Chapter 4 ENVIRONMENTAL ANALYSIS, CONSEQUENCES, AND MITIGATION

4.1 Land Use and Development

This section summarizes the existing land uses and developments in the project area, and the potential impacts of the proposed alternatives on these resources. The information in this section is based on the Land Use Impacts Technical Memorandum, which is incorporated into this Draft Environmental Impact Statement/Draft Environmental Impact Report (DEIS/DEIR) as Appendix M.

4.1.1 Existing Land Uses

The current land uses adjacent to the proposed project alignments are presented in detail in Appendix M. Overall, the project area is characterized by a dense downtown urban environment.

Tall skyscrapers with offices and hotels dominate the western end of the project area, including the City National Towers, Bonaventure Hotel, CitiGroup Tower, US Bank Tower, and the Standard Hotel.

Civic institutions dominate the central portion of the project area, including City Hall, City Hall East, the California Department of Transportation District 7 Headquarters, Parker Center, and the new Los Angeles Police Department Building.

Little Tokyo, which is located on the eastern portion of the project area, contains a mix of commercial, residential, civic, and light industrial mid- to low-scale development. Little Tokyo includes the Japanese Village Plaza, the Go For Broke Monument, and the Japanese-American National Museum, all of which have particular significance to the City of Los Angeles.

4.1.2 Regulatory Framework

The National Environmental Policy Act (NEPA), the California Environmental Quality Act (CEQA), and the Los Angeles CEQA Thresholds provide criteria for evaluating potential effects on land use and development. These criteria define an adverse impact as one that would:

- Conflict with regional land use policies
- Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project adopted for the purpose of avoiding or mitigating an environmental effect
- Conflict with the compatibility of surrounding land uses or adversely affect the development of surrounding land uses within the project area

The Regional Connector Transit Corridor project would be located entirely within the City of Los Angeles; therefore, consistency with the following plans, policies, and regulations would be needed to avoid land use impacts:

- City of Los Angeles General Plan:
  - Central City Community Plan
  - Central City North Community Plan
  - Transportation Element
  - City of Los Angeles Planning and Zoning Code
  - Civic Center Shared Facilities and Enhancement Plan
- Downtown Adaptive Reuse Incentive Ordinance
- Greater Downtown Housing Incentive Ordinance
- Redevelopment plans established by the Community Redevelopment Agency of the City of Los Angeles (CRA/LA):
  - Bunker Hill Urban Renewal Project
  - Central Business District Redevelopment Project
  - City Center Redevelopment Project
  - Little Tokyo Redevelopment Project

Additionally, the other impact analyses, such as the *Noise and Vibration Technical Memorandum* (Appendix S), were reviewed to determine whether any of the alternatives would have impacts that would diminish the quality of an adjacent land use. In general, zoning and land use policies in the area are supportive of increased density and transit use, as well as reuse of existing buildings. More details on these regulations and plans are available in Appendix M.

4.1.3 Affected Environment

The project area is heavily urbanized and is one of Los Angeles County's major employment centers that includes retail, entertainment, and residential districts. Income levels of residents vary greatly, and residential units range in cost from new luxury condominium developments in the western half of the project area to single-room occupancy hotels and homeless shelters in the eastern portion. Land use patterns in the project area consist mostly of commercial office buildings in the southwestern portion, public office buildings in the central and northern portion, and commercial manufacturing buildings in the southeast. Pockets of residential uses, which include adaptive reuse of older non-residential buildings, are scattered throughout the project area.

Figure 4.1-1 shows the zoning designations and neighborhoods in the project area.

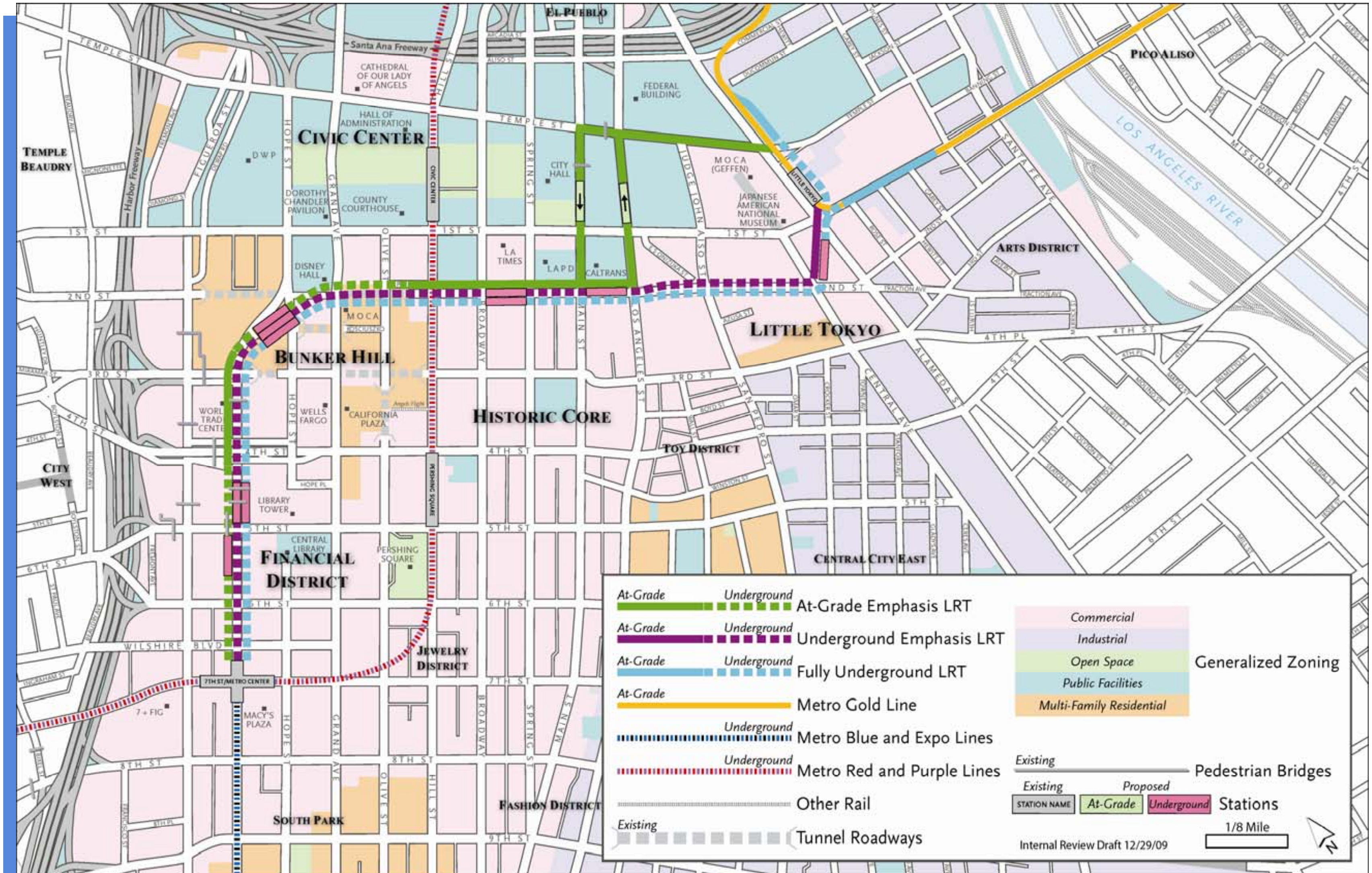

Figure 4.1-1. Neighborhoods and Zoning

The proposed build alternatives would introduce new light rail service in the following neighborhoods:

- Financial District: Existing land uses include office towers, public open space, hotels, and other commercial and retail establishments. The area is densely developed— many of the buildings in the area have 12 or more stories.

- Bunker Hill: Existing land uses include office towers, large auditoriums, residential developments, education buildings, and parking lots. The area contains the tallest buildings in the city. Most of the parcels currently used as parking lots are part of the proposed Grand Avenue redevelopment project.

- Historic Core: Existing land uses include public buildings, offices, retail, and parking lots. This highly urbanized area contains many buildings from the 1920s and earlier (most with ground floor retail). Most originated as office buildings, though some have been converted to manufacturing space or residential units.

- Civic Center: Existing land uses include public offices and services, and public open space. Hotels, restaurants, and other commercial uses are also present. Many of the businesses in the area directly serve public agency needs. Most of the public buildings are large and occupy entire blocks.

- Little Tokyo: Existing land uses include office buildings, restaurants, hotels, cultural institutions, parking lots, and retail establishments. The neighborhood is a center of Japanese-American culture. In general, building heights are lower in Little Tokyo than in the rest of the project area. Also, many of the parking lots are planned for redevelopment.

- Arts District: Existing land uses include warehouse retail, public offices and maintenance facilities, new residential buildings, artist lofts, and pockets of restaurant and retail establishments. Like Little Tokyo, building heights are typically lower in this neighborhood than in the rest of the project area.

4.1.4 Environmental Impacts/Environmental Consequences

The following sections summarize the evaluation of potential land use and development impacts for each alternative. Table 4.1-1 summarizes the results of the analysis.

4.1.4.1 No Build Alternative

The No Build Alternative does not include any new transportation infrastructure beyond what is identified in the 2009 Metro *Long Range Transportation Plan* (LRTP). The No Build Alternative would not provide the land use benefits typical of high-capacity transit projects, which the City of Los Angeles General Plan and the CRA/LA redevelopment plans seek to achieve (e.g., encouragement of livable spaces, sustainable travel patterns, and job growth).

