejo Northbound Station Variant), would not result in substantial impacts to the visual environment or to important visual resources in the Van Ness Avenue corridor. Tree removals and new planting opportunities would be evenly spaced throughout the project study area and would not disproportionately affect minority or low-income populations. As described in Section 4.15.3, visual impacts during project construction would be temporary, and would be experienced by all resident populations and users to a proportionate and nonsubstantial degree. Visual impacts resulting from any of the proposed build alternatives, including the LPA (with or without the Vallejo Northbound Station Variant), would not disproportionately affect minority and low-income populations.

4.14.3.5 | CULTURAL RESOURCES

As described in Sections 4.5 and 4.15.4, no impacts to known prehistoric or historical archaeological resources are expected to occur under any of the proposed build alternatives, including the LPA (with or without the Vallejo Northbound Station Variant). No adverse impacts to cultural resources would disproportionately affect minority and low-income populations.

4.14.3.6 | SECTION 4(F)

The Section 4(f) analysis presented in Section 4.15 concludes that there are no direct, temporary, or constructive uses of neither any of the 20 park and recreational facilities located in the vicinity of the project area nor any of the 7 historic properties located within the area of potential effect; therefore, no Section 4(f) impacts would disproportionately affect minority and low-income populations.

4.14.3.7 | UTILITIES

As described in Sections 4.6 and 4.15.5, construction and operation of any of the build alternatives, including the LPA (with or without the Vallejo Northbound Station Variant), would not result in changes to utility demand or capacity. Minority and low-income populations would not be disproportionately impacted by temporary utility service

interruptions because construction work would be coordinated with the SFDPW-led CULCOP and the San Francisco Street Construction Coordination Center, and information about planned utility service interruptions would be communicated to residents and employees through the public information program implemented as part of the TMP. The public information program would involve translation of all notices and announcements in Spanish and Chinese. Notices about utility interruptions would be mailed, as well as posted along the corridor, to maximize distribution of information to potentially affected people, including minority and low-income populations. The potential for utility disruptions is evenly distributed throughout the project corridor, and it is not anticipated that minority and low-income populations would be disproportionately affected.

4.14.3.8 | GEOLOGY AND SOILS

As described in Section 4.7, the results of the project geologic assessment indicate that there are no substantial geologic hazard impacts that would not be fully addressed by design specifications, and no mitigation measures are proposed. There would be no geologic or seismic project impacts to disproportionately affect minority and low-income populations.

4.14.3.9 | HAZARDOUS MATERIALS

As explained in Sections 4.8 and 4.15.7, project operation would not result in increased usage, transport, release, or exposure of hazardous materials to people in the project corridor. Potential exposure impacts from the release of hazardous materials during project construction would be avoided or mitigated through measures as described in Section 4.15. There would not be a potential for disproportionate exposure or other impacts on minority and low-income groups from hazardous materials as a result of the proposed project.

4.14.3.10 | HYDROLOGY AND WATER QUALITY

As described in Section 4.9, none of the build alternatives, including the LPA (with or without the Vallejo Northbound Station Variant), would substantially alter the existing drainage pattern of the area or create flooding. Each build alternative, including the LPA, would result in a slight reduction in stormwater runoff, which is a beneficial effect. The project would not affect groundwater or drinking water. Neither the potential stormwater impacts anticipated during construction nor the water quality and hydrology impacts under any build alternative would be significant and, accordingly, would not have a disproportionately high and adverse affect on minority and low-income populations.

4.14.3.11 | AIR QUALITY

As described in Section 4.10, operation of any of the project build alternatives, including the LPA (with or without the Vallejo Northbound Station Variant), would decrease VMT and associated regional emissions resulting in air quality benefits. Project construction would result in localized emissions; however, these emissions would not exceed the State ambient air quality standards. Construction-related air quality impacts would be temporary and would not disproportionately impact minority and low-income groups.

4.14.3.12 | NOISE AND VIBRATION

As discussed in Section 4.11, operation of the proposed project would not result in new vibration and noise impacts in the Van Ness Avenue corridor. Project construction would result in temporary increases in noise and vibration; however, these exposure effects are expected to be minimal, and they would not disproportionately impact minority and low-income groups.

4.14.3.13 | BIOLOGICAL RESOURCES

As explained in Sections 4.13 and 4.15.11, the proposed project is located in a highly developed, urban area of San Francisco with no water bodies, wetlands, open space, protected habitats, or other special-status biological resources. Project implementation

would result in removal of substantial median trees in the Van Ness Avenue corridor; however, long-term beneficial effects would result from increased vegetation and plantings in the Van Ness Avenue corridor, with benefits increasing over time as plantings mature. Tree removals and new plantings are spaced throughout the project corridor and would not disproportionately affect minority or low-income populations. Project construction would not result in significant impacts to biological resources that would in turn disproportionately affect minority and low-income populations.

4.14.3.14 | TRANSIT

Each of the proposed build alternatives, including the LPA, would result in improved transit reliability and travel time savings that would benefit all communities in the study area and citywide, including minority and low-income groups. Implementation of the proposed project would improve transit service for the transit-dependent populations within the corridor. There would be no fare increase for BRT on Van Ness Avenue.

Impacts to existing transit service during project construction would be temporary, and outreach as part of the TMP would include translation of all notices and announcements in Spanish and Chinese. Notices about construction would be mailed, as well as posted along the corridor, to maximize distribution of information to potentially affected people, including minority and low-income populations. Following project completion of any of the three build alternatives, transit benefits would be realized for all communities, including low-income and minority populations in the project study area, and for commuters residing outside the project study area.

4.14.3.15 | NONMOTORIZED TRANSPORTATION

As discussed in Section 3.4, the proposed build alternatives, including the LPA, would change the design characteristics of Van Ness Avenue, including crossing distances, median widths, and provision of corner bulbs. For the most part, these design changes would improve the overall pedestrian environment of Van Ness Avenue, resulting in beneficial effects, and would not significantly affect bicycle conditions. Adverse impacts to the pedestrian environment could include an increase in pedestrian delay at some intersections, which is the average amount of time a pedestrian must wait for the traffic signals to change to allow crossing. This impact is not considered substantial when considered in the context of the numerous project benefits to the pedestrian environment that include shorter crossing distances and installation of count-down signals and APS at all intersections.

As discussed in Sections 2.2.2 and 3.4.3.1, the LPA average spacing of the proposed BRT station locations would be approximately 1,150 feet (1,080 under the LPA with the Vallejo Northbound Station Variant), requiring an average walk of up to 570 feet (two blocks) (540 feet under the Vallejo Northbound Station Design Variant) from a location halfway between two stops; this would constitute an increase, on average, of up to approximately 240 feet of additional walking to access stops if a person had an origin or destination exactly between the proposed BRT station locations. A distance of 240 feet is less than one block along Van Ness Avenue.

Van Ness Avenue has few hills, with no grades above 10 percent. On average, the proposed project complies with the applicable 1,000- to 1,200-foot spacing guideline for light rail lines (SFMTA 2007).⁹⁸ The project team has also met with local groups and organizations that focus on accessibility issues during preparation of the Feasibility Study and Draft EIS/EIR, including the Lighthouse for the Blind and Visually Impaired, the Mayors Disability Council Physical Access Committee, and the Muni Accessibility Advisory Committee, to gather input for the BRT project. The project team has also met with senior and assisted living facilities located along the corridor to understand the unique needs of those users and to minimize the potential impact of stop consolidation.

⁹⁸ There are no MUNI stop spacing guidelines for BRT.

The proposed BRT station locations were refined based on this input and additional input from the Van Ness BRT Citizens Advisory Committee, the Mayor's Office on Disability, and accessibility coordinators at the SFDPW and SFMTA. The Van Ness Avenue BRT Project is designed to be as universally accessible as possible. The Draft EIS/EIR provides a full evaluation of the project's accessibility for all users in Section 3.4.3.1. The evaluation is based on the principles of Universal Design and recognizes that users, including the elderly and disabled, may have different concerns. Some may depend on transit to meet their need for efficient travel in the Van Ness Avenue corridor; others prefer more frequent stops to minimize walking distances. The evaluation identifies the increase in physical effort required to reach a transit stop as posing a challenge to some riders, but it also notes other benefits the project provides to improve accessibility in the corridor. For example, level or near level boarding at BRT stations would reduce the physical effort required to board transit vehicles, while curb bulbs, nose cones, pedestrian countdown signals, and accessible pedestrian signals at intersections would allow people with a greater range of physical abilities to safely cross the street.

Low-income and minority populations in the project study area would not be disproportionately affected by transit stop consolidation, and the universal accessibility has been a goal of project design as described above; however, during the public meetings conducted to obtain input on development and selection of the LPA, considerable concern was expressed by local residents regarding the lack of transit stations proposed in the vicinity of the Van Ness Avenue and Vallejo Street intersection. In response to these public comments regarding stop spacing in the vicinity of the Van Ness Avenue and Vallejo Street intersection, which has higher grades than other parts of the corridor, the LPA design was modified to include a SB station at the intersection of Vallejo Street and Van Ness Avenue. A NB transit station in this same location, referred to as the Vallejo Northbound Station Variant, is considered in this Final EIS/EIR as a design variant that could also be implemented and will be decided upon at the time of project approval.

The aforementioned benefits and impacts to nonmotorized transportation would occur throughout the Van Ness Avenue corridor and would not disproportionately affect low-income and minority communities. Impacts to nonmotorized transportation during project construction would be temporary and would not be substantial. Project construction would not involve closure of sidewalks or crosswalks. Detour signage and notifications for the general public would be part of the public information program implemented as part of the TMP.

4.14.3.16 | PARKING

Curbside parking on Van Ness Avenue would generally be preserved with the implementation of any of the build alternatives, including the LPA (with or without the Vallejo Northbound Station Variant), although parking spaces would be reconfigured and entirely removed on select blocks, as described in Section 3.5. Impacts from the removal of parking in the Van Ness Avenue corridor would not disproportionately affect low-income and minority communities.

4.14.3.17 | VEHICULAR TRAFFIC

Each of the proposed build alternatives, including the LPA (with or without the Vallejo Northbound Station Variant), is expected to result in potentially significant impacts to automobile traffic circulation, as explained in detail in Section 3.3, Vehicular Traffic. Vehicular traffic circulation impacts that would result from implementation of the proposed build alternatives would by nature not only affect people with cars who reside in the Van Ness Avenue corridor study area, but would also affect drivers who commute or otherwise pass through the study area.

Although the traffic technical study did not include a socioeconomic profile of drivers within the corridor, because such data is not typically collected, an analysis was conducted to compare the locations of forecasted traffic-impacted intersections to the minority

KEY FINDING

There would be no disproportionate environmental impacts on minority or low income communities under any of the areas of analysis.

population areas. As illustrated in Figures 4.14-1 and 4.14-2, none of the 14 potentially significant 2035 LOS-impacted intersections are located within low-income Block Groups (either using the HHS poverty guideline or the 2000 U.S. Census poverty thresholds) and only 4 of the 14 significant 2035 LOS-impacted intersections are located within minority Block Groups in the study area. Given that only 4 of 14 LOS-impacted intersections would affect environmental justice populations in the corridor, by either traffic diversion through minority neighborhoods or affecting minority residents who may drive personal automobiles, it can be concluded that the project overall would not disproportionately impact environmental justice populations in the project area relative to traffic circulation.

Regular commuters through the project study area and residents who own or use private vehicles within the project study area would be affected more than those who occasionally pass through the corridor. As indicated in Table 4.2-5 of this EIS/EIR, nearly half of all residents within the project study area do not own private vehicles, compared with approximately 30 percent of residents within the City and County of San Francisco.

Figure 4.14-1: Low-Income Block Groups, Significant Traffic Impacts, and Colored Parking Loss within the Van Ness Avenue Corridor BRT Study Area

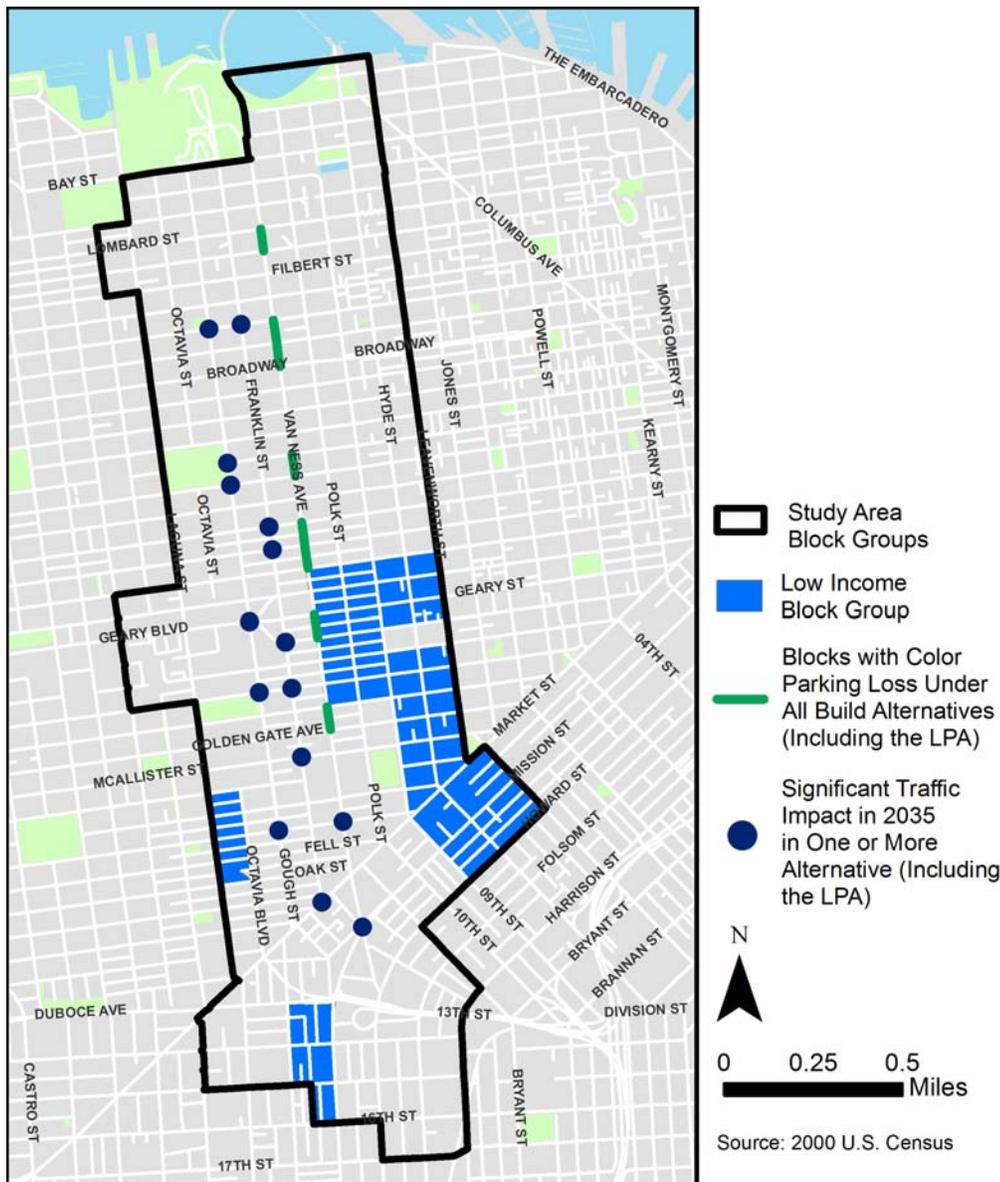
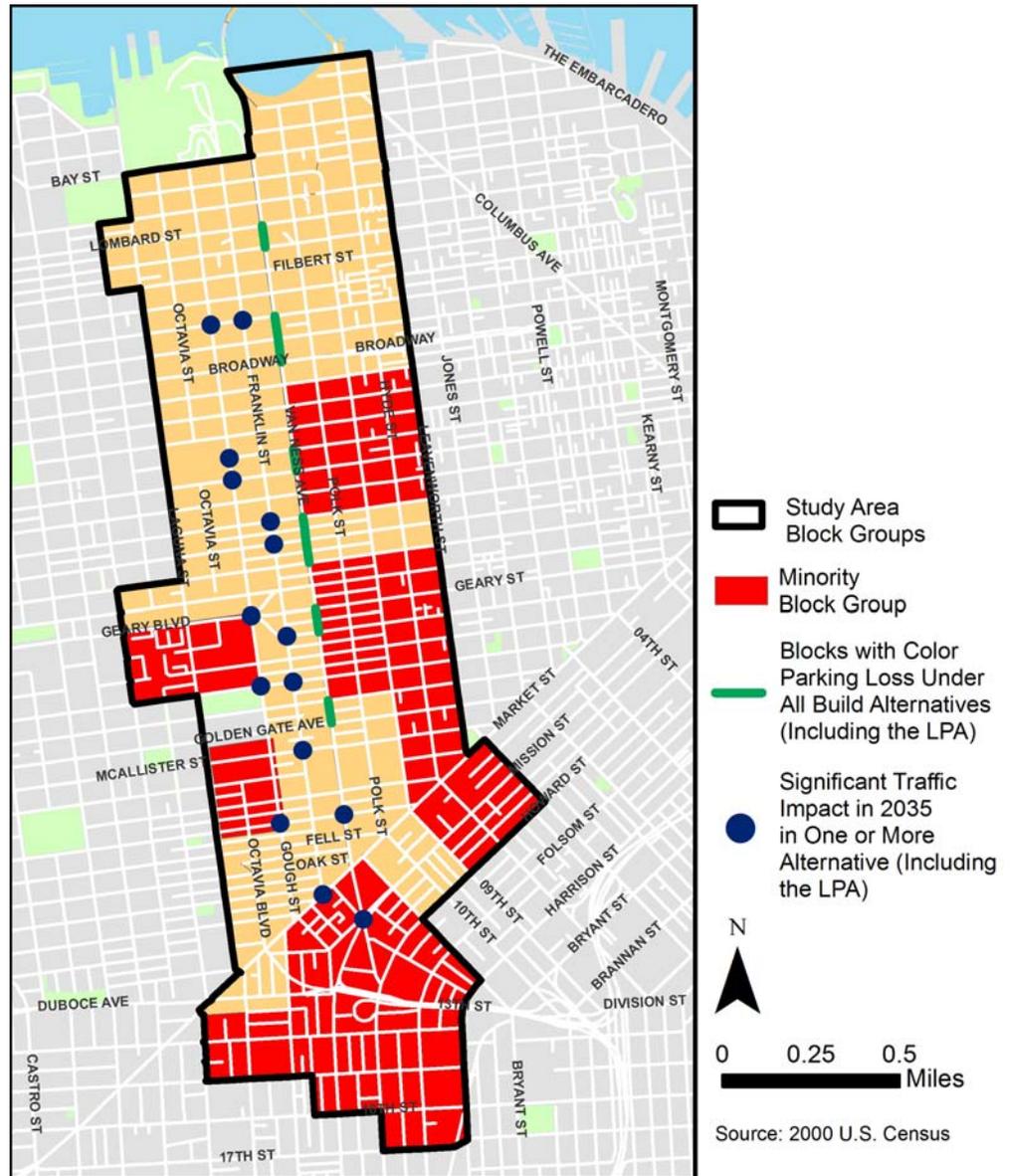


Figure 4.14-2: Minority Block Groups, Significant Traffic Impacts, and Colored Parking Loss within the Van Ness Avenue Corridor BRT Study Area



Therefore, there is a larger proportion of transit-dependent people living within the project study area compared with the City and County, and thus a larger proportion of transit-dependent people would reap the benefits of improved transit service in the Van Ness Avenue corridor. Although the project would negatively affect automobile traffic circulation, it would also enhance transit access, thereby benefiting minority groups in the corridor who do not own cars.

4.14.4 | Avoidance, Minimization, and/or Mitigation Measures

As described in Section 4.15.9, construction phase impacts would be mitigated to control noise and fugitive dust. These mitigation measures would serve to ensure that there would be no disproportionate adverse effects on minority and low-income residents. Moreover, public outreach as part of the TMP described in Section 4.15 would include translation of all

notices and announcements in Spanish and Chinese. Notices about construction would be mailed, as well as posted along the corridor, to maximize distribution of information to potentially affected people, including minority and low-income populations. No other avoidance, minimization, or mitigation measures are required to address environmental justice impacts. Based on the analysis of the project, the improvements proposed under any of the alternatives, including the LPA (with or without the Vallejo Northbound Station Variant), would not cause disproportionately high and adverse effects on any minority or low-income populations as per EO 12898 regarding environmental justice.

As described in other sections of this EIS/EIR, implementation of any of the build alternatives and the LPA (with or without the Vallejo Northbound Station Variant) would include many benefits to low-income and minority populations, as well as the community at large, including a safer, more reliable and improved transportation system, improved mobility across the corridor, improved accessibility to jobs, and aesthetic improvements. These benefits are expected to be shared across demographic groups.

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4.15 Construction Impacts

Temporary construction impacts associated with each of the build alternatives, including the LPA, for the proposed Van Ness Avenue BRT Project are described in detail in this section. Section 4.15.1 presents the construction scenario for each build alternative, including the LPA, and contains the anticipated construction stages, schedule, and work hours. The construction scenario and approach is based on the Project Construction Plan (PCP) developed for the project (Arup, 2012). The subsequent sections present the anticipated impacts and mitigation resulting from the construction scenario, including impacts of each build alternative where applicable.

Construction Plan

Construction of the proposed build alternatives, including the LPA, would occur within the existing street ROW. Construction would include the following major activities along the length of the proposed project: pavement rehabilitation as needed along the transitway, pavement resurfacing of Van Ness Avenue from curb to curb, reconstruction of curb and gutters (including curb bulbs), reconfiguration of the median, construction of BRT stations, replacement of the OCS support poles/streetlights system, replacement of traffic signal infrastructure, and associated utility relocations. BRT station construction would involve installing components such as platforms, canopies, ticket vending equipment, railings, lighting, signage, and station furniture. The manner in which construction would take place would be similar for all of the build alternatives and LPA. Following mobilization and staging activities, construction of all three build alternatives (including Design Option B and the LPA) would involve the major construction activities described in the following bullets.

- **Remove Existing Curb Bulbs and Undertake Utility Work.** Some existing curb bulbs would be removed to allow use of the curbside parking lane for mixed-flow traffic during construction. Where necessary, construction areas would be fenced at this point for public safety. During this phase, existing utilities that would interfere with construction would be removed and relocated as well (e.g., storm drains, laterals). Sewer pipeline replacement or relocation would be required for Build Alternatives 3 and 4, as discussed in Chapter 4.6, Utilities. Relocation or reconstruction of existing utilities would take into account services required at the BRT stations, reconstructed traffic signals, and replacement of the OCS support pole/streetlight network.
- **Build BRT Station/Platform Foundations.** Proposed BRT station locations would be cleared of obstructions, including demolition activities as needed, and rough-graded. Once the station areas are cleared, platform canopy foundations would be constructed, with 2.5-foot-diameter shafts drilled to approximately 5 feet bgs. Utility feeds would be installed and concrete platforms subsequently poured and finished. The above-platform features would be installed in a subsequent phase.
- **Construct Transitway.** Roadway work to construct the transitway would begin after the station foundations are complete and existing curb bulbs removed. The transitway would be paved and delineated, and the median curb and gutter work would be completed, including drainage facilities.
- **Conduct Intersection/Corner Work and OCS Support Pole/Streetlight Replacement.** Pedestrian corner bulbs would be constructed and new traffic signals installed during this phase, together with other elements proposed under the SFgo Program. The OCS pole replacement, trench work, and wiring would be undertaken at the same time as the intersection/corner work.
- **Finish BRT Stations/Platforms.** BRT station and platform elements and passenger amenities would be installed, including shelters, benches/seats, lighting, changeable



message signs (real-time arrival information), fixed signage, railings, trash receptacles, and TVMs at selected stations. Electrical and communications systems would be completed during this phase.

- **Curb-to-Curb Pavement Rehabilitation.** Curb-to-curb pavement rehabilitation under the Caltrans SHOPP project would be undertaken during this phase, as well as pavement resurfacing proposed under the BRT project.
- **Additional Infrastructure Elements.** Other key infrastructural elements would be completed, including replacement of the landscaping, as well as pavement striping and delineation. The corridor would require restriping of travel lanes and intersection approaches to allow alterations in street lane geometry and pedestrian crosswalks. New signage would be added along the corridor for transit users, motorists, pedestrians, and bicyclists. Once Phases 1 through 7 are complete, the BRT operation would be tested prior to being opened for service, including the interactive traffic signal system, communications equipment, and station facilities and equipment.

Approximate areas and depths of anticipated construction activities requiring earthwork are provided in Table 4.15-1. As shown in Table 4.15-1, traffic signal poles would require the deepest excavation, up to 16 feet bgs in an approximate 3-foot-diameter area. Additional deep excavations would include removal and replacement of the existing OCS support poles/streetlights, sewer replacement/relocation, and station canopy foundations. The remaining work would occur within 3 feet bgs.

Table 4.15-1: Anticipated Construction Areas and Excavation Depths

CONSTRUCTION ITEM	AREA	DEPTH ¹ (FEET)
OCS Support Pole Replacement	3-foot-diameter excavation area, within sidewalk; located throughout project limits.	11.0
OCS Conduit Trench	2-foot-wide trench, within sidewalk; located throughout project limits.	3.0
Sewer Pipeline Relocation	6-foot-wide trench, within street; replace or relocate sewer at platform stations and at any locations where the BRT proposes the transitway or mixed traffic lanes directly over the existing sewer facility.	11.5
Traffic Signal Poles	3-foot-diameter excavation area, located at intersections throughout project limits.	16.0
Controller Cabinets	2.5-foot by 4-foot excavation area, located within the sidewalk at intersections throughout project limits.	3.0
Curb Bulbs & Sidewalk Reconstruction	Approximately 30 feet of full-width sidewalk disturbance area, located at intersections throughout project limits (varies by project alternative).	1.5
Pavement Resurfacing	Curb-to-curb resurfacing.	0.7
Pavement Reconstruction/ Rehabilitation	Spot improvements, as needed, to travel lanes and parking lanes to remedy failed pavement areas.	1.5
New Pavement	New pavement will be provided where transitways encroach over existing median. The maximum width of new pavement construction would be 14 feet at station locations where transitways would replace existing 14-foot medians.	1.5
Station Platform	Typical station platform dimensions are 9 feet to 14 feet wide by 150 feet long at platforms, Geary/O'Farrell is the longest platform area of approximately 270 feet.	1.0
Station Canopy Foundation	2.5-foot-diameter excavation area at platforms.	5.0

¹ Depth below ground surface (bgs).

Construction Approach

Principles of the project construction approach to be implemented under each build alternative include the following:

- Maintain two mixed-flow traffic lanes, which would also carry transit vehicles, in each direction (NB and SB) during peak hours, and as feasible during non-peak hours on Van Ness Avenue during project construction;
- The two mixed-flow traffic lanes would carry transit vehicles and maintain service for the 47 and 49 bus routes throughout construction.
- Assure 10-foot widths for all traffic lanes at a minimum;
- Place a physical barrier between traffic lanes and the construction zone (typically to be done by using a concrete k-rail barrier);
- Provide an appropriate buffer width between the construction zones and the adjacent traffic lanes, inclusive of the k-rail concrete barrier;
- Reduce speeds through construction work areas;
- Remove curbside parking as needed during construction of stations or the transitway; and
- Adhere to requirements and standards identified in the MUTCD and the San Francisco Blue Book, which govern temporary work zone installations.

All construction work would be conducted in compliance with obtained permits and regulations set forth by the City and Caltrans, in accordance with the SFMTA Regulations for Working in San Francisco Streets (Blue Book), the MUTCD, San Francisco Municipal Code (Noise Ordinance, Sections 2907 and 2908), and SFPUC and SFDPW BSM work orders. Construction work will conform to San Francisco Health Code Article 22B, which requires all City projects of over 0.5-acre in size to control dust from construction activities by preparing a dust plan approved by the San Francisco Department of Public Health, with the goal of minimizing visible dust and protecting sensitive receptors from dust exposure. A Transportation Management Plan (TMP) outlining methods and strategies to minimize construction activity-related traffic delay and accidents would be developed during the 30 percent project design phase and would be coordinated with other major projects in the area (e.g., Doyle Drive/Presidio Parkway and CPMC projects). The TMP is described in more detail in a subsequent section below.

Most of the work could be done during daylight hours, but some nighttime work would be required to permit temporary closures of the second traffic lane for tasks that could interfere with traffic or create safety hazards, subject to City approval with respect to noise ordinance requirements. Specific construction staging requirements would be defined during the final design phase. Construction of the LPA is anticipated to take 20 months to substantial completion based on the preferred construction approach.⁹⁹ The preferred construction approach is identified in the PCP and Project Study Report/Project Report prepared for the proposed project (Arup, 2012; Parsons, 2013). Under the preferred construction approach, construction of each build alternative, including the LPA, would occur on two three-block segments of Van Ness Avenue at the same time to reduce the overall construction schedule. Construction on three-block segments would occur simultaneously in the northern and southern ends of the corridor to stagger associated parking and traffic circulation disruption, followed by construction in the central segment. A risk analysis described in Section 9.3 accounts for potential issues that could increase the total project schedule and costs, including construction delays if simultaneous construction on three-block segments is not implemented. The preferred construction approach would involve the most intensive environmental impacts (i.e., traffic, parking, and air quality); however, at the same time, it would be the most efficient approach in terms of resource management and mobilization, and it would minimize the effect of delays at one location greatly impacting the entire

To minimize disruption to the traveling public, all efforts will be made to keep two traffic lanes open in each direction during construction. Construction activities that require closure of the on-street parking lane and/or a second traffic lane in one direction would be staged on approximately three-block segments.