Table 4.1-1. Summary of Potential Impacts to Land Use and Development

Alternative	Regional Land Use and Development	Conflict with Applicable Land Use Plans	Incompatibility with Surrounding or Adjacent Land Uses	Mitigation Required
No Build	None	Potential adverse effect	None	None Available
TSM	None	Potential adverse effect	None	None Available
At-Grade Emphasis LRT	None	None	None	None
Underground Emphasis LRT	None	None	None	None
Fully Underground LRT	None	None	None	None

Since the LRTP predicts that traffic will worsen in the absence of additional transportation capacity, the No Build Alternative would contribute to deteriorating access and mobility within the Los Angeles region by failing to increase the efficiency and carrying capacity of the transit network.

This alternative would conflict with Federal Transportation Administration (FTA) guidance supporting transit investments that encourage and support land uses that are environmentally sustainable, foster livable communities, and increase economic vitality (FTA 2010).

The No Build Alternative would also be inconsistent with the Central City Community Plan goal for a light rail connector between 7th Street/Metro Center Station and Union Station.

4.1.4.1.1 NEPA Finding

The No Build Alternative would conflict with the Central City Community Plan, part of the City of Los Angeles General Plan Land Use Element, and would cause an adverse, unavoidable land use impact.

4.1.4.1.2 CEQA Determination

The No Build Alternative would conflict with the Central City Community Plan, part of the City of Los Angeles General Plan Land Use Element, and would cause a significant, unavoidable land use impact.

4.1.4.2 TSM Alternative

Like the No Build Alternative, the TSM Alternative does not include any new transportation infrastructure beyond what is identified in the LRTP. However, it does include two new shuttle bus lines connecting 7th Street/Metro Center Station and Union Station, but the quality of this service would be contingent on traffic congestion, which is anticipated to worsen in the coming years in the absence of additional capacity.

As such, the TSM Alternative would not provide the lasting benefits typical of high-capacity transit projects, which the City of Los Angeles General Plan and the CRA/LA redevelopment plans seek to achieve (e.g., encouragement of livable spaces, sustainable travel patterns, and job growth).

Since the LRTP states that traffic will worsen without additional transportation capacity, the TSM Alternative would contribute to deteriorating access and mobility within the Los Angeles region by failing to increase the efficiency and carrying capacity of the transit network.

This alternative would conflict with FTA guidance supporting transit investments that encourage and support land uses that are environmentally sustainable, foster livable communities, and increase economic vitality (FTA 2010). The TSM Alternative would also be inconsistent with the Central City Community Plan goal for a light rail connector between 7th Street/Metro Center Station and Union Station.

4.1.4.2.1 NEPA Finding

The TSM Alternative would conflict with the Central City Community Plan, part of the City of Los Angeles General Plan Land Use Element, and would cause an adverse, unavoidable land use impact.

4.1.4.2.2 CEQA Determination

The TSM Alternative would conflict with the Central City Community Plan, part of the City of Los Angeles General Plan Land Use Element, and would cause a significant, unavoidable land use impact.

4.1.4.3 At-Grade Emphasis LRT Alternative

The At-Grade Emphasis LRT Alternative alignment is surrounded primarily by land zoned for public facilities, commercial, and multi-family residential.

During construction, the at-grade portions of the alignment would be constructed mostly in existing roadways, and the underground portions would be constructed using the cut-and-cover method. More information about these construction methods is available in the *Description of Construction*, Appendix K. These methods can involve temporary, intermittent street and sidewalk closures in the immediate vicinity of the alignment. This could temporarily inhibit, but not eliminate, access to the adjacent parcels. The alternative would also require permanent removal of traffic lanes on Flower, 2nd, Los Angeles, Main, and Temple Streets. Traffic flow would be affected; however, access would be retained to adjacent land uses.

The LRT facilities would encroach upon parcels in the Historic Core and Little Tokyo areas. A traction power substation would be placed in a portion of the parking lot immediately south of the Los Angeles Times building, and the light rail tracks would encroach upon the parking lot surrounding the Go for Broke monument in Little Tokyo.

However, this permanent conversion of land use to LRT facilities would be compatible with the other surrounding land uses. The acquisitions needed for this alternative are discussed in the Displacement and Relocation Section (Section 4.2). Once the mitigation measures specified in the Noise and Vibration Section (Section 4.7) have been implemented, significant incompatible noise impacts would not affect surrounding land uses.

By improving transit service to major activity centers, the At-Grade Emphasis LRT Alternative would be consistent with the stated General Plan goal of focusing growth toward existing high-density areas countywide. It would also be consistent with the Transportation Element's support of high-capacity transit service between Union Station and the Metro Blue Line. By adding new stations to the downtown area, the alternative would also make more parcels eligible for density and parking bonuses created by the City of Los Angeles to encourage growth in areas served by transit.

It is anticipated that the At-Grade Emphasis LRT Alternative and other transit projects currently underway or planned for the future would support increases in transit ridership, which would be a cumulatively beneficial effect. Many new commercial and residential developments are planned in the project area on sites that are currently occupied by surface parking lots, and the At-Grade Emphasis LRT Alternative would help offset the effects of these land use changes by providing a better alternative to driving.

4.1.4.3.1 NEPA Finding

The At-Grade Emphasis LRT Alternative would not have direct, indirect, or cumulative adverse effects on land use.

4.1.4.3.2 CEQA Determination

The At-Grade Emphasis LRT Alternative would not have significant direct, indirect, or cumulative adverse effects on land use.

4.1.4.4 Underground Emphasis LRT Alternative

During construction, the majority of the alignment and LRT facilities would be constructed using the cut-and-cover and TBM methods. More information about these construction methods is available in Appendix K. These methods can involve temporary, intermittent closures of streets and sidewalks in the immediate vicinity of the alignment and stations. This could temporarily inhibit, but not eliminate, access to the adjacent parcels. The alternative would also require permanent removal of a traffic lane on Flower Street. Traffic flow would be affected, but access would be retained to adjacent land uses. Overall, construction would be less noticeable in the Historic Core area than under the At-Grade Emphasis LRT Alternative, due to the use of TBMs instead of at-grade construction methods.

The LRT facilities would encroach upon parcels in the Historic Core and Little Tokyo areas. Some businesses on the commercial parcel bounded by 1st Street, Alameda Street, 2nd Street, and Central Avenue would be removed for portal construction. Businesses on the southeast corner of 2nd and Spring Streets would also be acquired. Business owners would be compensated and relocation assistance would be provided as required by Uniform Relocation Assistance and Real Property Acquisition Policies Act. This conversion of land use to LRT facilities would not be incompatible with the other surrounding land uses. After construction, it would be possible for new developments to be located on some of the land used for construction staging. So land use conversions, including conversions on the parcel bounded by 1st Street, Alameda Street, 2nd Street, and Central Avenue, may not all be permanent. The acquisitions needed for this alternative are described in the Displacement and Relocation Section (Section 4.2). Significant noise impacts would not occur as a result of the Underground Emphasis LRT Alternative and land use incompatibility would not be expected.

By improving transit service to major activity centers, the Underground Emphasis LRT Alternative would be consistent with the stated General Plan goal of focusing growth toward existing high density areas countywide. It would also be consistent with the Transportation Element's support of high-capacity transit service between Union Station and the Metro Blue Line. By adding new stations to the downtown area, the alternative would also make more parcels eligible for density and parking bonuses created by the City of Los Angeles to encourage growth in areas served by transit.

It is anticipated that the Underground Emphasis LRT Alternative and other transit projects currently underway or planned for the future would support increases in transit ridership, which would be a cumulatively beneficial effect. Many new commercial and residential developments are planned in the project area on sites that are currently occupied by surface parking lots, and the Underground Emphasis LRT Alternative would help offset the effects of these land use changes by providing a better alternative to driving.

4.1.4.4.1 NEPA Finding

The Underground Emphasis LRT Alternative would not have direct, indirect, or cumulative adverse effects on land use.

4.1.4.4.2 CEQA Determination

The Underground Emphasis LRT Alternative would not have significant direct, indirect, or cumulative adverse effects on land use.

4.1.4.5 Fully Underground LRT Alternative

The land use impacts, construction methods, policy compatibility, and benefits of the Fully Underground LRT Alternative would be similar to those of the Underground Emphasis LRT Alternative. The Fully Underground LRT Alternative alignment is identical to the Underground Emphasis LRT Alternative – Broadway Station Option, west of Central Avenue.

East of Central Avenue, more businesses on the parcel bounded by 1st Street, Alameda Street, 2nd Street, and Central Avenue would need to be removed for station construction. However, only a portion of this land use conversion would be permanent, and the introduction of LRT facilities in this location would not be incompatible with the surrounding retail and dense residential land uses. The acquisitions needed for this alternative are discussed in the Displacement and Relocation Section (Section 4.2). This alternative would also make possible an integrated transit-oriented development at the future Nikkei Center parcel on the northeast corner of 1st and Alameda Streets. This type of development would be supportive of the City's land use goals of encouraging density near transit stops.

4.1.4.5.1 NEPA Finding

The Fully Underground LRT Alternative would not have direct, indirect, or cumulative adverse effects on land use.

4.1.4.5.2 CEQA Determination

The Fully Underground LRT Alternative would not have significant direct, indirect, or cumulative adverse effects on land use.

4.1.5 Mitigation Measures

The No Build and TSM Alternatives would conflict with applicable land use plans and policies, but no mitigation is planned. Significant adverse land use impacts would not occur as a result of any of the Regional Connector build alternatives. Hence mitigation measures would not be required for any alternative.