⁹⁹ Substantial completion is defined by the American Institute of Architects as “the stage in the progress of the Work where the Work or designated portion is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended use.”

project schedule. Closure of one mixed-flow traffic lane in each direction and some on-street parking would be necessary for construction of all of the build alternatives, including the LPA. Temporary conversion of existing parking lanes to mixed-flow traffic lanes would be implemented in some cases to maintain two traffic lanes in each direction and minimize traffic impacts. These two mixed-traffic lanes would also carry transit vehicles during the construction period. In all cases, two lanes of mixed-flow traffic would generally remain open in each direction during construction, although temporary closures of an additional mixed-flow traffic lane would be required during construction tasks that could interfere with traffic or create safety hazards such as utility relocations, placement of concrete barriers, or large equipment. These closures would be planned for nighttime or off-peak traffic hours as feasible, and as in conformance with approved noise requirements. Partial closure of the sidewalk would be required under all of the build alternatives, including the LPA, for curb bulb construction work, replacement of the OCS support poles/streetlights and associated duct trenching, signal installation, and reconfiguration of underground utilities.

Construction Implementation Staging

Under the preferred construction approach, construction of each build alternative, including the LPA, would occur on multiple blocks of Van Ness Avenue throughout the corridor at the same time to reduce the overall construction schedule. Thus, multiple construction crews would be working at different locations along the corridor at one time. To minimize disruption to the traveling public, construction activities that require closure of the on-street parking lane and/or a second traffic lane in one direction would be staged on approximate three-block segments. Construction on three-block segments would occur simultaneously in the northern and southern ends of the corridor to stagger associated parking and traffic circulation disruption, followed by construction in the central segment. The three build alternatives have different street staging plans due to the nature of construction required for each, as summarized in the following paragraphs.

Build Alternative 2 Construction Staging

Build Alternative 2 would be constructed on one side of Van Ness Avenue at a time to accommodate open lanes of mixed-flow traffic in both NB and SB directions at all times. One traffic lane would remain open alongside the construction area, and three traffic lanes would remain open on the opposite side of the street, along with on-street parking. Under construction of Build Alternative 2, a contraflow system would likely be used during daytime construction to maintain two open traffic lanes in each direction. In other words, the direction of one of the three traffic lanes on the side of the street opposite construction activity would be reversed. Left turns along Van Ness Avenue would be eliminated in either direction within the blocks under construction as part of the contraflow system. Appropriate signage and temporary traffic signals would be used to guide drivers, augmented by flagmen as needed. The contraflow system would not be needed during nighttime construction when traffic volumes are lower. If and when a contraflow system is not in place, only one traffic lane (serving a single direction) would remain open on the same side of the street on which construction is taking place. If a contraflow system is not implemented, construction work would generally be required to be scheduled at night when traffic volumes are lower. Sidewalk closures would not be required, although partial closure of the sidewalk would be required for curb bulb construction work, replacement of the OCS support poles/ streetlights and associated duct trenching, signal installation, construction of the BRT stations, and reconfiguration of underground utilities.¹⁰⁰ Construction of Build Alternative 2 is anticipated to last approximately 19 months, as shown in Table 4.15-2; however, construction duration could be extended if a contraflow system is not implemented and construction activities requiring closure of a second lane in one direction would be restricted to nighttime.

¹⁰⁰ Partial closure of the sidewalk would be required under all of the build alternatives for curb bulb construction work, replacement of the OCS support poles/streetlights and associated duct trenching, signal installation, and reconfiguration of underground utilities.

Under construction of Build Alternative 2, a contraflow system would likely be used during daytime construction to maintain two open traffic lanes in each direction. In other words, the direction of one of the three traffic lanes on the side of the street opposite construction activity would be reversed.

Build Alternatives 3 and 4 (including Design Option B) Construction Staging

Construction staging for Build Alternatives 3 and 4 would be similar. Construction of the BRT stations, transitway, and medians would take place in an approximate 43-foot-wide area in the center of the roadway. Two traffic lanes would generally remain open on either side of the construction area. The parking lane on both sides of the street would be closed during the construction work to maintain two open traffic lanes in each direction. Sidewalk closures would not be required, although partial closure of the sidewalk would be required for curb bulb construction work, replacement of the OCS support poles/streetlights and associated duct trenching, signal installation, and reconfiguration of underground utilities. The intersection corner work would be primarily performed during the night to minimize impacts to pedestrian and vehicular traffic.

Short-term closures of an additional traffic lane may be required at times for construction tasks that could interfere with traffic or create safety hazards, reducing the number of open lanes in one direction to one. These closures would be planned for nighttime or off-peak traffic hours as feasible to avoid or reduce traffic impacts, subject to stipulated noise restrictions.

Under this construction implementation scenario, construction for Build Alternative 3 is anticipated to require 21 months, whereas construction for Build Alternative 4 is anticipated to require 14 months. Replacement of the aging sewer pipeline beneath the entire transitway alignment (see Chapter 4.6, Utilities) would be coordinated with construction of Build Alternative 3, which accounts for the longer construction duration compared to Build Alternative 4. Under Build Alternative 4, it is anticipated that the sewer pipeline would require replacement only beneath stations and not the transitway, resulting in shorter construction duration. Table 4.15-2 summarizes the preferred construction approach and schedule for each build alternative. Incorporation of Design Option B under Build Alternative 3 or 4 would not affect the construction schedule for these alternatives.

The construction approach for each build alternative would involve the closure of one northbound and one southbound traffic lane.

Table 4.15-2: Preferred Construction Approach and Schedule

BUILD ALTERNATIVE	CONSTRUCTION APPROACH	DURATION*
Alternative 2	Construction along a single side of the street on multiple segments, simultaneously.	19 months**
Alternative 3	Construction along both sides of the street in multiple segments, simultaneously.***	21 months
Alternative 4	Construction along both sides of the street in multiple segments, simultaneously.	14 months
LPA	Construction along both sides of the street in multiple segments, simultaneously.****	20 months

*To substantial completion.

** Construction duration for Build Alternative 2 could be extended if a contraflow system is not implemented and construction activities requiring closure of a second lane in one direction would be restricted to nighttime.

***The duration for Build Alternative 3 construction would be longer than Build Alternative 4 due primarily to replacement of the sewer pipeline throughout the BRT alignment. Design Option B would not affect the construction schedule.

**** The duration for LPA construction is longer than Build Alternative 4 because it would require rebuilding of the median curb for the length of the corridor and also would require replacement of the sewer at station locations and in areas where construction of the transitway would occur directly above the sewer in its current location. Incorporation of the Vallejo Northbound Station Variant would extend construction time for the Vallejo block or segment, but it would not extend the overall project schedule under the preferred approach.

LPA Construction Staging

Construction staging for the LPA would be as described above for Build Alternatives 3 and 4, except that replacement of the aging sewer pipeline would be required at station locations and in areas where the transitway would be occur directly above the sewer in its current location. The duration for LPA construction would be longer than under Build Alternative 4 because it would require rebuilding the curb for the entire median, as well as replacement of

the sewer pipeline as described above. The Build Alternative 4 design does not require rebuilding of the median curbs on blocks that are not proposed to have stations and do not currently have a left-turn pocket and also would not have locations with the transitway running directly over the sewer, meaning more linear feet of sewer would require replacement under the LPA than under Build Alternative 4. Under this construction implementation scenario, construction for the LPA (with or without the Vallejo Northbound Station Variant) is anticipated to require 20 months to substantial completion. Incorporation of the Vallejo Northbound Station Variant would extend construction time for the Vallejo block or segment, but it would not extend the overall project schedule under the preferred approach.

Construction Equipment and Laydown

The nature of the BRT construction work is conventional. A list of anticipated construction equipment includes:

- 5 cubic yards (cy) and under rubber-tired loaders
- 3 cy and under rubber-tired combination backhoe/excavator/loader
- Rubber-tired excavator
- Street-legal dump truck-style hauling units
- Motor graders similar to “CAT” 120 series sized machines
- Small “CAT” D-4 size and under dozers
- Steel drum rubber-tired self-propelled compaction equipment
- Portable air compressor, light plant, and generators sets
- Track-mounted concrete and/or asphalt laydown equipment
- Rubber-tired lifting equipment
- Rollers
- Small pneumatically driven hand tools, such as pavement breakers, and electrically operated tools, such as blowers, “skill” saw, drills
- Barrier movement machine
- Flatbed trucks for transport of materials and to display traffic control devices

These tools and equipment can be rapidly mobilized by street-legal truck and transport vehicles. The project does not require extensive foundations; therefore, vibrations are limited to normal construction impacts, with the most significant being the application of vibration from earth-compacting rollers.

Along the Van Ness Avenue corridor, several storage or “laydown” areas would be necessary for construction-related equipment, materials, vehicles, and goods to be safely stored overnight for easy access during construction activities. These areas would also be used as the contractor’s staging and work areas. The selection of such sites is important strategically to reduce inefficient out-of-direction movements and to minimize time lost from transporting materials and workers from a storage area to the work area. Site access, size, security, and surrounding land uses play a role in the selection of appropriate siting locations. Construction laydown areas would be determined following final design. In the meantime, the following areas have been identified as potential equipment laydown areas to be confirmed when the project nears construction and is obtaining requirement construction permits:

- The State-owned parking lot located at South Van Ness Avenue and US 101 could be used as a primary base of operations, as well as for material and vehicle storage for the southern end of the corridor.
- A pedestrian plaza/traffic triangle located at South Van Ness Avenue and 12th Street could be used for staging on the southern portion of the corridor.
- The southwest corner of Van Ness Avenue and Filbert Street is an abandoned gas station, and the lot across from it at the northwest corner is vacant. These properties may be used for overnight material and equipment storage for northern part of corridor.

Transportation Management Plan for Construction

A TMP would be implemented leading up to and during project construction to minimize delay and inconvenience to the traveling public. The TMP will identify specific lane closures and transit operational changes; needed detours and other travel changes for drivers, transit, bicyclists, and pedestrians; and specific strategies that will be implemented to achieve those detours and other travel changes. The TMP for the project would be developed and refined during final design and will be approved by both Caltrans and SFMTA.

The proposed construction approach for each build alternative, including the LPA, includes roadway work that would require lane closures and/or detouring. The need for lane closures and short-term detour routes would be identified and included in the TMP, along with specific physical and communications measures that will be implemented to guide detours and other travel changes. The TMP would include, but not be limited to, some of the measures shown in Table 4.15-3. The TMP would include measures to ensure coordination with transit operators, emergency service providers, and neighborhood and special interest groups; consideration of construction strategies and contract incentives to ensure that construction is completed on schedule and that planned TMP measures are implemented; California Highway Patrol (CHP) and local law enforcement involvement; and development of contingency plans for unforeseen events or incidents. Various TMP elements, such as portable Changeable Message Signs and a CHP Construction Zone Enhanced Enforcement Program (COZEEP), may be utilized to alleviate and minimize delay to the traveling public.

The TMP would include a public information program and briefing for local public officials to disseminate project information and notices of upcoming traffic lane closures and detours. The public information program component of the TMP would be the plan for providing advance notice to motorists, public transportation providers, and emergency service providers with information on construction activities and durations, detours, and access issues during each stage of construction. The TMP would identify services to facilitate safe implementation of the construction project, such as increased law enforcement presence during critical construction operations, and it would include outreach to local businesses and residents with information related to the construction activities and durations, temporary closures, and detours. The TMP would include SFMTA’s process for accepting and addressing complaints. This includes provision of contact information for the Project Manager, Resident Engineer, and Contractor on project signage with direction to call if there are any concerns. Complaints are logged and tracked to ensure they are addressed.

Table 4.15-3: Elements of Transportation Management Plan

ELEMENT	DESCRIPTION	OBJECTIVE
Public Information Program	Brochures, mailers, Internet, e-mails, and briefings to local public officials, transit operators, and emergency services alerting travelers, residents, businesses, and interested parties of project construction, lane closures, detours, alternative routes, changes in locations of bus stops, partial sidewalk closures, changes to on-street parking (including loading zones) identification of safety hazards. SFMTA’s process for accepting and addressing complaints, including provision of contact information for the Project Manager, Resident Engineer, and Contractor on project signage with direction to call with concerns.	<ul style="list-style-type: none"> • Reduce congestion in work zones; • Maintain safety in work zones; • Minimize disruption to residents and businesses; and • Minimize traveler frustration. The public is interested in advance roadway information for travel planning purposes. The provision of this information would allow them to adjust travel plans accordingly and minimize vehicular congestion. The public information program provides a two-way communication tool between the local community and SFMTA to minimize disruption and promote safety.

Table 4.15-3: Elements of Transportation Management Plan

ELEMENT	DESCRIPTION	OBJECTIVE
Traveler Information Strategies	Changeable message signs and ground-mounted signs to alert traffic to potential delays and to direct traffic to alternative routes.	<ul style="list-style-type: none"> • Reduce congestion in work zones; • Maintain safety in work zones; and • Minimize traveler frustration. <p>Provides motorists an advance opportunity to make a decision that would divert them away from the possible congestion. Signage will support safe travel movements.</p>
Transit Passenger Information Strategies	Public outreach measures described above, including notices on transit vehicles, shelters, and Web sites that inform passengers of changes in bus stop locations and alternative parallel routes, and facilitate wayfinding.	<ul style="list-style-type: none"> • Minimize traveler frustration; • Maintain transit accessibility; and • Minimize travel delays. <p>As with the public information program, notification of upcoming delays would allow transit passengers to adjust travel plans if necessary.</p>
Incident Management	CHP and local law enforcement involvement and development of contingency plans in the event of an incident, unexpected construction activities such as a late lane opening or need for a second lane closure in one direction; Implementation of a Construction Zone Enhanced Enforcement Program (COZEEP) with CHP and local traffic control officer presence through the construction period.	<ul style="list-style-type: none"> • Reduce potential congestion in work zones; • Maintain accessibility for travelers throughout incident; • Maintain safety in work zones; and • Minimize disruption to the traveling public. <p>This element of the plan is critical as an effective tool for incidents ranging from flat tires to vehicular collisions to public demonstrations.</p>
Construction Strategies	<ul style="list-style-type: none"> ▪ Use of approved lane closure charts governing acceptable periods for all planned lane closure activities ▪ Maintain two, open traffic lanes in each direction during peak hours ▪ Limit closures of a second mixed-flow traffic lane for nighttime or off-peak traffic hours ▪ Implement truck traffic restrictions ▪ Utilize parking restrictions within the construction zones ▪ Implement reduced speed zones in construction areas ▪ Consider transit operations in identifying construction segments ▪ Locate bus stops outside construction zones ▪ Reduce/consolidate bus stops in consideration of traffic impacts as appropriate ▪ Maintain curbside bus stops where buses are able to pull out of through traffic 	<ul style="list-style-type: none"> • Maintain safety in work zones; • Reduce congestion in work zones; • Minimize traveler frustration; • Maintain transit accessibility; and • Minimize travel delays.

Table 4.15-3: Elements of Transportation Management Plan

ELEMENT	DESCRIPTION	OBJECTIVE
	<ul style="list-style-type: none"> ▪ Designate additional parking removal to facilitate bus weaves to/from the travel lane ▪ Avoid sidewalk closures ▪ Maintain one east-west and north-south crosswalk leg open at all times at all intersections ▪ Install sufficient barricading, signage, and temporary walkways as needed to minimize impacts to pedestrians and bicyclist 	
Alternative Route Strategies	Temporary signage and parking restrictions to direct drivers to alternative routes. Bicycle and pedestrian accommodations also considered.	<ul style="list-style-type: none"> • Minimize traveler frustration; • Maintain transit accessibility; • Minimize travel delays; and • Maintain safety in work zones. <p>Detours provide direction to alternative routes, thus alleviating congestion in the construction zone, facilitating safe travel detours, and allowing travelers the opportunity to avoid the work area.</p>
Contingency Planning	Strategies for handling traffic congestion in the event of unexpected construction activities such as a second lane closure in one direction.	<ul style="list-style-type: none"> • Reduce potential congestion in work zones; • Maintain accessibility for travelers throughout incident; • Maintain safety in work zones; and • Minimize disruption to the traveling public. <p>During the construction phase, plans need to be in place for unexpected situations to avoid gridlock.</p>

4.15.1 | Traffic and Transportation/Pedestrian and Bicycle Facilities

Impacts to traffic, transit, parking and the nonmotorized (i.e., pedestrians and bicyclists) transportation environment that could result during project construction are discussed in the following subsections.