4.2 Displacement and Relocation

This section describes the potential displacements and relocations that could be needed to construct the proposed Regional Connector Transit Corridor alternatives. The information in this section is based on the Displacement and Relocation Technical Memorandum, which is incorporated into this DEIS/DEIR as Appendix N.

4.2.1 Regulatory Framework

NEPA requires that the Uniform Relocation Assistance and Real Property Acquisition Policies Act (Uniform Act) of 1970 be implemented if displacements would be a direct cause of a project. The law ensures that relocation services and payments be made available to eligible residents, businesses, and nonprofit organizations displaced as a direct result of federal projects. The act provides for uniform and equitable treatment of persons displaced from their homes and businesses by establishing uniform and equitable land acquisition policies. No other NEPA requirements or thresholds for displacement impacts exist.

CEQA provisions apply to projects in the absence of federal funding. CEQA requires conformance to the California Relocation Act (California Act), which is similar to the Uniform Act. It ensures consistent and fair treatment of owners, expedited acquisition of property by agreement to avoid litigation, and promotion of confidence in the public land acquisitions process. According to CEQA guidelines, a project would have a significant impact if it would result in any of the following:

- Displace a substantial number of existing housing units, particularly affordable housing units, necessitating the construction of replacement housing elsewhere
- Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere

CEQA does not include thresholds for employment displacement impacts. Thresholds similar to population and housing displacements are used in this analysis, since most of the potential displacements for the Regional Connector Transit Corridor project would be businesses.

4.2.2 Affected Environment

For purposes of this evaluation of potential land acquisition impacts, the affected environment is limited to the areas within and directly adjacent to the proposed alternative alignments. Depending on project funding and schedule, property acquisition may be phased over time.

4.2.2.1 Typical Causes of Displacement

Table 4.2-1 shows typical causes of land acquisition and displacement that could potentially occur with a project. When a land acquisition occurs, it typically results in either a full or partial take of a parcel.

A partial take would occur if only a portion of the entire parcel was required to accommodate the project (e.g., a portion of a commercial parking lot fronting the alignment is required, but not the adjacent commercial building located away from the alignment). Partial property takes may result from widening a street or intersection due to inadequate right-of-way widths, limited cross-sections, and vertical circulation needs adjacent to subway stations. Street widening may be necessary when the existing horizontal alignment contains insufficient right-of-way. Vertical circulation is necessary near subway stations to bring passengers to the surface and additional land may be needed for station entrances.

Table 4.2-1. Causes of Displacement

Reason	Type of Acquisition	Cause/Process
Horizontal alignment	Full/Partial	Not enough right-of-way for construction and operation of alignment and stations
Vertical circulation above subway station	Partial	Additional area needed adjacent to subway station to bring passengers to surface
Street widening	Partial	At-grade trackway and stations
Illegal encroachment	Full	Unauthorized use of private property
Access to a businesses (driveway or road)	Full	Damages resulting from reduced or restricted access
Storage yards	Full	Additional area required to perform maintenance, for ancillary facilities, and TPSS sites
Widening of intersections	Partial	Additional area to maintain traffic volumes, turn lanes, or platforms
Tunneling easement	Easement	Subway travels off public right-of-way

A full take could occur when the majority of the property is required for the horizontal alignment because of insufficient right-of-way or the need to construct storage or maintenance facilities.

An easement is the right to use another person's land for a stated purpose. An easement can involve a general or specific portion of the property and can be either at the surface level or beneath the property. Easements can be temporary (e.g., during construction) or permanent. Temporary construction easements are utilized when a portion of a property is acquired for construction staging or equipment use. Permanent underground easements are utilized when a subway is tunneled and during its operation.

Using these criteria for the types of acquisitions that could be required for the proposed project , a list of properties that could be affected was compiled for each alternative (listed in Section 4.2.3).

4.2.3 Environmental Impacts/Environmental Consequences

This section identifies all parcels where displacements could occur for the Regional Connector Transit Corridor project and provides additional details about the ones where the displacements could constitute a potentially significant adverse impact. More information on parcels not adversely impacted is available in Appendix N. Table 4.2-2 provides a summary of each alternative's potential displacement and relocation impacts.

Table 4.2-2 Summary of Potential Displacement and Relocation Impacts

Alternative	Total Displacements	Significant Before Mitigation	Significant After Mitigation
No Build	None	None	None
TSM	None	None	None
At-Grade Emphasis LRT	11 Partial Takes 2 Temporary Easements	4 Partial Takes 1 Temporary Easements	None
Underground Emphasis LRT	11 Partial Takes 10 Full Takes 8 Temporary Easements 4 Permanent Easements	2 Partial Takes 2 Full Takes 1 Temporary Easement 1 Permanent Easement	None
Fully Underground LRT	10 Partial Takes 16 Full Takes 5 Temporary Easements 6 Permanent Easements	1 Partial Take 3 Full Takes 1 Temporary Easement 1 Permanent Easement	None

4.2.3.1 No Build Alternative

The No Build Alternative would not involve any new construction for the Regional Connector Transit Corridor project. As such, displacement of properties would not occur for transit infrastructure.

4.2.3.1.1 NEPA Finding

The No Build Alternative would have no effects with respect to displacement or relocation, and mitigation measures would not be required.

4.2.3.1.2 CEQA Determination

The No Build Alternative would have no significant adverse effects with respect to displacement or relocation, and mitigation measures would not be required.

4.2.3.2 TSM Alternative

The TSM Alternative includes all provisions of the No Build Alternative, plus two new shuttle bus lines linking 7th Street/Metro Center Station and Union Station. Up to 24 curb parking and loading spaces would be removed along 2nd Street between Hill Street and Central Avenue to accommodate new bus stops, but this would not constitute a significant impact. The removal of surface parking lots for the addition of new developments to the downtown area, many of which will qualify for reduced off-street parking quotas, could increase parking demand. The new shuttle bus service would partially offset the parking demand in the area; however, this offset would not be as great as would be provided by the build alternatives.

4.2.3.2.1 NEPA Finding

The TSM Alternative would not have adverse effects with respect to displacement or relocation, and mitigation measures would not be required.

4.2.3.2.2 CEQA Determination

The TSM Alternative would not have significant adverse effects with respect to displacement or relocation, and mitigation measures would not be required.

4.2.3.3 At-Grade Emphasis LRT Alternative

To construct the At-Grade Emphasis LRT Alternative, partial takings of 11 parcels and temporary easements across two parcels would be needed for the construction of LRT facilities. These parcels are shown in Table 4.2-3 and Figure 4.2-1.

Permanent displacement of approximately 170 parking spaces (about 51 of which are on-street parking spaces) would occur as a result of the acquisitions required for this alternative. Approximately 23 of these displaced spaces would occur in the Little Tokyo community, where businesses and residents have expressed concern over the potential loss of parking. Surface parking lots are an important resource in downtown Los Angeles due to the presence of many historic buildings that do not provide the amount of off-street parking required by current planning code. Construction of this alternative would not directly disturb the Go For Broke Monument although it would affect the surrounding parking lot.

The Regional Connector Transit Corridor would provide new non-auto access to the area upon completion of construction, which would partially offset the potential effects associated with parking loss. However, some cumulative impacts would still remain, though they would not be significant.

Table 4.2-3. Parcels Potentially Affected by Displacement At-Grade Emphasis LRT Alternative

Figure 4.2-1 #	APN	Address	Type of Displacement	Current Use	Intended Use
1	5151023400	525 S. Flower Street	Partial Take/ Temporary Construction Easement	City National Plaza	Construction Staging
2	5151018017	444 S. Flower Street	Temporary Construction Easement	Courtyard	Construction Staging
3	5151014032	703 W. 3rd Street	Partial Take	Central Plant	Construction Staging
4	5151014033	Parcel Bounded by 3rd/Hope/Flower Streets & General Kosciuszko Way	Partial Take	Vacant	Construction Staging
5	5151027256	Parcel Bounded by Figueroa/3rd/Flower/ 2nd Streets	Partial Take	Pool and Tennis Courts	Station Entrance
6	5149008032	201 S. Spring Street	Partial Take	Parking Lot	TPSS Location
7	5161014902	Parcel bounded by Main/1st/Los Angeles Streets and Parcel 5161014901	Partial Take	Government Building	Station
8	5161014901	Parcel Bounded by Main/Temple/Los Angeles Streets and Parcel 5161014902	Partial Take	Government Building	Alignment Tracks & Station
9	5161013905	Parcel bounded by Judge John Aiso/1st/Los Angeles Streets and Parcel 5161013904	Partial Take	Government Building	Station
10	5161013904	Parcel Bounded by Judge John Aiso/Temple/Los Angeles Streets and Parcel 5161013905	Partial Take	Government Building	Alignment Tracks & Station
11	5161012901	Parcel on SW corner of Temple/Alameda Streets	Partial Take	Parking Lot	Alignment Tracks
12	5161012905	152 N. Central Avenue	Partial Take	MOCA and Public Parking	Pedestrian Bridge Footing

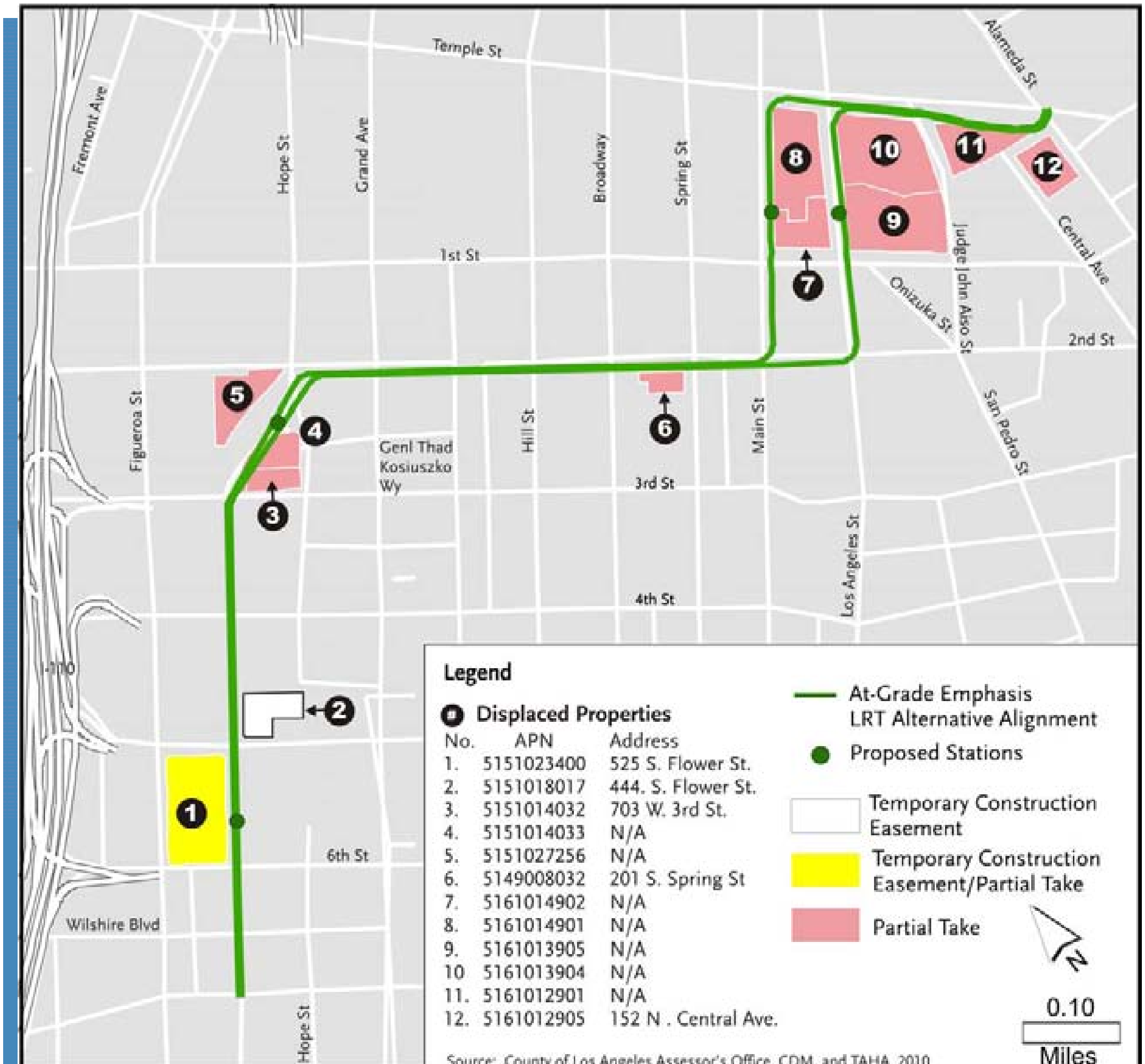

Figure 4.2-1. At-Grade Emphasis LRT Alternative Potential Displacements

4.2.3.3.1 Easements

Of the easements identified in Table 4.2-3 and Figure 4.2-1, potentially significant adverse impacts may occur at the following parcels:

APN 5151023400 (525 S. Flower Street; Figure 4.2-1 #1) – This parcel contains the City National Plaza and towers. Construction of the At-Grade Emphasis LRT Alternative is expected to utilize a portion of the City National Plaza for equipment and/or material staging and for construction of a proposed below-grade station. Part of the City National Plaza serves as a bus stop for various bus lines from several transit service providers. Access to this bus stop would be maintained or relocated during construction. In addition, part of the public sidewalk would be utilized as an entrance to the proposed below-grade station, but this would not encroach onto private property. This easement would be temporary; however, potential adverse impacts could result if access is not maintained to the bus stop. Proposed mitigation measures in Section 4.3.4 have been developed to reduce this potential impact to a less than significant level.

4.2.3.3.2 Partial Takes

Of the partial takes identified in Table 4.2-2 and Figure 4.2-1, potentially significant adverse impacts may occur at the following parcels:

- APN 5151023400 (525 S. Flower Street; Figure 4.2-1 #1) – This parcel contains the City National Plaza and towers. Construction of the At-Grade Emphasis LRT Alternative is expected to require a partial take for locating an entrance to a proposed underground station. Part of the City National Plaza serves as a bus stop for bus lines from several transit service providers. Access to this bus stop would be maintained or relocated during construction. Potential adverse impacts could result if access is not maintained to the bus stop. Proposed mitigation measures in Section 4.3.4 have been developed to reduce this potential impact to a less than significant level.

- APN 5151014032 (703 W. 3rd Street; Figure 4.2-1 #3) – This parcel contains the Central Plant, which is a heating and ventilation plant for some buildings in Bunker Hill. This parcel is located within the Bunker Hill Redevelopment Area as designated by the City of Los Angeles CRA (Parcel H, Central Plant). Construction of the At-Grade Emphasis LRT Alternative is expected to result in a partial take of this site for construction staging and the proposed station. The part of the parcel that would be utilized for construction staging is currently used for parking and is the primary access point to the Central Plant. During construction, this access point would remain available and replacement parking would be required. Potential adverse impacts could result if replacement parking was not provided or if access was restricted or eliminated to the Central Plant. Proposed mitigation measures described in Section 4.3.4 have been developed to reduce this potential impact to a less than significant level.

- APN 5161012901 (Parcel located on southwestern corner of the Temple Street/Alameda Street intersection; Figure 4.2-1 #11) – This parcel is currently used as a publicly owned, pay-to-park, surface parking lot. Part of this lot is anticipated to be developed by others (Bureau of Engineering 2009). Construction of the At-Grade Emphasis LRT Alternative is expected to result in a partial take of a parking lot and loss of several parking spaces (approximately 26 standard spaces and 7 handicapped spaces) for part of its alignment to accommodate the turning radius required to join the existing Metro Gold Line Extension tracks. Since driveway access would be limited, coordination of design would need to occur between Metro and the development. In addition, Metro would need to meet the safety requirements of the California Public Utilities Commission (CPUC), the City, and other regulatory agencies. Loss of the current parking lot may cause an inconvenience for users but it would not represent a significant adverse impact. Additional privately operated parking lots and structures are located in the vicinity.

- APN 5161012905 (Parcel located on southwestern corner of the Temple Street/Alameda Street intersection; Figure 4.2-1 #12) – This parcel, which is currently used as a publicly owned, pay-to-park, surface parking lot, also contains the Geffen Contemporary at the Museum of Contemporary Art (MOCA). Only part of the surface parking lot is anticipated to be developed by others (Bureau of Engineering 2009). Construction of the At-Grade Emphasis LRT Alternative is expected to result in a partial take of five parking spaces to locate the footing of a proposed pedestrian bridge across Alameda Street. Loss of the current parking lot may cause an inconvenience for users but it would not represent a significant adverse impact.

  All other partial takes would result in less than significant impacts because the takes consist of small portions of each parcel including landscaping and adjacent hardscape, privately-owned tennis courts, or private parking. Private parking is typically considered a transitional land use that could be developed by the owners for higher and better uses. The partial takes proposed by the At-Grade Emphasis LRT Alternative would not impede the function of these parcels or their potential for future development.

4.2.3.3.3 NEPA Finding

The At-Grade Emphasis LRT Alternative would have adverse direct and cumulative effects with respect to displacement and relocation. However, these impacts could be mitigated.

4.2.3.3.4 CEQA Determination

The At-Grade Emphasis LRT Alternative would have significant adverse direct and cumulative effects with respect to displacement and relocation. However, these impacts could be mitigated below the level of significance.

4.2.3.4 Underground Emphasis LRT Alternative

To construct the Underground Emphasis LRT Alternative, partial takings of 11 parcels, full takings of 10 parcels, permanent easements across 4 parcels, and temporary easements across 8 parcels would be needed for the construction of LRT facilities. These parcels are shown in Table 4.2-4 and Figures 4.2-2 through 4.2-4.