4.15.1.1 | ENVIRONMENTAL CONSEQUENCES

Traffic

Traffic circulation would be impacted whenever a mixed-flow traffic lane is closed for construction activities. As described in Section 4.15.1, the construction approach for each build alternative, including the LPA, with or without the Vallejo Northbound Station Variant, would involve closure of one SB and one NB traffic lane. Because the proposed BRT project would convert one NB and SB mixed-flow traffic lane to dedicated transit use, the lane closures during construction would be similar to the completed, operational project. However, unlike the completed project, buses would continue to operate in the mixed traffic lanes during the construction period, and there would be slower overall operations due to

reduced speed zones. Thus, the traffic impacts described in Chapter 3.3, Vehicular Traffic, would occur during project construction, along with some additional congestion and reduced travel speed due to construction activities. The impact of transit operations on the remaining traffic lanes would be minimized by: (1) moving bus stops out of the three-block construction segments to prevent buses stopping in the lane of traffic to load/unload; or (2) ensuring that stops were located where the bus could pull out of the traffic lane. In addition, localized congestion would occur in advance of each construction segment, where the current three lanes would merge to two, lane shifts occur, or where contraflow operations are in effect. Furthermore, traffic lanes in one direction could be reduced to one lane during short-term closures (e.g., for equipment transport or construction vehicles pulling in/out of mixed-flow traffic), or if a contraflow operation is not undertaken for construction of Build Alternative 2. This would result in additional congestion in the corridor due to the inability to move around right-turning vehicles waiting for crossing pedestrians to clear; however, this scenario would only occur during off-peak times and would not result in substantial congestion impacts.

In addition, other temporary traffic impacts would occur during construction due to short-term detours and as a result of signage stipulating reduced speeds through construction zones and encouraging drivers to use parallel streets to reduce traffic flow through construction zones. Thus, some drivers would divert to parallel routes, such as Franklin or Gough streets, during the project construction period. Short-term detours and closure of a second travel lane in one direction may be required for construction tasks that could interfere with traffic or create safety hazards, such as certain utility relocations, placement of concrete barriers or large equipment, and pavement conforms. These closures would be planned for nighttime or off-peak traffic hours as feasible to avoid or reduce traffic impacts.

KEY FINDING

Reduced road capacity and posted operating speeds could produce localized traffic congestion and slow average travel speeds (for all vehicles, including Muni buses) on Van Ness Avenue during project construction. The impact minimization measures described in Section 4.15.1.2 would be implemented to reduce these impacts during project construction.

In summary, reduced road capacity and posted operating speeds would produce localized traffic congestion and slow average travel speeds on Van Ness Avenue during project construction. The impacts would be minimized to the extent practicable through implementation of the TMP. In addition, impact minimization measures described in Chapter 3.3, Vehicular Traffic, and in Section 4.15.1.2 would lessen these impacts.

Transit

Transit operational impacts would be similar to those for the general traffic. Whenever the travel lanes are reduced or shifted, throughput capacity and operating speeds would be impacted, affecting not only private automobiles but also buses that travel the same corridor. Closures of the second travel lane in one direction would be infrequent and short-term during construction, and would only occur during off-peak or nighttime (see Section 4.15.1.1) whenever possible. Thus, service provided by Muni bus Routes 47 and 49, and GGT would be affected. Transit operational impacts would be greatest when the number of travel lanes in one direction is reduced to one because buses would be delayed by right-turning vehicles waiting for crossing pedestrians to clear.

During project construction, existing Muni bus stops would need to be closed or relocated on the three-block segments where construction is taking place. This would impact transit patrons who are accustomed to the existing Muni stops and may need to walk longer distances to board, alight, or transfer to other transit routes as a result of consolidated stops. The impact to transit patrons from consolidated stops would be similar to the bus stop consolidation impacts described in Section 3.4.3.1, Pedestrian Impacts. During construction, like operation, the average distance between bus stations would likely increase from approximately 700 feet to 1,170 feet under each of the build alternatives (1,150 feet under the LPA and 1,080 feet under the LPA with the Vallejo Northbound Station Variant). As a result, the average maximum distance from a location halfway between two stops would increase from 350 feet to 590 feet (570 feet under the LPA and 540 feet under the Vallejo Northbound Station Design Variant scenario). The increased distance between stops may be difficult to traverse for some passengers, and some passengers may initially be confused

about where to locate bus stops during project construction. The stop spacing during construction, as well as with the BRT project, would remain within SFMTA standards for rapid stop spacing of between 900 and 1,300 feet. The TMP described above would include a wayfinding and transit passenger information campaign to assist transit passengers in identifying stop locations during construction, as well as assist transit passengers in understanding the new with-project stop locations.

In summary, reduced road capacity and posted operating speeds would produce localized traffic congestion and slow average travel speeds of buses on Van Ness Avenue during project construction. Impact minimization measures described in Chapter 3.3, Vehicular Traffic, and in Section 4.15.1.2 would reduce these impacts. In addition, closure and consolidation of Muni stops where construction is taking place would impact transit service, potentially resulting in adverse impacts to transit patrons who could be confused by these changes and need to walk farther distances. Impact minimization measures described in Section 4.15.1.2 would reduce, and in some cases avoid, such impacts.

The reduction in capacity by taking travel lanes and reducing posted speeds during construction would ultimately be offset by improved transit speeds and reliability provided by the BRT.

Parking

During construction of each build alternative, including the LPA (with or without the Vallejo Northbound Station Variant), temporary conversion of parking lanes to mixed-flow traffic lanes would be implemented, resulting in removal of on-street parking on both sides of Van Ness Avenue where construction is taking place. Additional curbside parking may be needed in some instances for construction equipment staging. Construction activities requiring closure of curbside parking would be staged on approximately three-block segments. Additional curbside parking may be needed in some instances for construction equipment staging; however, staging would occur inside the three-block segment. Thus, as a worst-case scenario, parking would be temporarily removed from all three blocks at one time. The amount of curbside parking on Van Ness Avenue varies and averages approximately eight spaces per block. Thus, a three-block segment could average 24 spaces, which could all be temporarily unavailable at the same time. Signage would be provided to indicate parking restrictions. As part of the TMP, a public information program would be implemented to provide advance notice of construction activities and parking restrictions to local businesses and residents. Impacts from temporary removal of colored parking spaces during project construction are discussed in Section 4.15.2, Land Use & Community Impacts.

Parking for construction workers would be addressed in the TMP. The circular City-owned lot at South Van Ness and US 101 (where the on-ramp is) is anticipated to accommodate construction working parking, in addition to equipment staging (Arup, 2012).

Nonmotorized

For all of the build alternatives, including the LPA (with or without the Vallejo Northbound Station Variant), pedestrian traffic would be disrupted by construction work noise, vibration, dust, and air emissions of construction vehicles. Construction of Build Alternative 2 would require temporary closure of part of the sidewalk, or narrowing of the sidewalk area, to accommodate construction of BRT stations. Partial closure of the sidewalk would be required under all of the build alternatives, including the LPA, for curb bulb construction work, replacement of the OCS support poles/streetlights and associated duct trenching, signal installation, and reconfiguration of underground utilities. The intersection corner work would be primarily performed during the night to minimize impacts to pedestrian and vehicular traffic.

KEY FINDING

During construction of each build alternative, temporary conversion of parking lanes to mixed-flow traffic lanes would be implemented, resulting in removal of on-street parking on both sides of Van Ness Avenue where construction is taking place. The impact minimization measures described in Section 4.15.1.2 would be implemented to reduce these impacts during project construction.

KEY FINDING

For all of the build alternatives, pedestrian traffic could be disrupted by construction work noise, vibration, dust, and air emissions of construction vehicles. The impact minimization measures described in Section 4.15.1.2 would be implemented to reduce these impacts during project construction.

Pedestrian and bicycling crossing movements would also be impacted under all of the build alternatives, including the LPA (with or without the Vallejo Northbound Station Variant), when the median and BRT stations are under construction. For safety reasons, the intersection leg located adjacent to a median or BRT station under construction may be temporarily closed. One side of an intersection would be kept open for crossing at any given time; however, this would still burden elderly and disabled pedestrians who would have to walk farther distances to use the open crosswalk leg. In cases where parking is temporarily removed, pedestrians would no longer have a buffer of parked cars between the sidewalk and travel lanes; however, other streetscape features would remain, and the sidewalks of Van Ness Avenue are wide, which alleviate this impact.

Impact minimization measures described in Section 4.15.1.2 would reduce identified impacts to pedestrians and cyclists during project construction.

4.15.1.2 | AVOIDANCE, MINIMIZATION, AND/OR MITIGATION MEASURES

All construction activity for the Van Ness Avenue BRT Project will be carried out in compliance and accordance with the California MUTCD and applicable regulations of the SFPUC and SFPD BSM, and SFMTA Regulations for Working in San Francisco Streets Blue Book. The following additional measures will be implemented during project construction to minimize temporary impacts to traffic, transit, parking, and the nonmotorized (i.e., pedestrians and bicyclists) transportation environment:

M-TR-C1. Temporary conversion of existing parking lanes to mixed-flow traffic lanes will be implemented to generally maintain two open traffic lanes in each direction and minimize traffic impacts.

M-TR-C2. A contraflow system, including elimination of left turns in either direction along Van Ness Avenue, will be implemented during daytime construction under Build Alternative 2 to enable two lanes of mixed-flow traffic to generally remain open in each direction during construction and minimize traffic congestion on Van Ness Avenue. Appropriate signage and temporary traffic signals will be used to guide drivers, augmented by flagmen as needed.

M-TR-C3. Plan required closures of a second mixed-flow traffic lane and detours for nighttime or off-peak traffic hours, in conformance with approved noise requirements.

M-TR-C4. Maintain one east-west and north-south crosswalk leg open at all times at all intersections.

M-TR-C5. Install sufficient barricading, signage, and temporary walkways as needed to minimize impacts to pedestrians and bicyclist.

M-TR-C6. SFMTA will coordinate with GGT as part of the TMP to plan temporarily relocated transit stops as needed and minimize impacts to GGT service.

M-TR-C7. Develop and implement a TMP outlining methods and strategies to minimize construction activity-related traffic delay and inconvenience to the traveling public during the 30 percent project design phase and coordinate with other major projects in the area (e.g., Doyle Drive/Presidio Parkway and CPMC projects). The TMP will include a public information program and wayfinding to provide local businesses and residents with information related to the construction activities and durations, temporary traffic closures and detours, parking restrictions, and bus stop relocations. The public information program will be coordinated with regional agencies, such as Caltrans and Golden Gate Transit. Actions to be included in the TMP are described in mitigation measures M-CI-C1, M-CI-C3, M-CI-C4, M-CI-C5, M-CI-C6, M-CI-C7, and M-TR-6.

4.15.2 | Land Use & Community Impacts

This section assesses land use and community impacts that could result from project construction and specifies avoidance, minimization, and/or mitigation measures to address these construction-related impacts.

4.15.2.1 | ENVIRONMENTAL CONSEQUENCES

As discussed in Section 4.2.1.1, non-white, non-Hispanic residents comprise 46 percent of the study area population; this is lower than the citywide percentage. Some adverse effects to area residents, businesses, and visitors could occur on a temporary basis along the street segments under construction. Construction of each of the build alternatives, including the LPA (with or without the Vallejo Northbound Station Variant), would result in impacts to traffic, circulation, parking, transit service, and the pedestrian and bicycle environment in the Van Ness Avenue corridor, as described above in Section 4.15.1. Impact minimization measures described in Section 4.15.1.2 would be implemented to reduce these impacts during project construction.

Temporary conversion of parking lanes to mixed-flow traffic lanes would be implemented during project construction, resulting in removal of on-street parking on both sides of Van Ness Avenue on the blocks where construction is taking place. This would also result in the temporary removal of colored parking spaces, including truck and passenger loading spaces. Temporary removal of colored parking spaces could adversely impact operations of adjacent land uses during construction. Similarly, partial closures of sidewalk areas during construction may result in short-term disruption to loading operations of adjacent land uses. It is not anticipated that access to businesses and other properties along Van Ness Avenue would be disrupted, although parking constraints and increased traffic would likely cause temporary inconvenience to businesses and residents.

Potential impacts from temporary disruption in utility services could result during replacement or relocation of utilities along Van Ness Avenue. Impacts from temporary disruption in utility service and associated avoidance measures are described in Section 4.15.5. Light and glare impacts to residential properties that could result from nighttime construction are addressed in Section 4.15.3.

The affected community would also be subject to noise, dust, vibration, and air emissions from construction equipment during project construction. Potential noise and vibration impacts during construction and associated mitigation measures are discussed in Section 4.15.10. Potential air quality impacts during construction and associated mitigation measures are discussed in Section 4.15.9. These impacts associated with typical construction projects can discourage or restrict pedestrian activity along the blocks under construction and reduce foot traffic, which could impact local businesses.

Land use characteristics differ along the length of the project corridor and may generally be described as civic and municipal uses in the south (Mission Street – Golden Gate Avenue), commercial/retail in the midsection (Golden Gate Avenue – Broadway Street), and primarily residential uses in the north (Broadway Street – North Point Street). To reduce construction-related impacts to adjacent land uses and the community, the unique characteristics of each area will be taken into consideration in construction planning and scheduling. Construction planning would minimize nighttime construction in residential areas and minimize daytime construction affecting retail and commercial areas. Construction scheduling and planning in the Civic Center area would take into consideration major civic and performing arts events. These considerations would be undertaken as part of the public information procedures outlined in the TMP.

4.15.2.2 | AVOIDANCE, MINIMIZATION, AND/OR MITIGATION MEASURES

Construction phase impacts will be mitigated with special provisions to control noise and fugitive dust, discussed in Sections 4.15.10.2 and 4.15.9.2, respectively. These measures will

KEY FINDING

Temporary removal of colored parking spaces could adversely impact operations of adjacent land uses during construction. The impact minimization measures described in Section 4.15.2.2 would be implemented to reduce these impacts during project construction.

serve to ensure that there will be no adverse effects on the community, including minority and low-income residents. Construction phase impacts related to the removal of colored parking spaces will be addressed by mitigation/improvement measure M-IM-CI-1, described in Section 4.2. Moreover, the following mitigation measures will be implemented to reduce construction-related impacts to local businesses and residents:

M-CI-C1. A TMP that includes traffic rerouting, a detour plan, and public information procedures will be developed during the design phase with participation from local agencies, other major project proponents in the area (e.g., CPMC Cathedral Hill, Hayes Two-Way Conversion, and the Geary Corridor BRT projects), local communities, business associations, and affected drivers. Early and well-publicized announcements and other public information measures will be implemented prior to and during construction to minimize confusion, inconvenience, and traffic congestion.

M-CI-C2. As part of the TMP, construction planning will minimize nighttime construction in residential areas and minimize daytime construction impacts on retail and commercial areas.

M-CI-C3. As part of the TMP, construction scheduling and planning in the Civic Center area will take into consideration major civic and performing arts events.

M-CI-C4. As part of the TMP public information program, SFMTA will coordinate with adjacent properties along Van Ness Avenue to determine the need for colored parking spaces and work to identify locations for replacement spaces or plan construction activities to minimize impacts from the loss of these spaces.

M-CI-C5. As part of the TMP public information program, SFMTA will coordinate with adjacent properties along Van Ness Avenue to ensure that pedestrian access to these properties is maintained at all times.

M-CI-C6. As part of the TMP, SFMTA's process for accepting and addressing complaints will be implemented. This includes provision of contact information for the Project Manager, Resident Engineer, and Contractor on project signage with direction to call if there are any concerns. Complaints are logged and tracked to ensure they are addressed.

M-CI-C7. As part of the TMP, adequate passenger and truck loading zones will be maintained for adjacent land uses, including maintaining access to driveways and providing adequate loading zones on the same or adjoining street block face.

4.15.3 | Visual/Aesthetics

This section presents construction phase impacts related to visual resources and aesthetics, and specifies avoidance, minimization, and/or mitigation measures required to address these construction impacts.

4.15.3.1 | ENVIRONMENTAL CONSEQUENCES

Construction of the proposed project would occur within and adjacent to the existing street ROW. Project construction activities would involve the use of a variety of equipment, stockpiling of materials, and other visual signs of construction.

Various TMP elements, such as portable Changeable Message Signs, detours, and other signage would be used during construction. While evidence of construction activity would be noticeable to area residents and viewer groups, such visual disruptions would be short term and are a common feature of the urban environment. Measures described in Section 4.15.3.2 would reduce aesthetic impacts from construction activities.

Some construction would be accomplished at night. Project specifications would require the project contractor to direct artificial lighting onto the worksite while working in residential areas at night to minimize "spill-over" light or glare effects. This would be a temporary degradation of the visual environment that would be restored at the completion of

Project specifications would require the project contractor to direct artificial lighting onto the worksite while working in residential areas at night to minimize "spill-over" light or glare effects.

construction. Construction best practices described in Section 4.15.3.2 would minimize nighttime light and glare impacts.

4.15.3.2 | AVOIDANCE, MINIMIZATION, AND/OR MITIGATION MEASURES

Implementation of the following construction best practices during project construction are considered improvement measures that would minimize aesthetic/visual resource impacts:

IM-AE-C1. During project construction, SFMTA will require the contractor to maintain the site in an orderly manner, removing trash and waste, and securing equipment at the close of each day's operation.

IM-AE-C2. To reduce glare and light used during nighttime construction activities, SFMTA will require the contractor to direct lighting onto the immediate area under construction only and to avoid shining lights toward residences, nighttime commercial properties, and traffic lanes.

4.15.4 | Cultural Resources

4.15.4.1 | ENVIRONMENTAL CONSEQUENCES

Though no prehistoric archaeological sites have been recorded within 0.25-mile of the project's APE, construction of any of the Van Ness BRT build alternatives, including the LPA (with or without the Vallejo Northbound Station Variant), would involve some ground disturbance with the potential to unearth prehistoric sites that are heretofore unknown. As detailed in Section 4.5, Cultural Resources, of this EIS/EIR, the *Archaeological and Native American Cultural Resources Sensitivity Assessment* (ANACRSA) for the project described a few general locations that may be sensitive for the presence of prehistoric archaeological resources, particularly in areas close to former freshwater courses and coastal bay resources, primarily in or adjacent to the northernmost areas of the APE.

Likewise, while construction of any of the build alternatives, including the LPA (with or without the Vallejo Northbound Station Variant), would not affect known historical archaeological resources, the ANACRSA identified several locations where there may exist a possibility of construction activities uncovering significant historic-era features or deposits. Despite the potential for some buried archaeological resources to be located within the project APE, it is not certain that such resources would be affected or where specifically this may occur. Engineering and other logistical concerns of a modern urban environment constrain preconstruction archaeological testing.

There are no plans that construction would involve directly or physically altering, demolishing, or relocating any character-defining features of any of the historic buildings or Civic Center Historic District. The Noise and Vibration Study for this project did not identify any potentially significant adverse effects to historic properties during construction of the Van Ness Avenue BRT Project. Adverse visual effects during construction would be of temporary duration, and none would be considered a substantial adverse effect to the setting, feeling, or association of the historically significant properties in the APE.

4.15.4.2 | AVOIDANCE, MINIMIZATION, AND/OR MITIGATION MEASURES

Potential impacts to archaeological resources resulting from construction activities under the No Build Alternative and each build alternative, including the LPA (with or without the Vallejo Northbound Station Variant), will be mitigated by implementing the following measures during or prior to project construction:

M-CP-C1. Focused archival research will identify specific areas within the APE that are likely to contain potentially significant remains. Methods and findings will be documented as an addendum to the 2009 survey and sensitivity assessment (Byrd *et al.*, 2013). Research will be initiated once the project's APE map is finalized identifying the major Areas of Direct Impact (i.e., the stations and sewer relocation). Many documents, maps, and drawings cover

KEY FINDING

Adverse visual effects during construction would be of temporary duration, and none would be considered a substantial adverse effect to the setting, feeling, or association of the historically significant properties in the APE.

long stretches of Van Ness Avenue, while other locations may be researched if documents indicate potential sensitivity in adjacent areas.

The Addendum Survey Report will include the following:

- A contextual section that addresses the development of urban infrastructure along Van Ness Avenue, as well as widening and grading activities along the thoroughfare. This overview will provide a basis for evaluating potential resources as they relate to the history of San Francisco and to its infrastructure.
- Documentary research that identifies the types of documents available for the identified station locations: street profiles for grading, street widening maps showing demolished building sites, utility work plans, and others as appropriate. This will include researching various archives and records of public agencies in both San Francisco and Oakland (Caltrans).
- Locations apt to have historic remains present within select areas of the APE (i.e., not removed by later grading or construction).
- A cut-and-fill reconstruction of the entire APE corridor, comparing the modern versus mid-1800s ground surface elevations, to fine-tune the initial prehistoric sensitivity assessment and refine the location of high-sensitivity locations where prehistoric remains may be preserved.
- Relevant profiles and plan views of specific blocks to illustrate the methods used in analyzing available documentation.
- Summary and conclusions to provide detailed information on locations that have the potential to contain extant prehistoric archaeological and historic-era remains that might be evaluated as significant resources, if any.

Two results are possible based on documentary research:

- **No or Low Potential for Sensitive Locations.** Major Areas of Direct Impact have no potential to retain extant archaeological remains that could be evaluated as significant resources. No further work would be recommended, beyond adherence to the Inadvertent Discovery Plan (M-CP-3).
- **Potentially Sensitive Locations.** If the major Areas of Direct Impact contain locations with a moderate to high potential to retain extant historic or prehistoric archaeological remains that could be evaluated as significant resources, further work would be carried out, detailed in a Testing and Treatment Plan (see M-CP-2).

The Phase I addendum report will be submitted to the SHPO for review and concurrence prior to initiation of construction.

M-CP-C2. The Testing/Treatment plan, if required, would provide archaeological protocols to be employed immediately prior to project construction to test areas identified as potentially significant or having the potential to contain buried cultural resources. If such areas might be unavoidable, mitigation measures would be proposed.

For historic-era resources, work would initially entail detailed, focused documentary research to evaluate the potential significance of any archaeological material identified during initial research that might be preserved. Significance would be based on the data-potential of possible remains applied to accepted research designs. Two results could ensue:

- **No Potentially Significant Remains.** If no locations demonstrate the potential for significant remains, no further archaeological testing would be recommended.
- **Potentially Significant Remains.** If any locations have the potential to contain significant remains, then appropriate field methods will be proposed, including compressed testing and data-recovery efforts. Testing will be initiated immediately prior to construction, when there is access to historic ground levels. Should a site or site feature be found and evaluated as potentially significant, mitigation in the form of data recovery will take place immediately upon discovery should avoidance of the site not be possible.

If required for prehistoric resources, a Treatment Plan would identify relevant research issues for resource evaluation, and pragmatic field methods to identify, evaluate, and conduct data recovery if needed. This could include a pre-construction geoarchaeological coring program or a compressed three-phase field effort occurring prior to construction, when the ground surface is accessible.

The procedures detailed in the Treatment Plan would be finalized in consultation with the SHPO.

A Phase 2 Test/Phase 3 Mitigation report will document all testing and data-recovery excavation methods and findings.

M-CP-C3. If buried cultural resources are encountered during construction activities, pursuant to 36 CFR 800.13(b)(3), construction would be halted and the discovery area isolated and secured until a qualified professional archaeologist assesses the nature and significance of the find. Unusual, rare, or unique finds—particularly artifacts or features not found during data recovery—could require additional study. Examples of these would include the following:

- Any bone that cannot immediately be identified as non-human.
- Any types of intact features (e.g., hearths, house floors, cache pits, structural foundations).
- Artifact caches or concentrations.
- Rare or unique items (i.e., engraved or incised stone or bone, beads or ornaments, mission-era artifacts).
- Archaeological remains that are redundant with materials collected during testing or data recovery and that have minimal data potential need not be formally investigated. This could include debitage; most flaked or ground tools, with the exception of diagnostic or unique items (e.g., projectile points, crescents); shell; non-human bone; charcoal; and other plant remains.
- Diagnostic and unique artifacts unearthed during construction would be collected and their origins noted. Artifact concentrations and other features would be photographed, flotation/soils/radiocarbon samples taken (as appropriate), and locations mapped using a GPS device.

Upon discovery of deposits that may constitute a site, the agency official shall notify the SHPO and any Indian tribe that might attach religious and cultural significance to the affected property. The notification shall describe the agency official's assessment of National Register eligibility of the property and proposed actions to resolve the adverse effects (if any). The SHPO, Indian tribe, and Council shall respond within 48 hours of the notification. The agency official shall take into account their recommendations regarding National Register eligibility and proposed actions, then carry out appropriate actions. The agency official shall provide the SHPO, Indian tribe, and the Council a report of the actions when they are completed.

The above activities could be carried out quickly and efficiently, with as little delay as possible to construction work.

The methods and results of any excavations would be documented, with photographs, in an Addendum Report. Any artifacts collected would be curated along with the main collection. Samples would be processed in a lab and analyzed, or curated with the collection for future studies, at the discretion of the project proponent.

If major adjustments are made to the final project design, a qualified professional archaeologist should be consulted before work begins to determine whether additional survey, research, and/or geoarchaeological assessments are needed.

M-CP-C4. If human remains are discovered during project construction, the stipulations provided under Section 7050.5 of the State Health and Safety Code will be followed. The San Francisco County coroner would be notified as soon as is reasonably possible (CEQA Section 15064.5). There would be no further site disturbance where the remains were found,

and all construction work would be halted within 100 feet of the discovery. If the remains are determined to be Native American, the coroner is responsible for contacting the California Native American Heritage Commission within 24 hours. The Commission, pursuant to California PRC Section 5097.98, would notify those persons it believes to be the most likely descendants (MLD). Treatment of the remains would be dependent on the views of the MLD.

4.15.5 | Utilities/Service Systems

This section presents construction phase impacts related to utilities and specifies any avoidance, minimization, and/or mitigation measures required to address construction impacts.

4.15.5.1 | ENVIRONMENTAL CONSEQUENCES

The proposed project could result in adverse impacts to utilities during construction if it would result in the need for expanded or additional facilities by a utility provider, or if a utility provider determines that it has inadequate capacity to serve a project's projected demand in addition to existing demand. Project demolition and construction waste would be accommodated by existing offsite landfills and recycling centers, and it would not affect landfill capacity. Construction activities would be accommodated by existing water and power facilities. Wastewater generation during construction would not exceed wastewater treatment requirements of the San Francisco RWQCB and would comply with batch discharge permits from SFPUC, as described in Section 4.15.8.2, Hydrology and Water Quality.

The proposed project would have adverse impacts to utilities during project construction if it would damage facilities, or interfere with utility service to customers and public facilities. As discussed in Section 4.6.4, coordination with all utility providers and proponents of related projects in the project corridor would be initiated during the preliminary engineering phase of the project and carried through final design and construction phases. Coordination and planning efforts would be facilitated through the CULCOP, Street Construction Coordination Center, and Caltrans, with the focus on identifying potential conflicts and formulating strategies to avoid them, including planning utility relocations/reroutes, and other measures to avoid utility service interruptions. For example, it is known at this time that construction of the center-lane transitway under center-lane configured alternatives, including the LPA (with or without the Vallejo Northbound Station Variant), has the potential to damage portions of the existing sewer main pipeline that are in poor condition. The project team, together with SFDPW and SFPUC, has already begun to address this issue and ensure that this pipeline would not be damaged due to project construction (see Section 4.6, Utilities). Similarly, coordination with SFDPW, Caltrans, and utility providers would avoid or minimize utility service interruption by staging construction activities and taking appropriate precautions for the protection of any unforeseen utility lines discovered during project construction. This planning and coordination process would avoid and minimize impacts to utilities during construction.

4.15.5.2 | AVOIDANCE, MINIMIZATION, AND/OR MITIGATION MEASURES

Avoidance, minimization, and mitigation measures discussed in Section 4.6.4 will alleviate impacts to utilities during construction. In addition, the following typical standard specifications outline the procedures for locating, protecting, and relocating existing underground utilities and surface improvements. These specifications are included in the Van Ness Avenue BRT PCP (Arup, 2012) and will be implemented to help ensure the proper operation of work to minimize the potential for damage to utilities, injury to construction workers, and proper completion of construction work.

IM-UT-C1. Construction work involving utilities will be conducted in accordance with contract specifications, including the following requirements:

- Obtain authorization from utility provider before initiating work;

Coordination and planning efforts would be facilitated through the CULCOP, Street Construction Coordination Center, and Caltrans, with the focus on identifying potential conflicts and formulating strategies to avoid them, including planning utility relocations/reroutes, and other measures to avoid utility service interruptions.

- Contact Underground Service Alert in advance of excavation work to mark-out underground utilities;
- Conduct investigations, including exploratory borings if needed, to confirm the location and type of underground utilities and service connections;
- Prepare a support plan for each utility crossing detailing the intended support method;
- Take appropriate precautions for the protection of unforeseen utility lines encountered during construction; and
- Restore or replace each utility as close as planned and work with providers to ensure its location is as good or better than found prior to removal.

4.15.6 | Geology/Soils/Seismic/Topography

This section presents construction phase impacts related to geologic and seismic hazards, and specifies avoidance, minimization, and/or mitigation measures required to address these construction impacts.