Table 4.2-4. Parcels Potentially Affected by Displacement – Underground Emphasis LRT Alternative

Fig.	#	APN	Address	Type of Displacement	Current Use	Intended Use
4.2-2	1	5151023400	525 S. Flower Street	Temporary Construction Easement	City National Plaza	Construction Staging
4.2-2	2	5151018017	444 S. Flower Street	Temporary Construction Easement	Citicorp Plaza	Construction Staging
4.2-2	3	5151014032	703 W. 3rd Street	Partial Take	Central Plant	Construction Staging

Table 4.2-4. Parcels Potentially Affected by Displacement – Underground Emphasis LRT Alternative (continued)

Fig.	#	APN	Address	Type of Displacement	Current Use	Intended Use
4.2-2	4	5151014033	Parcel Bounded by 3rd/Hope/Flower Streets & General Kosciuszko Way	Partial Take	Vacant	Construction Staging
4.2-2	5	5151027256	Parcel Bounded by 3rd/Hope/Flower Streets	Partial Take	Tennis Courts and Pool for Residential Bldg	Station Entrance and Bridge
4.2-2	6	5151004911 thru 5151004913	Parcel Bounded by 2nd Street, Hope Street, Grand Avenue, and Genl. Kosciuszko Way	Permanent Underground Easement	Parking Lot	Tunneling
4.2-3	7	5149001903	Parcel Bounded by 1st/2nd/Hill Streets, Broadway	Temporary Construction Easement & Partial Take	Empty Lot	Construction Staging/ Station Entrance
4.2-3	8	5149008031	200 S. Broadway	Full Take	Parking Lot	Potential Station
4.2-3	9	5149008030	208 S. Broadway	Full Take	Parking Lot	Potential Station
4.2-3	10	5149008032	201 S. Spring Street	Full Take	Parking Lot	Potential Station
4.2-3	11	5149001902	100 W. 1st Street	Temporary Construction Easement	New LAPD HQ	Construction Staging
4.2-3	12	5149007006	206 S. Spring Street	Full Take	Commercial Buildings	Construction Staging
4.2-3	13	5149007005	212 S. Spring Street	Full Take	Commercial Buildings	Construction Staging
4.2-3	14	5149006010-028; 031-054; 056-059; 061-095; 097; 099-108; 110; 112-149, 151	108 W. 2nd Street, Units 102-108; 201-212; 215; 301-315; 401-408; 410-415; 501-515; 601-615; 701-704; 706; 708-715; 801-802; 804; 806-815; 901-915; 1001-10015	Permanent Underground Easement	Higgins Bldg; Mixed-Use Commercial and Condos	Tunneling
4.2-3	15	5161015901	100 S. Main Street	Temporary Construction Easement & Partial Take	Caltrans HQ	Station Entrance

Table 4.2-4. Parcels Potentially Affected by Displacement – Underground Emphasis LRT Alternative (continued)

Fig.	#	APN	Address	Type of Displacement	Current Use	Intended Use
4.2-3	16	5161026023	200 S. Main Street	Permanent Underground Easement	St. Vibiana	Tunneling
4.2-3	17	5161026024	114 E. 2nd Street	Permanent Underground Easement	St. Vibiana	Tunneling
4.2-3	18	5161026033	Parcel at SW corner of Los Angeles/2nd Streets	Partial Take	Plaza	Station Plaza
4.2-3	19	5161026901	203 S. Los Angeles Street	Partial Take	Little Tokyo Branch Public Library	Station Entrance
4.2-3	20	5161024014	Parcel at SE corner of Los Angeles/2nd Streets	Temporary Construction Easement & Partial Take	Parking Lot	Construction Staging & Station Plaza
4.2-3	21	5161024018	Parcel at SE corner of Los Angeles/2nd Streets	Temporary Construction Easement	Parking Lot	Construction Staging
4.2-4	22	5161018007	401 E. 2nd Street	Full Take	Parking Lot	Portal
4.2-4	23	5161018011	437 E. 2nd Street	Full Take	Parking Lot	Portal
4.2-4	24	5161018020	Parcel Bounded by 1st/2nd /Alameda Streets and Central Avenue	Partial Take	Commercial	Portal
4.2-4	25	5161018010	Parcel Bounded by 1st/2nd /Alameda Streets and Central Avenue	Full Take	Parking Lot	Portal
4.2-4	26	5161018009	Parcel Bounded by 1st/2nd /Alameda Streets and Central Avenue	Full Take	Parking Lot	Portal
4.2-4	27	5161018008	105 S. Alameda Street	Full Take	Commercial	Portal
4.2-4	28	5161018001	416 E. 1st Street	Full Take	Commercial	Portal
4.2-4	29	5173011900	Parcel at NE corner of 1st/Alameda Streets	Temporary Construction Easement & Partial Take	Vacant Lot	Footing for Pedestrian Bridge

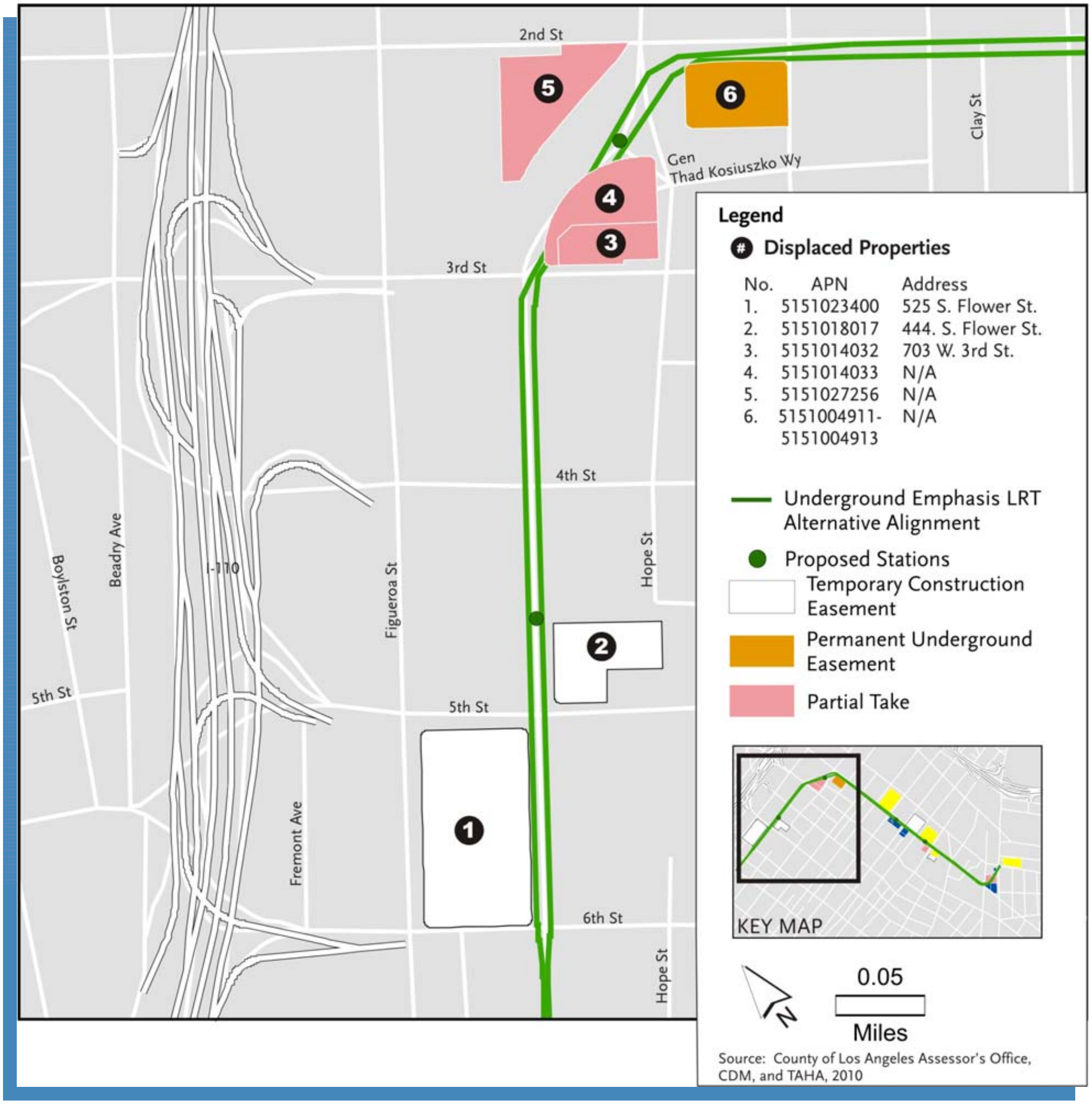

Figure 4.2-2. Underground Emphasis LRT Alternative Potential Displacements – Flower Street