4.15.6.1 | ENVIRONMENTAL CONSEQUENCES

As described in Section 4.7.1, the corridor may be susceptible to the following geologic and seismic hazards: very strong ground shaking, liquefaction, and settlement. Design of project features under each build alternative (including Design Option B and the LPA, with or without the Vallejo Northbound Station Variant) would address liquefaction and settlement impacts. In the event of an earthquake during project construction, very strong ground shaking could result in slope instability at excavated areas. As a result, mitigation for each build alternative, including the LPA, to avoid potential slope instability impacts during project construction is specified in Section 4.15.6.2.

4.15.6.2 | AVOIDANCE, MINIMIZATION, AND/OR MITIGATION MEASURES

M-GE-C1. All cuts deeper than 5 feet must be shored (AGS, 2009a). Shoring design of open excavations must be completed in consideration of the surcharge load from nearby structures, including an examination of the potential for lateral movement of the excavation walls as a result. The following construction BMPs related to shoring and slope stability will be implemented:

- Heavy construction equipment, building materials, excavated soil, and vehicle traffic shall be kept away from the edge of excavations, generally a distance equal to or greater than the depth of the excavation.
- During wet weather, storm runoff shall be prevented from entering the excavation. Excavation sidewalls can be covered with plastic sheeting, and berms can be placed around the perimeter of the excavated areas.
- Sidewalks, slabs, pavement, and utilities adjacent to proposed excavations shall be adequately supported during construction.

4.15.7 | Hazardous Materials

4.15.7.1 | ENVIRONMENTAL CONSEQUENCES

There is a potential to encounter pre-existing hazardous materials during project construction proposed under each build alternative (including Design Option B and the LPA, with or without the Vallejo Northbound Station Variant). Construction activities that would occur under the No Build Alternative could also encounter pre-existing hazardous materials, as described in Section 4.8.2.

Known potential contaminants include petroleum hydrocarbons (from gasoline and diesel fuels), ADL in median soils, and LBP in streetscape structures. There is also the potential to encounter unknown sources of contamination that are sometimes found in areas of undocumented fill, which is a risk common to construction projects. Hazardous materials impacts would occur if construction workers or members of the public were exposed to

DEFINITION

SHORED: In the context of excavation, this usually involves creating wooden buttresses to support the soil walls formed through digging.

Hazardous materials impacts would occur if construction workers or members of the public were exposed to hazardous materials during excavation, grading, and related construction earthwork activities; therefore, mitigation measures for each build alternative are proposed for project construction.

hazardous materials during excavation, grading, and related construction earthwork activities; therefore, mitigation measures for each build alternative, including the LPA (with or without the Vallejo Northbound Station Variant), to be implemented during project construction are described below.

4.15.7.2 | AVOIDANCE, MINIMIZATION, AND/OR MITIGATION MEASURES

The following mitigation measures applicable to each build alternative, including the LPA (with or without the Vallejo Northbound Station Variant), will be implemented to avoid and minimize hazardous materials exposure during project construction:

M-HZ-C1. A Worker Site Health and Safety Plan will be created with the following components, in response to potential RECs identified in the Phase II review or other follow-up investigations, and results from preconstruction LBP and ADL surveys specified in Sections 4.8.3 and 4.8.4:

- A safety and health risk/hazards analysis for each site task and operation in the work plan;
- Employee training assignments;
- Personal protective equipment requirements;
- Medical surveillance requirements;
- Air monitoring, environmental sampling techniques, and instrumentation;
- Safe storage and disposal measures for encountered contaminated soil, groundwater, or debris, including temporary storage locations, labeling, and containment procedures.
- Emergency response plan; and
- Spill containment program.

M-HZ-C2. Procedures will be included in the project SWPPP to contain any possible contamination, including protection of storm drains, and to prevent any contaminated runoff or leakage either into or onto exposed ground surfaces, as specified in Section 4.15.8, Hydrology and Water Quality Construction Impacts.

M-HZ-C3. Necessary public health and safety measures will be implemented during construction.

4.15.8 | Hydrology and Water Quality

As described in Section 4.9.1, the RWQCBs implement and enforce the NPDES program to protect water quality, as specified under the CWA. The control of pollutant discharges is established through NPDES permits issued by the RWQCBs, which contain effluent limitations and standards. The NPDES Permit requires that all owners of land within the state with construction activities resulting in more than 1-acre of soil disturbance (e.g., clearing, grubbing, grading, trenching, stockpile, utility relocation, temporary haul roads), comply with the California SWRCB General Construction Permit (General Permit). An NOI to construct must be filed with the RWQCB at least 30 days prior to any soil-disturbing activities. The purpose of the permit is to ensure that the landowners: (1) eliminate or reduce non-stormwater discharges to storm drains and receiving waters; (2) develop and implement an SWPPP; (3) inspect the water pollution controls specified in the SWPPP; and (4) monitor stormwater runoff from construction sites to ensure that the BMPs specified in the SWPPP are effective.

The SWPPP includes a site map(s) showing the construction site perimeter, existing and proposed buildings, lots, roadways, stormwater collection and discharge points, general topography before and after construction, and drainage patterns across the site. The SWPPP must also specify BMPs that will be used to protect stormwater runoff, as well as the placement of those BMPs; a visual monitoring program; a chemical monitoring program for nonvisible pollutants to be implemented if there is a failure of BMPs; and a sediment monitoring plan if the site discharges directly to a water body listed as an impaired water body for sediment. Measures for erosion and sediment control, construction waste handling

and disposal, and post-construction erosion and sediment control must also be addressed, along with methods to eliminate or reduce non-stormwater discharges to receiving waters.

NPDES and construction wastewater discharge permits are issued from SFPUC. SFPUC has developed guidelines for water pollution prevention referred to as “Keep it on Site”¹⁰¹ (SFPUC, 2009), which provides information for construction within the city and provides important regulatory agency contact information for the contractor. It also describes requirements for SWPPP development and implementation to ensure NPDES compliance with the General Permit.

4.15.8.1 | ENVIRONMENTAL CONSEQUENCES

During construction of any of the build alternatives, including the LPA (with or without the Vallejo Northbound Station Variant), earthwork activities would result in exposure of soil to storm runoff, potentially causing sediment to be carried offsite. In general, construction would include shallow ground disturbance, earthwork grading, and soil excavation within the existing roadway median and sidewalk areas. The DSA would be approximately 2.9 acres for Build Alternative 2; 8.1 acres for Build Alternative 3; 8.4 acres for Build Alternative 3 with Design Option B; 3.8 acres for Build Alternative 4; 3.8 acres for Build Alternative 4 with Design Option B; 5.8 acres for the LPA; and 5.9 acres for the LPA with the Vallejo Northbound Station Variant. The impacts related to such construction would be minimal because the proposed project would require nominal earthwork, and the area of soil to be disturbed would be limited.

The deepest excavation work would be the installation of OCS support poles/streetlights, involving excavation of up to 16 feet bgs in an area approximately 3 feet in diameter. Other deep excavation would include removal and replacement of the existing OCS support poles/streetlights, which would involve excavation of up to 13 feet bgs in an area approximately 3 feet in diameter and replacement/relocation of a sewer line located 11 feet bgs. Most excavation and other soil disturbance during project construction would occur within 5 feet bgs and would involve construction of station platforms, controller cabinets, streetlights, and signage, in addition to utility relocation and pavement work. Dewatering is not anticipated to be necessary for this project.

Offsite oil stockpiles and onsite excavations areas would be exposed to runoff and, if not managed properly, the runoff could increase the amount of sediment in the CSS. The accumulation of sediment could result in blockage of flows, potentially resulting in increased localized ponding or flooding.

In addition, the potential for chemical releases is common at construction sites. Once spilled or released, substances such as fuels, oils, paints, and solvents could be picked up by storm runoff and released into groundwater or carried into the combined sewer system. Section 4.15.8.2 describes avoidance and mitigation measures intended to reduce the release of pollutants and sediment into the CSS and prevent violation of water quality standards and degradation of groundwater resources. These mitigation measures would be required under each proposed build alternative, including Design Option B and the LPA, with or without the Vallejo Northbound Station Variant, and under the No Build Alternative. The No Build Alternative would involve substantially less earthwork comparatively, as discussed in Section 4.15.

4.15.8.2 | AVOIDANCE, MINIMIZATION, AND/OR MITIGATION MEASURES

All of the build alternatives, including the LPA (with or without the Vallejo Northbound Station Variant), have potential environmental consequences due to runoff during the construction phase. The following measures are required:

During construction, earthwork activities can result in exposure of soil to storm runoff. If not properly managed, the runoff could increase the amount of sediment in the combined sewer system. The minimization and avoidance strategies recommended in Section 4.15.8.2 would reduce the potential for this impact to occur.

KEY FINDINGS

All alternatives, including the LPA, have potential environmental consequences due to runoff during the construction phase. The following measures are required:

- **Preparation and implementation of a Stormwater Pollution Prevention Plan during project construction.**
- **Coordination with SFPUC and conformity of construction activities with “Keep it on Site” Guide.**
- **If groundwater is encountered during project excavation activities, the water will be pumped from the excavated area and contained and treated in accordance with all applicable State and federal regulations before being discharged to the existing local combined sewer system.**

¹⁰¹ Visit www.sfwater.org and type “Keep it on Site” in the search box.

RESOURCE

For more information on
“Keep It on Site”, visit
www.sfwater.org and type
“Keep it on Site” in the
search box.

Construction-related stormwater impacts can be mitigated throughout the project site through: (1) use of stormwater BMPs, including inlet protection devices, temporary silt fencing, soil stabilization measures, street sweeping, stabilized construction entrances, and temporary check dams; (2) conducting drilling/piling operations in accordance with guidelines set forth by the City and County of San Francisco, including the San Francisco Department of Public Health Local Oversight Program, and Caltrans Construction Site BMP Manual; (3) lining storage areas; and (4) proper and expeditious disposal of items to be removed, such as landscaping, curb bulb waste, existing bus stop shelters, and demolished OCS and signal poles. In addition, completion of an SWPPP for the NPDES General Permit is required, which will also help to identify and implement construction BMPs to reduce impacts on water quality. SFPUC has developed guidelines for water pollution prevention referred to as “Keep it on Site” (SFPUC, 2009), which provides information for construction within the City and provides important regulatory agency contact information for the contractor. It also describes requirements for SWPPP development and implementation to ensure NPDES compliance with the California State Department of Water Resources General Construction Permit. The SWPPP will address water quality impacts associated with construction activities, including identification of all drainage facilities onsite, placement of appropriate stormwater and non-stormwater pollution controls, erosion and sediment control, spill response and containment plans, inspection scheduling, maintenance, and training of all construction personnel onsite. Coordination with SFPUC and conformity of construction activities with the “Keep it on Site” guide will be necessary.

All exposed soil material should be covered, and soil stockpiles generated during construction should be properly analyzed and characterized for possible contaminants before proceeding with offsite disposal and/or onsite reuse. All construction activities should prevent the creation of potential conduits that allow or facilitate direct vertical migration of any near-surface soil contaminants into the underlying groundwater zone or otherwise enhance lateral migration of residual contaminants in the project area. During wet weather, runoff water should be prevented from entering the excavation and collected and disposed of outside the construction limits. To prevent runoff from entering the excavation, a perimeter berm may be constructed at the top of the excavated area. The sidewalls of the excavation may be covered by plastic sheeting to prevent saturation of the earth material.

If groundwater is encountered during project excavation activities, the water will be pumped from the excavated area and contained and treated in accordance with all applicable State and federal regulations before being discharged to the existing local CSS.

In summary, the following required procedures, identified as improvement measures, will be implemented to avoid adverse water quality impacts during construction:

IM-HY-C1. Preparation and implementation of an SWPPP during project construction will minimize or avoid significant impacts to water quality. Completion of an SWPPP for the NPDES General Permit will be required for construction of each build alternative and for earthwork activities under the No Build Alternative, such as the OCS support pole/streetlight replacement and repaving activities. The SWPPP will address water quality impacts associated with construction activities, including identification of all drainage facilities onsite, placement of appropriate stormwater and non-stormwater pollution controls and BMPs, erosion and sediment control, spill response and containment plans, inspection scheduling, maintenance, and training of all construction personnel onsite.

The SWPPP will specify how construction-related stormwater impacts can be mitigated throughout the project site through:

- The appropriate treatment of overflow stormwater during construction, including inlet protection devices, temporary silt fencing, soil stabilization measures, street sweeping, stabilized construction entrances, and temporary check dams;
- Lining storage areas; and

- Proper and expeditious disposal of items to be removed, such as landscaping, curb bulb waste, existing bus stop shelters, and demolished OCS support poles/streetlights and signal poles.

IM-HY-C2. Any construction work that impacts the CSS will require coordination with SFPUC, and construction-related activities shall conform to the “Keep it on Site” guide (SFPUC, 2009).

IM-HY-C3. If groundwater is encountered during project excavation activities, the water will be pumped from the excavated area and contained and treated in accordance with all applicable State and federal regulations before being discharged to the existing local CSS. A batch discharge permit from SFPUC will be required prior to commencement of discharge to the CSS.

4.15.9 | Air Quality

The federal, state, and local governing bodies, regulations and policies relevant to air quality impacts of the proposed project are described in detail under Section 4.10.1. This also includes a description of relevant TAC and GHG regulations.

4.15.9.1 | ENVIRONMENTAL CONSEQUENCES

Methodology and Significance Criteria

The Sacramento Metropolitan Air Quality Management District’s (SMAQMD) Road Construction Emissions Model (RoadMod) was utilized to quantify construction-related emissions. The assumptions and the model inputs were based on the construction details provided in the PCP.

BAAQMD’s approach to the CEQA analysis of construction-related impacts is to emphasize the implementation of effective and comprehensive control measures rather than detailed quantification of emissions. Particulate matter (PM₁₀ and PM_{2.5}) is the pollutant of greatest concern with respect to construction activities. The BAAQMD provides feasible control measures for construction emissions of particulate matter. If the appropriate construction controls are implemented, then emissions for construction activities would be considered less than significant.

According to the CEQ regulations (40 CFR §§ 1500-1508), the determination of a significant impact is a function of both context and intensity. Context means that the significance of an action must be analyzed in several contexts such as society as a whole (i.e., human, national), the affected region, the affected interests, and the locality. Both short- and long-term effects are relevant. Intensity refers to the severity of impact. To determine significance, the severity of the impact must be examined in terms of the type, quality, and sensitivity of the resource involved; the location of the proposed project; the duration of the effect (short- or long-term), and other considerations of context. Adverse impacts will vary with the setting of the proposed action and the surrounding area.

CEQA Construction Phase Impacts – Regional Emissions

During the construction phase of the proposed project, heavy-duty construction equipment and vehicle trips generated by construction workers traveling to and from the proposed project site may cause air quality impacts. The RoadMod estimating tool and associated model default values were used to estimate worker commute emissions. These emissions are minor compared to equipment and exhaust emissions. While fugitive dust emissions would primarily result from demolition and site preparation (e.g., grading) activities, NO_x emissions would primarily result from the use of heavy-duty construction equipment. Each of these potential sources was taken into consideration to estimate construction air quality impacts. Construction emissions can vary substantially from day to day, depending on the level of activity, the specific type of operation, and the prevailing weather conditions.