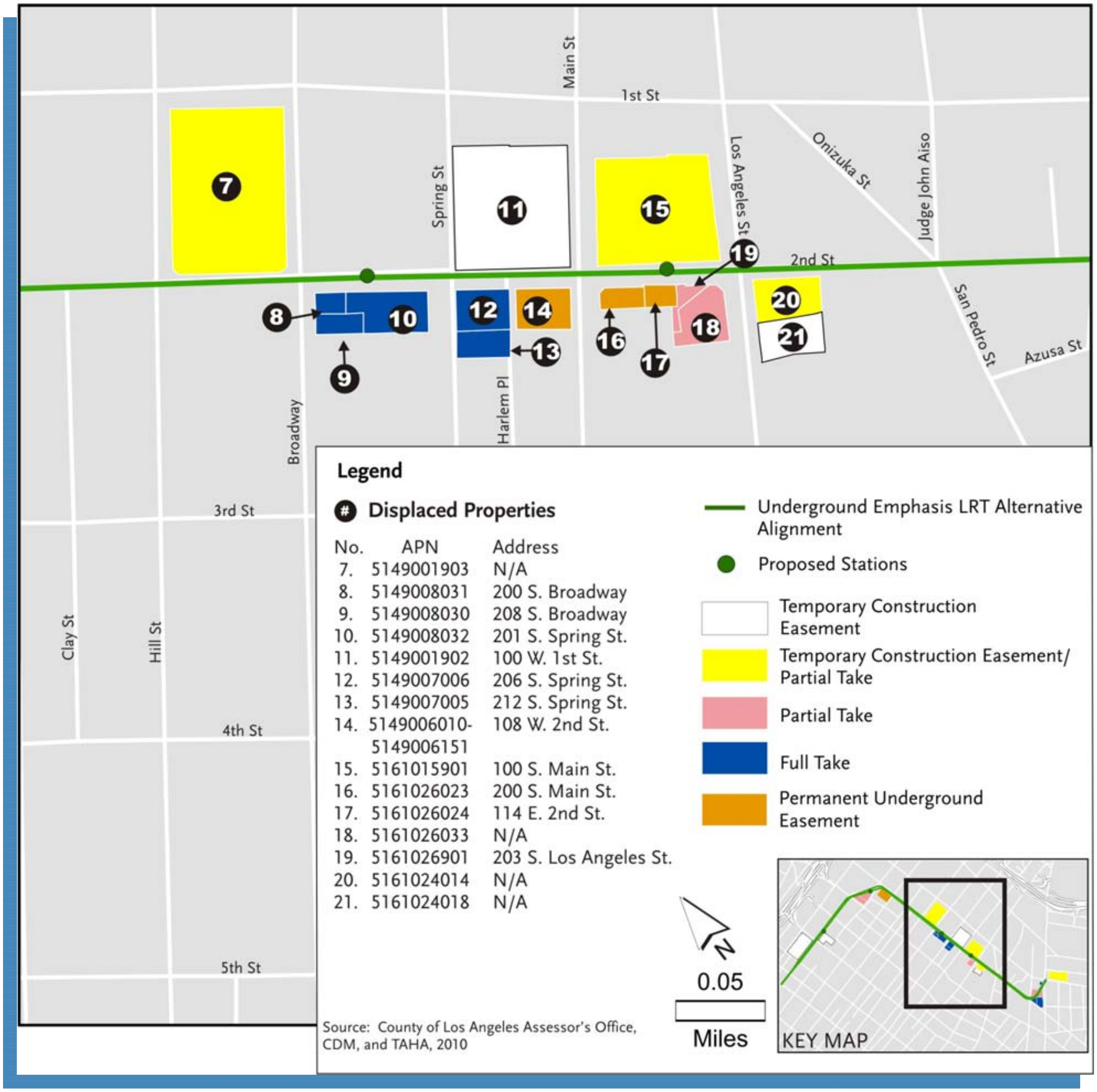

Figure 4.2-3. Underground Emphasis LRT Alternative Potential Displacements – 2nd Street

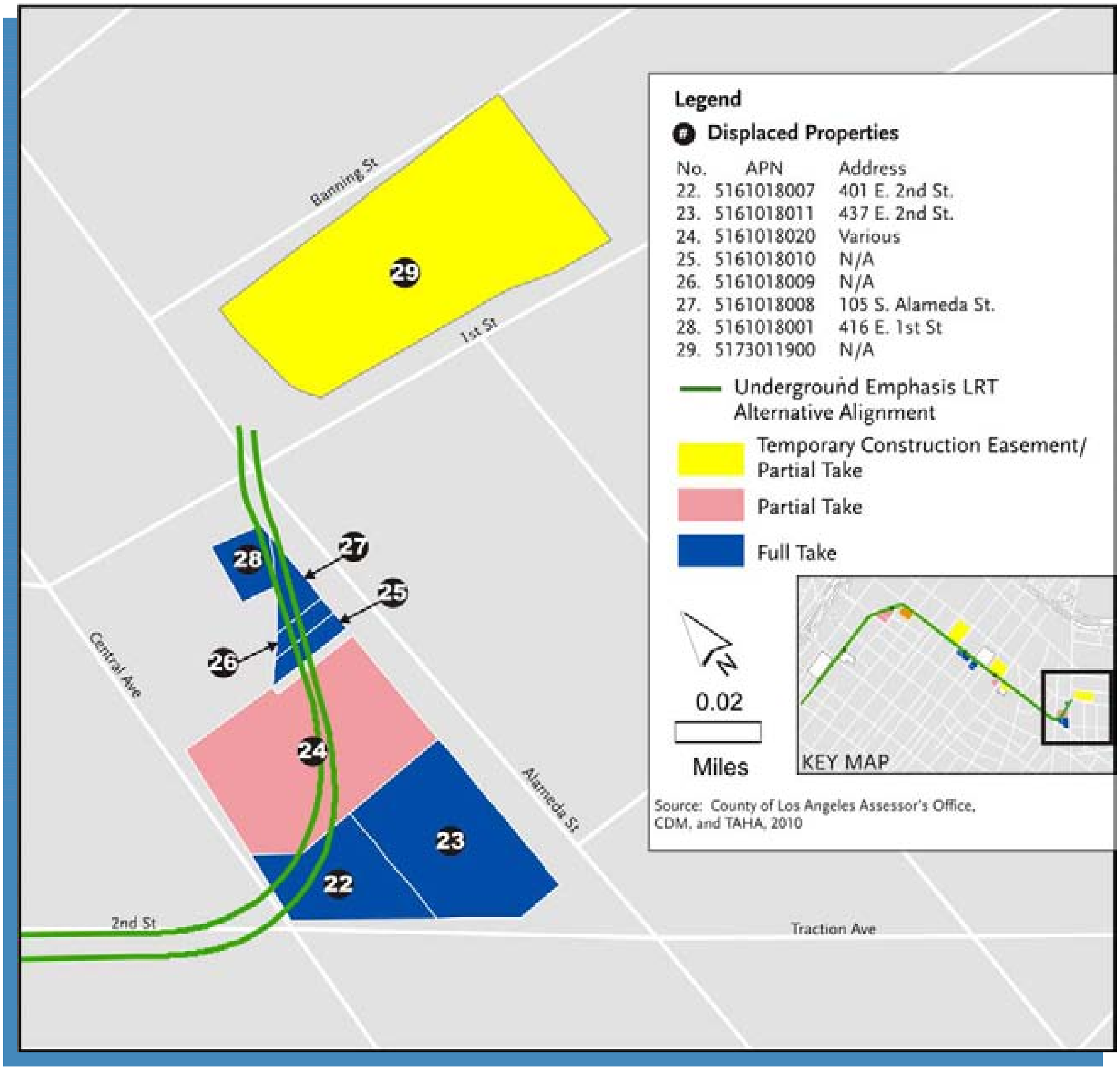

Figure 4.2-4. Underground Emphasis LRT Alternative Potential Displacements – Little Tokyo

Permanent displacement of approximately 148 to 281 parking spaces (about 26 of which are on-street parking spaces) would occur as a result of the acquisitions required for this alternative. Approximately 139 of these displacements would occur in the Little Tokyo community, where businesses and residents have expressed concern over the potential loss of parking. Surface parking lots are an important resource in downtown Los Angeles due to the presence of many historic buildings that do not provide the amount of off-street parking required by current planning code. The Regional Connector would provide new non-auto access to the area, and partially offset the potential adverse effects associated with parking loss. However, some cumulative impacts would still remain, though they would not be significant.

4.2.3.4.1 Easements

Of the easements identified in Table 4.2-4 and Figures 4.2-2 through 4.2-4, potentially significant adverse impacts may occur with the following temporary construction easements:

- APN 5151023400 (525 S. Flower Street; Figure 4.2-2 #1) – See discussion of impacts to this parcel in Section 4.2.3.3.1.

Potentially significant adverse impacts may occur with the following permanent underground easement:

- APNs 5161026023 and 5161026024 (200 S. Main Street and 114 E. 2nd Street; Figure 4.2-3 #s 16 and 17) – This parcel is currently occupied by St. Vibiana Church and accessory buildings. The 2nd Street station - Los Angeles Street Option would have its footprint beneath part of these parcels. Impacts to the church or its associated structures are not anticipated. However, as the church is a historic resource, appropriate shoring practices would be used to avoid subsidence and damage to the structure during construction and operation. Adverse impacts with mitigation are not expected with this permanent underground easement.

4.2.3.4.2 Partial Takes

Of the partial takes identified in Table 4.2-4 and Figures 4.2-2 through 4.2-4, potentially significant adverse impacts may occur at the following parcels:

- APN 5151014032 (703 W. 3rd Street; Figure 4.2-2 #3) – See discussion of impacts to this parcel in Section 4.2.3.3.2.

- APNs 5161026033 and 5161026901 (203 S. Los Angeles Street; Figure 4.2-3 #s18 and 19) – These parcels are currently occupied by the City of Los Angeles Public Library Little Tokyo Branch. The Underground Emphasis LRT Alternative would use portions of these parcels as a plaza and entrance to the potential underground 2nd Street station (Los Angeles Street Option). These parcels contain a public resource. It is anticipated that during operations, the plaza would be a shared resource, serving as the main entrance to the library and the underground station. Potential adverse impacts may occur if access to the Little Tokyo Library Branch were removed or restricted during construction.

All other partial takes would result in less than significant impacts because the takes consist of small portions of each parcel including landscaping and adjacent hardscape, privately-owned tennis courts, or private parking. Private parking is typically considered a transitional land use that could be developed by the owners for higher and better uses. The partial takes proposed by the At-Grade Emphasis LRT Alternative would not impede the function of these parcels or their potential for future development.

4.2.3.4.3 Full Takes

Of the full takes identified in Table 4.2-4 and Figures 4.2-2 through 4.2-4, potentially significant adverse impacts may occur at the following parcels:

- APNs 5161018010, 5161018009, and 5161018008 (portion) (105 S. Alameda Street; Figure 4.2-4 #25, 26, and 27, respectively) – These parcels are currently used as a privately operated parking lot. All of these parcels are expected to be acquired to stage materials during construction and serve as an LRT egress/ingress portal for the Underground Emphasis LRT Alternative. These parcels have approximately 30 parking spaces (this is an estimate because some of the spaces are unmarked). Typically, privately operated parking lots are considered transitional land uses that could be developed by the owners for higher and better uses. Several other privately operated parking lots and structures are located in the vicinity. Loss of the current parking lot may cause an inconvenience for users but it would not represent a significant adverse impact. Potential impacts to parking would be partially offset by the increased public transit access provided by the proposed project. However, Little Tokyo residents and business owners have indicated that parking spaces are important community resources and that the loss of this parking could negatively impact the adjacent small businesses and the Japanese-American National Museum located across the street. The community is concerned that this could, in turn, affect the economic stability and ultimately the character of the community. Therefore, prior to construction of the alternative, Metro would conduct a parking capacity study of the Little Tokyo area to determine if there is sufficient parking availability without these parcels. This change would not be an adverse effect with respect to displacements, but it would be an adverse effect with respect to environmental justice (see Section 4.17).

- APNs 5161018007 and 5161018011 (437 E. 2nd Street; Figure 4.2-4 #s22 and 23) – These parcels are currently used as parking lots. Construction and operation of the Underground Emphasis LRT Alternative would displace 109 parking spaces on these parcels for the LRT egress/ingress portal. The parking lot is associated with businesses in the adjacent parcels and normally would not be separately considered from its complementary use. However, this parking lot is also used in the evenings for public, paid parking after the Office Depot has closed for the day. This potential impact to parking would be partially offset by the increased public transit access provided by the proposed project. Little Tokyo residents and business owners have indicated that parking spaces are important community resources and that losing this parking could negatively impact the adjacent small businesses and the Japanese-American National Museum, located across the street. The community is concerned that this could, in turn, affect the economic stability and ultimately the character of the community. Therefore, Metro would conduct a parking capacity study of the Little Tokyo area to determine if there is sufficient parking availability without these parcels. This change would not be an adverse effect with respect to displacements, but it would be an adverse effect with respect to environmental justice (see Section 4.17).

4.2.3.4.4 NEPA Finding

The Underground Emphasis LRT Alternative would have adverse direct and cumulative effects with respect to displacement and relocation. However, these impacts could be mitigated.

4.2.3.4.5 CEQA Determination

The Underground Emphasis LRT Alternative would have significant adverse direct and cumulative effects with respect to displacement and relocation. However, these impacts could be mitigated below the level of significance.

4.2.3.5 Fully Underground LRT Alternative

To construct the Fully Underground LRT Alternative, partial takings of ten parcels, full takings of 16 parcels, permanent underground easements across five parcels, and temporary construction easements across six parcels would be needed for the construction of LRT facilities. The Fully Underground LRT Alternative would have the same acquisitions as the Underground Emphasis LRT Alternative, with the following exceptions:

- Parcel #5149001902 (Figure 4.2-3 #10)
- Parcel #5161024014 (Figure 4.2-3 #20)
- Parcel #5161024018 (Figure 4.2-3 #21)

Additional parcels that would need to be acquired for the Fully Underground LRT Alternative are shown in Table 4.2-5 and Figure 4.2-5.

Approximately 13 curb parking spaces, which are located in the Financial District, would be removed for the Fully Underground LRT Alternative. Parking space losses from surface lots for the Fully Underground LRT Alternative would be the same as the Underground Emphasis LRT Alternative. Surface parking lots are an important resource in downtown Los Angeles due to the presence of many historic buildings that do not provide the amount of off-street parking required by current planning code. The Regional Connector Transit Corridor would provide new non-auto access to the area, which would partially offset the potential adverse effects associated with parking loss. However, some cumulative impacts would still remain, though they would not be significant.

4.2.3.5.1 Easements

Of the easements identified for the Fully Underground LRT Alternative, potentially significant adverse impacts may occur with the following temporary construction easement:

- Parcel #5151023400 (Figure 4.2-2 #1) – See discussion of impacts to this parcel in Section 4.2.3.3.1.

Potentially significant adverse impacts may occur with the following permanent underground easement:

- Parcels #5161026023 and 5161026024 (Figure 4.2-3 #16 and #17) – See discussion of impacts to this parcel in Section 4.2.3.4.1.

4.2.3.5.2 Partial Takes

Of the partial takes identified for the Fully Underground LRT Alternative, potentially significant adverse impacts may occur at the following parcel:

- Parcel #5151014032 (Figure 4.2-2 #3) – See discussion of impacts to this parcel in Section 4.2.3.4.2.

Table 4.2-5. Additional Parcels Potentially Affected by Displacement – Fully Underground LRT Alternative

Fig.	#	APN	Address	Type of Displacement	Current Use	Intended Use
4.2-5	30	5173011901	Parcel bounded by Alameda Street, 1st Street, Temple Street, and Parcel 5173011900	Full Take	Metro Gold Line Alignment/ Station	Road Widening
4.2-5	31	5173012900	Parcel bounded by 1st Street, Temple Street, and Parcels 5173011900 and 5173012031	Temporary Construction Easement & Partial Take	Empty Lot	Construction Staging, Station Entrance, and Road Widening
4.2-5	32	5173012901	Parcel bounded by 1st Street and Parcel 5173012900	Full Take	Parking lot	Road Widening
4.2-5	33	5173008908	432 E. Temple Street	Permanent Underground Easement	Warehouse and grounds	Alignment
4.2-5	34	5173008901	432 E. Temple Street	Permanent Underground Easement	Warehouse and grounds	Alignment
4.2-5	35	5173007901	433 E. Temple Street	Partial Take	LA Dept of Water and Power (DWP) Station	Portal
4.2-5	36	5173006900	433 E. Temple Street	Partial Take	DWP Station	Portal/Aerial Structure
4.2-5	37	5173001901	Parcel at Southeast corner of Alameda Street/Commercial Street intersection	Partial Take	Vacant	Portal/Aerial Structure
4.2-5	38	5163018002	402 E. 1st Street	Potential Full Take	Parking Lot	Station Entrance
4.2-5	39	5163018021	Parcel at Southwest corner of Alameda Street/Commercial Street intersection	Potential Full Take	Parking Lot/ Restaurant	Station Entrance

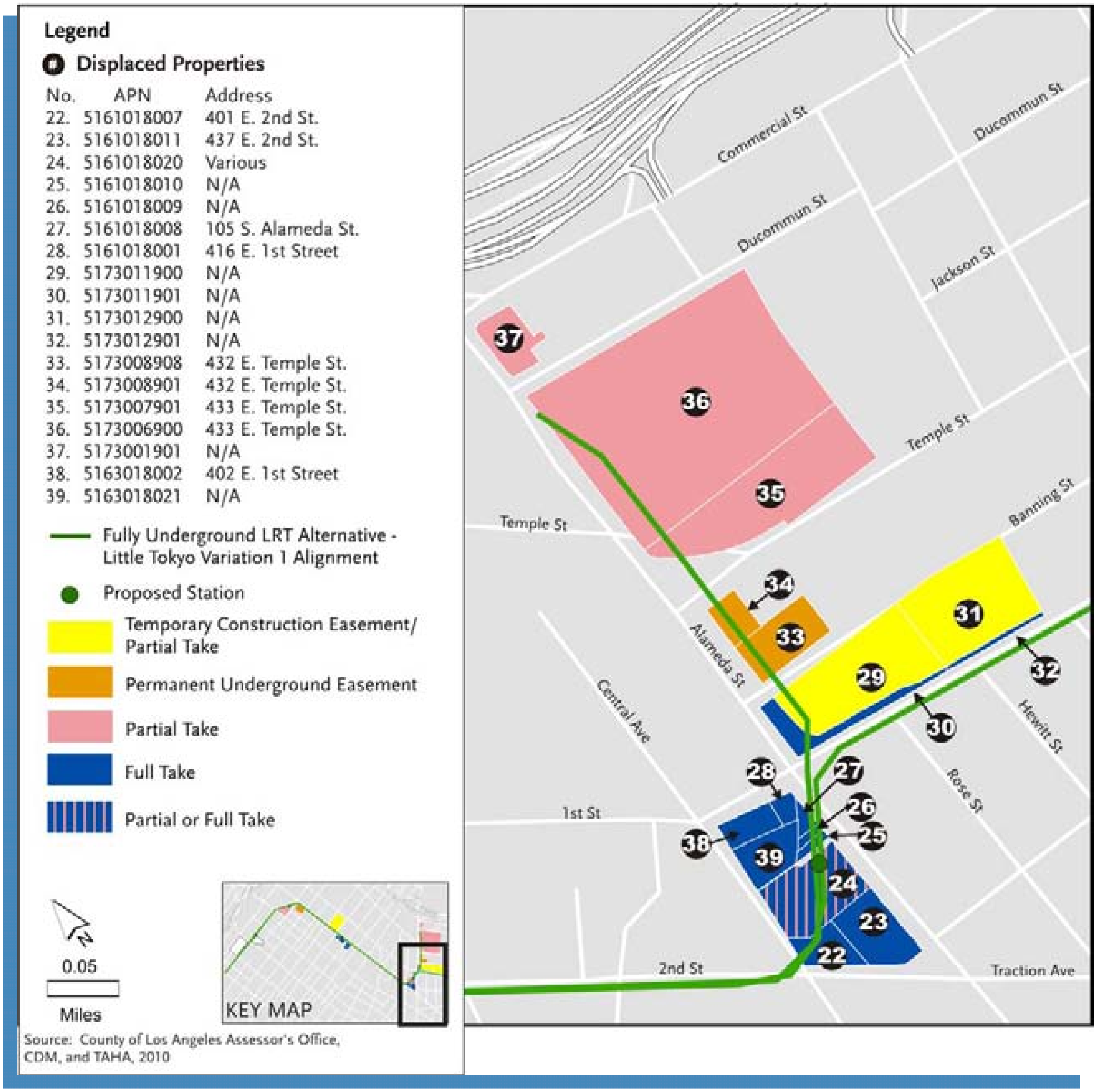

Figure 4.2-5. Additional Potential Displacements for the Fully Underground LRT Alternative

All other partial takes would result in less than significant impacts because the takes consist of small portions of each parcel including landscaping and adjacent hardscape, privately-owned tennis courts, or private parking. Private parking is typically considered a transitional land use that could be developed by the owners for higher and better uses. The partial takes proposed by the At-Grade Emphasis LRT Alternative would not impede the function of these parcels or their potential for future development.