Emissions from construction vehicles are summarized in Tables 4.15-4 and 4.15-5 for informational purposes. Each build alternative, including the LPA, would result in lane closures and may affect vehicle speeds on Van Ness Avenue and parallel roadways. There is a direct correlation between decreased vehicle speeds and higher pollutant emissions at low vehicle speeds (e.g., 6 to 11 mph). The construction analysis conservatively assumed that average daily traffic along Van Ness Avenue would be reduced by 5 mph during construction activity. The increased emissions resulting from traffic delays were added into the emissions caused by general construction activity. The traffic analysis prepared for the proposed project identified Van Ness Avenue between Market Street and Fell Street as having the highest average daily traffic along the corridor. To be conservative, this traffic volume was used to determine traffic delay emissions for the corridor during construction. For each alternative, including the LPA, it was assumed that traffic would be delayed for up to three blocks.

Tables 4.15-4 and 4.15-5 include onsite and offsite exhaust emissions. Onsite emissions are emissions generated by construction equipment located directly on the project site. Offsite emissions are generated by haul trucks and worker trips, both of which occur primarily away from the project site.

Alternative 1: No Build (Baseline Alternative). The No Build Alternative would include replacing the existing OCS and support poles/streetlights, traffic signal infrastructure improvements, new buses, sidewalk and street lighting improvements, pavement resurfacing, and various bus infrastructure improvements described above. These projects would undergo individual environmental review and construction emissions would be analyzed, as necessary. This alternative would have a less-than-significant impact under CEQA.

Build Alternative 2: Side-Lane BRT with Street Parking. Table 4.15-4 shows construction exhaust emissions for informational purposes. The BAAQMD’s approach to CEQA analyses of construction impacts is to emphasize implementation of effective and comprehensive control measures for particulate matter rather than detailed quantification of emissions. Construction equipment emits exhaust pollutants such as CO and O₃ precursors. These emissions are included in the emission inventory that is the basis for regional air quality plans, and they are not expected to impede attainment or maintenance of O₃ and CO standards in the Bay Area. If all appropriate particulate matter control measures are implemented, then air pollutant emissions from construction activities would be considered a less-than-significant impact; however, without particulate matter control measures, construction activity from Build Alternative 2 would result in a significant impact under CEQA.

Table 4.15-4: Build Alternative 2 Estimated Daily Construction Emissions – Unmitigated

CONSTRUCTION YEAR	POUNDS PER DAY			
	ROG	NO _x	PM ₁₀	PM _{2.5}
Total Maximum Exhaust Emissions	4	49	2	2

SOURCE: TAHA, 2013 (Appendix C).

Build Alternative 3: Center-Lane BRT with Right-Side Boarding and Dual Medians. Table 4.15-5 shows construction exhaust emissions associated with Build Alternative 3 for informational purposes. Construction equipment emits exhaust pollutants such as CO and O₃ precursors. These emissions are included in the emission inventory that is the basis for regional air quality plans, and they are not expected to impede attainment or maintenance of O₃ and CO standards in the Bay Area; however, without particulate matter control measures, construction activity from Build Alternative 3 would result in a significant impact under CEQA.

KEY FINDINGS

Under all build alternatives, including the LPA, with PM control measures construction exhaust emissions would result in a less-than-significant impact for each alternative under CEQA.

Emissions of DPM would result in a less-than-significant impact for each alternative under CEQA.

Finally, demolition and renovation of asbestos-containing materials (ACMs), NOA exposure, and odor emissions would result in a less-than-significant impact for each alternative under CEQA.

The avoidance, minimization, and mitigation measures recommended in Section 4.15.9.2 would reduce the likelihood and magnitude of these impacts.

Table 4.15-5: Build Alternative 3 Estimated Daily Construction Emissions – Unmitigated

CONSTRUCTION YEAR	POUNDS PER DAY			
	ROG	NO _x	PM ₁₀	PM _{2.5}
Total Maximum Exhaust Emissions	4	53	2	2
Exceed Threshold?	No	Yes	No	No

SOURCE: TAHA, 2013 (Appendix C).

Build Alternative 4: Center-Lane BRT with Left-Side Boarding and Single Median. Construction activity under Build Alternative 4 would be similar to that described under Build Alternative 3; except Build Alternative 4 has different design features due to a single median configuration that would result in a shorter construction period compared with Build Alternative 3. The construction period for Build Alternative 4 would be approximately 3 months shorter than for Build Alternative 3, resulting in less mass regional construction emissions under Build Alternative 4 compared to Build Alternative 3. Table 4.15-5 shows construction exhaust emissions associated with Build Alternative 4 for informational purposes. Construction equipment emits exhaust pollutants such as CO and O₃ precursors. These emissions are included in the emission inventory that is the basis for regional air quality plans, and they are not expected to impede attainment or maintenance of O₃ and CO standards in the Bay Area; however, without particulate matter control measures, construction activity from Build Alternative 4 would result in a significant impact under CEQA.

LPA: Center-Lane BRT with Right-Side Boarding/Single Median and Limited Left Turns. Construction activity under the LPA would be similar to that described under Build Alternative 3; except the LPA has different design features on blocks without stations, which would result in a construction period for the LPA approximately 1-month shorter than for Build Alternative 3. This would result in slightly less mass regional construction emissions under the LPA compared to Build Alternative 3. The BAAQMD’s approach to CEQA analyses of construction impacts is to emphasize implementation of effective and comprehensive control measures for particulate matter rather than detailed quantification of emissions. Without particulate matter control measures, construction activity from the LPA would result in a significant impact under CEQA.

In addition to regional emissions discussed above, demolition and renovation of asbestos-containing materials (ACMs), NOA exposure, and odor emissions would result in a less-than-significant impact for each alternative under CEQA.

Toxic Air Contaminants – Toxic Air Contaminant Concentrations

Construction-related activities could result in the generation of TACs, specifically diesel PM, from on-road haul trucks and off-road equipment exhaust emissions. Due to the variable nature of construction activity, the generation of TAC emissions would be temporary; especially considering the short amount of time equipment is typically located near sensitive land uses. Build Alternative 3 represents the longest construction period of each alternative, which is 17 to 21 months. Current models and methodologies for conducting health risk assessments are associated with longer-term exposure periods of 9, 40, and 70 years, which do not correlate well with the temporary and highly variable nature of construction activities. This results in difficulties with producing accurate estimates of health risk.

An analysis was completed to assess the potential health risk associated with construction TAC emissions, despite the difficulties described above. Onsite PM_{2.5} emissions (e.g., equipment exhaust) were input into the AERMOD dispersion model approved by EPA. Anticipated TAC concentrations along Van Ness Avenue were obtained using local

meteorological conditions and adjacent sensitive receptors placed on both sides of construction activity. In addition, the concentrations obtained from AERMOD were modified using a Lifetime Exposure Adjustment factor because exposure to construction emissions would be short-term and intermittent as construction activity moves along Van Ness Avenue. The results indicate that the cancer risk would be less than one person in one million at residences along Van Ness Avenue, and the annual PM_{2.5} concentration would be 0.14 µg/m³. The cancer risk would be below the 10 persons in one million threshold, and the annual PM_{2.5} concentration would be 0.7 percent of the State standard, which would not be considered a significant increase in ambient concentration. Additionally, implementation of the BAAQMD Basic Construction Mitigation Measures, which are required for all project alternatives, including the LPA, would reduce TAC emissions. Construction TAC emissions would result in a less-than-significant impact for each alternative, including the LPA, under CEQA.

NEPA Construction Phase Impacts

Alternative 1: No Build (Baseline Alternative). The No Build Alternative would include replacing the existing OCS and trolley/streetlight poles, traffic signal infrastructure improvements, new buses, sidewalk and street lighting improvements, pavement resurfacing, and various bus infrastructure improvements described above. These projects would undergo individual environmental review, and construction emissions would be analyzed, as necessary. This alternative would not result in adverse construction impacts under NEPA.

Build Alternative 2: Side-Lane BRT with Street Parking. Construction activity would generate regional emissions, TAC emissions, and odors. It would also increase localized pollutant concentrations. In addition, Build Alternative 2 would comply with local regulations and fugitive dust emissions control measures to lessen potential construction-related emissions; however, construction emissions from Build Alternative 2 would be temporary and are not considered adverse under NEPA with implementation of standard control measures.

Build Alternative 3: Center-Lane BRT with Right-Side Boarding and Dual Medians. Construction activity would generate regional emissions, TAC emissions, and odors. It would also increase localized pollutant concentrations. In addition, Build Alternative 3 would comply with local regulations and fugitive dust emissions control measures to lessen potential construction-related emissions; however, construction emissions from Build Alternative 3 would be temporary and are not considered adverse under NEPA with implementation of standard control measures.

Build Alternative 4: Center-Lane BRT with Left-Side Boarding and Single Median. Construction activity would generate regional emissions, TAC emissions, and odors. It would also increase localized pollutant concentrations. In addition, Build Alternative 4 would comply with local regulations and fugitive dust emissions control measures to lessen potential construction-related emissions; however, construction emissions from Build Alternative 4 would be temporary and are not considered adverse under NEPA with implementation of standard control measures.

LPA: Center-Lane BRT with Right-Side Boarding/Single Median and Limited Left Turns. As a combination of design features of Build Alternatives 3 and 4, the LPA would share the same impacts with Build Alternatives 3 and 4. Construction activity would generate regional emissions, TAC emissions, and odors. It would also increase localized pollutant concentrations; however, construction emissions from the LPA would be temporary and are not considered adverse under NEPA with implementation of standard control measures.

4.15.9.2 | AVOIDANCE, MINIMIZATION, AND/OR MITIGATION MEASURES

Implementation of BAAQMD control measures would reduce potential impacts from construction particulate matter emissions. The control measures would also reduce equipment exhaust emissions, including NO_x. Construction work will also conform to San Francisco

Health Code Article 22B, which requires all City projects over 0.5-acre in size to control dust from construction activities by preparing a dust plan approved by the San Francisco Department of Public Health, with the goal of minimizing visible dust and protecting sensitive receptors from dust exposure. In addition, the TMP provides a program for accepting and addressing air quality and other complaints, explained in Sections 4.15 and 4.15.2.2. This includes provision of contact information for the Project Manager, Resident Engineer, and Contractor on project signage with direction to call if there are any concerns (see mitigation measure M-CI-C6). Complaints are logged and tracked to ensure they are addressed.

M-AQ-C1. Construction contractors shall implement the BAAQMD *Basic Construction Mitigation Measures* listed in Table 4.15-6 and the applicable measures in the *Additional Construction Mitigation Measures*. This includes Measure 10 in the *Additional Construction Mitigation Measures*.

Table 4.15-6: Feasible Control Measures for Construction Emissions

Basic Construction Mitigation Measures. The following controls should be implemented at all construction sites:

1. All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered two times per day.
2. All haul trucks transporting soil, sand, or other loose material offsite shall be covered.
3. 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.
4. All vehicle speeds on unpaved roads shall be limited to 15 mph.
5. 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.
6. 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). Clear signage shall be provided for construction workers at all access points.
7. All construction equipment shall be maintained and properly tuned in accordance with manufacturer's specifications. All equipment shall be checked by a certified mechanic and determined to be running in proper condition prior to operation.
8. 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. The Air District's phone number shall also be visible to ensure compliance with applicable regulations.

Additional Construction Mitigation Measures. The following measures are recommended for projects with construction emissions above the threshold:

1. All exposed surfaces shall be watered at a frequency adequate to maintain minimum soil moisture of 12 percent. Moisture content can be verified by lab samples or moisture probe.
2. All excavation, grading, and/or demolition activities shall be suspended when average wind speeds exceed 20 mph.
3. Wind breaks (e.g., trees, fences) shall be installed on the windward side(s) of actively disturbed areas of construction. Wind breaks should have at maximum 50 percent air porosity.
4. Vegetative ground cover (e.g., fast-germinating native grass seed) shall be planted in disturbed areas as soon as possible and watered appropriately until vegetation is established.
5. The simultaneous occurrence of excavation, grading, and ground-disturbing construction activities on the same area at any one time shall be limited. Activities shall be phased to reduce the amount of disturbed surfaces at any one time.
6. All trucks and equipment, including their tires, shall be washed off prior to leaving the site.
7. Site accesses to a distance of 100 feet from the paved road shall be treated with a 6- to 12-inch compacted layer of wood chips, mulch, or gravel.
8. Sandbags or other erosion control measures shall be installed to prevent silt runoff to public roadways from sites with a slope greater than 1 percent.
9. Minimize the idling time of diesel-powered construction equipment to 2 minutes.

Table 4.15-6: Feasible Control Measures for Construction Emissions

10. The project shall develop a plan demonstrating that the off-road equipment (more than 50 horsepower) to be used in the construction project (i.e., owned, leased, and subcontractor vehicles) would achieve a projectwide fleet-average 20 percent NO_x reduction and 45 percent PM reduction compared to typical construction equipment. Acceptable options for reducing emissions include the use of late model engines, low-emission diesel products, alternative fuels, engine retrofit technology, after-treatment products, add-on devices such as particulate filters, and/or other options as such become available.
11. Use low volatile organic compound (VOC) (i.e., ROG) coatings beyond the local requirements (i.e., Regulation 8, Rule 3: Architectural Coatings).
12. Require that all construction equipment, diesel trucks, and generators be equipped with BACT for emission reductions of NO_x and PM.
13. Require all contractors to use equipment that meets CARB’s most recent certification standard for off-road heavy duty diesel engines.

SOURCE: BAAQMD, 2010b.

M-AQ-C2. Construction contractors shall comply with BAAQMD Regulation 11 (Hazardous Pollutants) Rule 2 (Asbestos Demolition, Renovation, and Manufacturing). The requirements for demolition activities include removal standards, reporting requirements, and mandatory monitoring and record keeping.

4.15.9.3 | IMPACTS AFTER MITIGATION

Build Alternative 2: Side-Lane BRT with Street Parking. Appropriate mitigation measures would reduce fugitive dust and equipment exhaust emissions. Table 4.15-7 shows mitigated exhaust emissions. The fugitive dust and exhaust control measures would comply with the BAAQMD policy to control construction emissions; therefore, construction activity under Build Alternative 2 would result in a less-than-significant impact under CEQA.

Table 4.15-7: Build Alternative 2 Estimated Daily Construction Emissions – Mitigated

BUILD ALTERNATIVE 2	POUNDS PER DAY			
	ROG	NO _x	PM ₁₀	PM _{2.5}
Total Maximum Exhaust Emissions	4	37	1	1

Note:
The BAAQMD recommends implementing Measure 10 from the *Additional Construction Mitigation Measures* for a 20 percent reduction in NO_x, and a 45 percent reduction in PM₁₀ and PM_{2.5}. The BAAQD recommends that implementation of the *Basic Construction Mitigation Measures* reduces NO_x an additional 5 percent (BAAQMD, 2010b).

SOURCE: TAHA, 2013 (Appendix C).

Build Alternative 3: Center-Lane BRT with Right-Side Boarding and Dual Medians. Table 4.15-8 shows mitigated exhaust emissions. The fugitive dust and exhaust control measures would comply with the BAAQMD policy to control construction emissions; therefore, construction activity under Build Alternative 3 would result in a less-than-significant impact under CEQA.

Table 4.15-8: Build Alternative 3 Estimated Daily Construction Emissions – Mitigated

BUILD ALTERNATIVE 3	POUNDS PER DAY			
	ROG	NO _x	PM ₁₀	PM _{2.5}
Total Maximum Exhaust Emissions	4	40	1	1

Note:
The BAAQMD recommends implementing Measure 10 from the *Additional Construction Mitigation Measures* for a 20 percent reduction in NO_x, and a 45 percent reduction in PM₁₀ and PM_{2.5}. The BAAQD recommends that implementation of the *Basic Construction Mitigation Measures* reduces NO_x an additional 5 percent (BAAQMD, 2010b).

SOURCE: TAHA, 2013 (Appendix C).

Build Alternative 4: Center-Lane BRT with Left-Side Boarding and Single Median. Construction activity under Build Alternative 4 would be similar to that described under Build Alternative 3; however the construction period for Build Alternative 4 would be approximately 3 months shorter than for Build Alternative 3, resulting in less mass regional construction emissions in comparison to Build Alternative 3. The fugitive dust and exhaust control measures would comply with the BAAQMD policy to control construction emissions; therefore, construction activity under Build Alternative 4 would result in a less-than-significant impact under CEQA.

LPA: Center-Lane BRT with Right-Side Boarding/Single Median and Limited Left Turns. Construction activity under the LPA would be similar to that described under Build Alternative 3; however, the construction period for the LPA would be approximately 1 month shorter than for Build Alternative 3, resulting in less mass regional construction emissions in comparison to Build Alternative 3. The fugitive dust and exhaust control measures would comply with the BAAQMD policy to control construction emissions; therefore, construction activity under the LPA would result in a less-than-significant impact under CEQA.

4.15.10 | Noise and Vibration

4.15.10.1 | ENVIRONMENTAL CONSEQUENCES

Construction Noise

The nature of the proposed Van Ness Avenue BRT construction work is conventional, principally modifications to the existing street/highway surfaces, new stations and concrete/asphalt travel way, curbs and gutters, utility relocations, drainage, signs, striping, and signals. Construction noise varies greatly depending on the construction process, type and condition of the equipment used, and layout of the construction site. Many of these factors are subject to the contractor's discretion. Projections of potential construction noise levels may vary from actual noise experienced during construction due to these factors.

Overall, construction noise levels are governed primarily by the noisiest pieces of equipment. The engine, which is usually diesel, is the dominant noise source for most construction equipment. Table 4.15-9 presents reference noise levels for representative pieces of construction equipment that may be used for the proposed project.

Table 4.15-9: Projected Construction Noise Emission Levels (dBA)

EQUIPMENT	TYPICAL NOISE LEVEL 50 FEET FROM SOURCE	TYPICAL NOISE LEVEL 100 FEET FROM SOURCE ¹
Backhoe	80	74
Rubber-tired Excavator	85	79
Forklift	85	79
Front Loader	85	79
Jack Hammer	88	82
Saw	76	70
Asphalt Milling Machine*	84	78
Roller	74	68
Paver	77	71
Grader	85	79
Dozer	85	79
Concrete Mixers	77	71
Dump Trucks	75	69

Notes:

1. Noise levels at 100 feet are calculated using spherical spreading from a point source.

2. Noise levels are measured in decibels (dBA)

* The noise emission of an asphalt milling machine is not identified in the FTA manual; these data are from Parsons.

Source: FTA, 2006; Parsons, 2010b.

Brief noise disturbances could also be caused by trucks transporting equipment and supplies to and from construction staging areas. The proposed staging areas are at Erie Street, Otis Street, and Filbert Street. Traffic noise from US 101 would tend to mask noise related to construction staging at the Erie Street location. Traffic near the busy intersection of Otis and Mission streets and Van Ness Avenue would tend to do the same for the Otis Street location. The proposed northern staging location is also near a major source of traffic noise – Van Ness Avenue; however, minor, intermittent noise disturbance could still occur at multi-family residences adjacent to the proposed staging site along Filbert Street.

Nighttime construction related to the proposed project would cause City noise ordinance limits to be exceeded from time to time (see Section 4.11.3, Regulatory Setting).

Construction Vibration

Construction activity can result in varying degrees of ground vibration, depending on the equipment and methods used. The operation of construction equipment causes vibrations that spread through the ground and diminish in strength with traveled distance. Buildings in the vicinity of the construction site are affected by these vibrations, with resulting damage in the most severe cases.

Vibratory rollers would be the most dominant sources of overall construction vibration for this project. The vibration levels created by the normal movement of vehicles, including graders, front loaders, and backhoes, are comparable in order-of-magnitude to ground-borne vibrations created by heavy vehicles traveling on streets and highways.

Building damage can be cosmetic or structural. Fragile buildings, such as some historical structures, are generally more susceptible to damage from ground vibration. Normal buildings that are not particularly fragile would not experience any cosmetic damage (e.g., plaster cracks) at distances beyond 25 feet based on typical construction equipment vibration levels. This distance can vary substantially depending on the soil composition between vibration source and receiver.

FTA has specifically addressed four different types of buildings: Category One, reinforced-concrete, steel or timber (no plaster); Category Two, engineered concrete and masonry (no plaster); Category Three, non-engineered timber and masonry buildings; and Category Four, buildings extremely susceptible to vibration damage. Commercial type and multiple-storied structures are generally represented by Categories One and Two. Typical wood-framed residences fall under Category Three, while any structurally fragile buildings (i.e., more likely to be historical in nature) would fall under Category Four. There are buildings of historical significance within the project limits, but none have been identified as sufficiently sensitive to vibration impact to fall under Category Four.

KEY FINDINGS

Construction for all build alternatives, including the LPA, would result in ground-borne vibration and other noise impacts. Minimization and mitigation measures recommended in Section 4.15.10.2 would reduce these impacts.

Calculations were performed to determine the distances at which vibration impacts would occur according to the FTA criteria. Table 4.15-10 shows the results of those calculations classified per building category. Mitigation measures would be required if construction equipment were to operate within the distances shown in Table 4.15-10 from buildings located along the project alignment.

It is expected that ground-borne vibration from construction activities would cause only intermittent, localized intrusion along the Van Ness Avenue BRT corridor. Processes, such as earth moving with bulldozers and the use of vibratory compaction rollers, can create annoying vibration. There could be a few instances where vibratory rollers would need to operate close to wood-frame buildings such that FTA vibration thresholds for cosmetic damage could be briefly and slightly exceeded at those buildings.

Table 4.15-10: Vibration Source Levels and Building Damage Impact Distances for Construction Equipment

EQUIPMENT	PPV ¹ AT 25 FEET, INCHES PER SECOND	APPROXIMATE LV ² AT 25 FEET	IMPACT DISTANCE FOR BUILDING CATEGORY, FEET		
			I	II	III
Vibratory Roller	0.210	94	14	18	25
Loaded Trucks	0.076	86	7	10	14
Jackhammer	0.035	79	4	6	8
Small Bulldozer	0.003	58	1	1	2

Notes:

¹ Peak Particle Velocity

² RMS velocity in decibels (VdB), re: 1 micro-inch per second

Source: FTA, 2006.

4.15.10.2 | AVOIDANCE, MINIMIZATION, AND/OR MITIGATION MEASURES

Construction impacts are of a temporary nature, and construction is a necessary part of any project. Project construction will comply with requirements in the City Noise Ordinance, Article 29 of the San Francisco Municipal Code (San Francisco, 2008); including obtaining permission from the Director of Public Works for nonemergency construction activities during nighttime hours if the resulting noise level is more than 5 dB in excess of the ambient noise at the nearest property line (see Section 4.11.3.4). The TMP provides a program for accepting and addressing noise and other complaints, explained in Sections 4.15 and 4.15.2.2. This includes provision of contact information for the Project Manager, Resident Engineer, and Contractor on project signage with direction to call if there are any concerns (see mitigation measure M-CI-C6). Complaints are logged and tracked to ensure they are addressed.

To further reduce noise and vibration impacts during construction, the following best practices, identified as improvement measures, will be implemented:

IM-NO-C1. Project construction will implement best practices in equipment noise and vibration control as feasible, including the following:

1. Use newer equipment with improved noise muffling and ensure that all equipment items have the manufacturers' recommended noise abatement measures, such as mufflers, engine covers, and engine vibration isolators intact and operational. Newer equipment will generally be quieter in operation than older equipment. All construction equipment should be inspected at periodic intervals to ensure proper maintenance and presence of noise control devices (e.g., mufflers and shrouding).
2. Perform all construction in a manner that minimizes noise and vibration. Utilize construction methods or equipment that will provide the lowest level of noise and ground vibration impact.
3. Turn off idling equipment.
4. When possible, limit the use of construction equipment that creates high vibration levels, such as vibratory rollers and hammers. When such equipment must be used within 25 feet of any existing building, select equipment models that generate lower vibration levels.
5. Restrict the hours of vibration-intensive equipment or activities, such as vibratory rollers, so that annoyance to residents is minimal (e.g., limit to daytime hours as defined in the noise ordinance).

IM-NO-C2. Project construction will conduct truck loading, unloading, and hauling operations so that noise and vibration are kept to a minimum by carefully selecting routes to avoid passing through residential neighborhoods to the greatest possible extent.

IM-NO-C3. Perform independent noise and vibration monitoring in sensitive areas, as needed, to demonstrate compliance with applicable noise limits. Require contractors to modify and/or reschedule their construction activities if monitoring determines that maximum limits are exceeded at residential land uses per the City Noise Ordinance.

IM-NO-C4. The construction contractor will be required by contract specification to comply with the City noise ordinances and obtain all necessary permits, particularly in relation to nighttime construction work.

4.15.11 | Biological Environment

This section presents construction phase impacts to biological resources in the project corridor and any avoidance, minimization, and/or mitigation measures required to address construction impacts. Section 4.13.2, Biological Environment, describes biological resources present along the Van Ness Avenue corridor.

4.15.11.1 | ENVIRONMENTAL CONSEQUENCES

The project area has no special-status biological resources or protected habitats that could be impacted by the proposed build alternatives or No Build Alternative. Nonetheless, median and sidewalk vegetation along Van Ness Avenue provides habitat for nesting birds, which are protected by the MBTA. Construction of the proposed build alternatives, including the LPA (with or without the Vallejo Northbound Station Variant), could disturb migratory birds and active bird nests during the nesting season, causing nest abandonment and death of young or loss of reproductive potential at active bird nests, resulting in adverse impacts. Mitigation described below in Section 4.15.11.2 is required to avoid or minimize disturbance to any active bird nests.

Mature trees shall be preserved and incorporated into the project landscape plan where space permits. Nonetheless, all of the build alternatives, including the LPA (with or without the Vallejo Northbound Station Variant), would require removal of mature trees and potential work within tree drip lines. As described in Section 4.4.4, Visual/Aesthetics, a preconstruction tree survey would be required by a certified arborist to identify protected trees that would be potentially impacted by the proposed project and determine the need for tree removal permits and tree protection plans. Tree protection plans include BMPs to preserve the health of trees during project construction.

4.15.11.2 | AVOIDANCE, MINIMIZATION, AND/OR MITIGATION MEASURES

The following mitigation measures are proposed to offset potential biological resource impacts during construction resulting from the build alternatives, including the LPA (with or without the Vallejo Northbound Station Variant):

M-BI-C1. BMPs identified in tree protection plans and tree removal permits resulting from the preconstruction tree survey will be implemented to preserve the health of trees during project construction.

M-BI-C2. Disturbance of protected bird nests during the breeding season will be avoided. Tree and shrub removal will be scheduled during the nonbreeding season (i.e., September 1 through January 31), as feasible. If tree and shrub removal are required to occur during the breeding season (i.e., February 1 through August 31), then the following measures will be implemented to avoid potential adverse effects to nesting birds:

- A qualified wildlife biologist will conduct preconstruction surveys of all potential nesting habitat within 500 feet of construction activities where access is available. Exclusionary structures (e.g., netting or plastic sheeting) may be used to discourage the construction of nests by birds within the project construction zone. A preconstruction survey of all accessible nesting habitat within 500 feet of construction activities is required to occur no more than 2 weeks prior to construction.

Mature trees shall be preserved and incorporated into the project landscape plan where space permits.

Disturbance of protected bird nests during the breeding season will be avoided.

- If preconstruction surveys conducted no more than 2 weeks prior to construction identify that protected nests are inactive or potential habitat is unoccupied during the construction period, then no further mitigation is required. Trees and shrubs within the construction footprint that have been determined to be unoccupied by protected birds or that are located outside the no-disturbance buffer for active nests may be removed.
- If active protected nests are found during preconstruction surveys, then the project proponent will create a no-disturbance buffer (acceptable in size to CDFW) around active protected bird and/or raptor nests during the breeding season, or until it is determined that all young have fledged. Typical buffers include 500 feet for raptors and 50 feet for passerine nesting birds. The size of these buffer zones and types of construction activities restricted in these areas may be further modified during consultation with CDFW, and it will be based on existing noise and human disturbance levels at the project site. Nests initiated during construction are presumed to be unaffected, and no buffer will be necessary; however the “take” (e.g., mortality, severe disturbance to) of any individual protected birds will be prohibited. Monitoring of active nests when construction activities encroach upon established buffers may be required by CDFW.

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4.16 Irreversible and Irrecoverable Commitment of Resources

Uses of nonrenewable resources during the initial and continued phases of a project could be irreversible because of a commitment of resources that make removal or nonuse of the resource unlikely thereafter. Implementation of the Van Ness Avenue BRT Project would involve the use of some nonrenewable resources. Construction and operation of the proposed project would require consumption of fossil fuels, labor, and construction materials. These expenditures would be, for the most part, irrecoverable; however, they are not in short supply, and their use would not have an adverse effect upon continued availability of these resources. Moreover, the project would accommodate a greater number of transit trips into the future and provide more efficient use of fossil fuel than if these trips were to be taken in private automobiles. In addition, the project would upgrade the existing bus fleet from a mix of diesel motor coaches and electric trolleys to a mix of diesel hybrid motor coach and electric trolley BRT vehicles, which are more fuel efficient.

Any construction would also require a substantial one-time expenditure of federal and local funds. These funds have been planned and programmed, as explained in Chapter 9, Financial Analysis. The Van Ness Avenue BRT Project currently has identified between 73 percent (Build Alternatives 3 and 4) and 100 percent (Build Alternative 2) of the capital funding need for the project. For the LPA, the project currently has identified more than 85 percent of the capital funding need for the project.

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4.17 Relationship between Local Short-Term Uses of the Environment and the Maintenance and Enhancement of Long-Term Productivity

The Van Ness Avenue BRT build alternatives, including the LPA with or without the Vallejo Northbound Station Variant, would each involve short-term uses of the environment during the construction period through the use of fuel and construction materials, and temporary increases in noise levels and air pollutants. These short-term effects and uses of resources would result in long-term benefits, such as improved transit travel times within the Van Ness Avenue corridor and a corresponding increase in transit ridership. In addition, travel time savings projected from proposed BRT implementation under each build alternative, including the LPA, would allow the same service frequencies to be provided using fewer buses and drivers, which would reduce existing operating costs for Muni Bus Routes 47 and 49.

Other long-term benefits to air quality, noise, and energy demand would result from an upgrade of the existing bus fleet from a mix of diesel motor coaches and electric trolleys to an approximate 50 percent split between diesel hybrid motor coach and electric trolley BRT vehicles. These improvements would contribute to the long-term livability and, therefore, productivity of the area.

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