4.2.3.5.3 Full Takes

Of the full takes identified for the Fully Underground LRT Alternative, potentially significant adverse impacts may occur at the following parcels:

- Parcels #5161018007 and 5161018011 (Figures 4.2-4 and 4.2-5 #22 and #23) – See discussion of impacts to this parcel in Section 4.2.3.4.3.
- Parcels #5161018008, 5161018009, and 5161018010 (Figures 4.2-4 and 4.2-5 #25, #26, and #27) – See discussion of impacts to this parcel in Section 4.2.3.4.3.
- APN 5161018002 (402 E. 1st Street; Figure 4.2-5 #38) – This parcel is currently occupied by a privately owned, pay-to-park lot used primarily by customers of the restaurants in the vicinity of the lot and patrons of the Japanese-American National Museum (JANM). If engineering analysis indicates that a full take is required on this parcel, construction and operation of the Fully Underground LRT Alternative would displace all parking spaces (approximately 70; however, this is an estimate because not all spaces are marked) for staging of construction equipment and for construction of an underground station. Privately operated parking lots are typically considered transitional land uses that could be developed by owners for higher and better uses. Several other privately operated parking lots and structures are located in the vicinity. Loss of the current parking lot may cause an inconvenience for users but it would not represent a significant adverse impact. This potential impact to parking would be partially offset by the increased public transit access provided by the proposed project. However, Little Tokyo residents and business owners have indicated that parking spaces are important community resources and that the loss of this parking could negatively impact the adjacent small businesses and the JANM located across the street. The community is concerned that this could, in turn, affect economic stability and ultimately the character of the community. Therefore, Metro would conduct a parking capacity study of the Little Tokyo area to determine if there is sufficient parking availability without these parcels. This change would not be an adverse effect with respect to displacements, but it would be an adverse effect with respect to environmental justice (see Section 4.17).

4.2.3.5.4 NEPA Finding

The Fully Underground LRT Alternative would have adverse direct and cumulative effects with respect to displacement and relocation. However, these impacts could be mitigated.

4.2.3.5.5 CEQA Determination

The Fully Underground LRT Alternative would have significant adverse direct and cumulative effects with respect to displacement and relocation. However, these impacts could be mitigated below the level of significance.

4.2.4 Mitigation Measures

4.2.4.1 No Build and TSM Alternatives

Significant adverse displacement or relocation impacts would not occur and mitigation measures would not be required for the No Build or TSM Alternatives.

4.2.4.2 Mitigation Measures Common to All Build Alternatives

The following mitigation measures would be common to all build alternatives. In combination with the additional mitigation measures listed in Sections 4.2.4.3, 4.2.4.4, and 4.2.4.5, all potential impacts would be reduced below the level of significance.

- Regarding APN 5151014032 (Parcel 3, 703 W 3rd St.), where a potential adverse impact is expected due to the partial take of parking and primary access to the Central Plant, replacement parking would be provided at the parcel or a nearby parcel. In addition, access to the Central Plant would be maintained at all times during construction.

- Access would be maintained and adequate signage indicating the location and accessibility of a bus stop would be posted where access to bus stops is restricted (such as APN 5151023400, Parcel 1, 525 S Flower St.).

- Adequate relocation of a bus stop to a nearby alternative location based on the re-routing of bus service would be implemented where bus stops would be displaced due to street closures (such as APN 5151016013, Parcel 14, 108 W 2nd St.). Adequate signage and notices indicating the relocated bus stop would be placed at strategic locations (as determined by Metro Operations).

- Upon completion of construction, property needed for construction but not required to maintain the physical infrastructure or necessary for access would be included in Metro Joint Development Program for possible development. A development would be environmentally and separately cleared from this project and would undergo its own community input process. Until a development is approved, the remaining underutilized property may be used for public parking spaces or at the very least be graded and fenced to a higher standard that reflects the community's identity and character more than typical gravel and chainlink.

- During construction, Metro would work with the City to develop a parking mitigation program to mitigate the loss of public parking spaces in the area of Little Tokyo. This could include, but is not limited to:

  - Restriping the existing street to allow for diagonal parking.

  - Reducing the number of restricted parking areas.

  - Increasing the number of hours of parking for on-street parking.

4.2.4.3 At-Grade Emphasis LRT Alternative

In conjunction with the mitigation measures listed in Section 4.2.4.2, the following mitigation measures would reduce the potential impacts of the At-Grade Emphasis LRT Alternative below the level of significance.

- Regarding APN 5161012901 (Parcel 32), where a potential adverse impact is expected due to the loss of 33 publicly operated parking spaces, replacement parking would be considered at a nearby parcel to ensure public parking continues to be available.

- Metro would conduct a parking analysis of the Little Tokyo area to determine current parking capacity and how temporary or permanent displacement of parking would affect this capacity. Metro could possibly replace public parking spaces displaced on APNs #s 6161012905 and 5161012901. Access would be maintained to other public parking lots during construction. Refer to Appendix L, Transportation Impacts Technical Memorandum for detailed mitigation measures regarding parking.

4.2.4.4 Underground Emphasis LRT Alternative

In conjunction with the mitigation measures listed in Section 4.2.4.2, the following mitigation measures would reduce the potential impacts of the Underground Emphasis LRT Alternative below the level of significance.

- Access to the Little Tokyo Library Branch would be maintained at all times during construction (APN 5161026033, Parcel 18). Notification of construction activities would be defined in a Construction Mitigation Program developed by Metro upon approval of the project. This program would include identification of communication protocol with the community during final design and construction.

- Regarding all displaced businesses (APNs 5149007006, 5161018001, 5161018020, and 5161018021, Parcels 12, 28, 24, and 39 respectively), Metro would provide relocation assistance and compensation as required by both the Uniform Act and the California Act. The details of these laws are described in Appendix N. Where acquisitions and relocations are unavoidable, FTA and Metro would follow the provisions of both acts including any amendments. All real property acquired by Metro would be appraised to determine its fair market value. Just compensation, which would not be less than the approved appraisal, would be made to each property owner. Each business displaced as a result of the project would be given advance written notice and informed of its eligibility for relocation assistance and payments. It is anticipated that where relocation would be required, most of the jobs potentially displaced would be retained with the relocation. This would not result in significant adverse impacts related to job loss.

- Regarding APN 5161018001 (Parcel 28, 416 E 1st St.), refer to Appendix X, Cultural Resources – Built Environment, for detailed mitigation measures regarding historical properties. Regarding the privately operated parking lot spaces in Little Tokyo (parcels bounded by Central Avenue, Alameda Street, 1st Street, and 2nd Street), Metro would conduct a parking capacity study in Little Tokyo to evaluate the need to replace these parking spaces.

- Prior to construction, Metro would conduct a parking analysis of the Little Tokyo area to determine parking capacity and if temporary or permanent displacement of parking would affect this capacity. During construction and operation of this alternative, Metro would consider replacing displaced parking on the block bounded by Central Avenue, 1st Street, 2nd Street, and Central Avenue. During construction, access to other public parking lots would be maintained. Refer to Appendix L, Transportation Impacts, for detailed mitigation measures regarding parking.

4.2.4.5 Fully Underground LRT Alternative

The displacement and relocation impacts associated with the Fully Underground LRT Alternative are expected to be similar to those of the Underground Emphasis LRT Alternative. Therefore, the mitigation measures listed in Sections 4.2.4.2 and 4.2.4.4 in conjunction with the following would reduce the potential impacts of the Fully Underground LRT Alternative below the level of significance.

- For APNs 5173007901 and 5173006900 (Parcels 37 and 36 respectively), the LADWP would be consulted during the design phase to accommodate its operational needs during construction and operation of the Fully Underground LRT Alternative.

4.3 Community and Neighborhood Impacts

This section summarizes the existing communities and neighborhoods in the project area, and the potential impacts that the proposed alternatives could have on these areas. The information in this section is based on the Community and Neighborhood Impacts Technical Memorandum, which is incorporated into this DEIS/DEIR as Appendix O.

Community and neighborhood impacts encompass physical division of a community, adverse alterations of its social or physical character, or degradation of quality of life, which can include:

- Deterioration of public health and safety
- Increase in crime, and adverse effects on community resources and events
- Adverse effects on senior citizens and disabled persons
- Reduction of local business viability
- Deterioration of community public services
- Large changes in population or employment

Some impacts contained in other overlapping sections are also discussed in this section, including:

- The Displacement and Relocation Section (Section 4.2)
- The Parklands and Other Community Facilities Section (Section 4.13)

- The Transportation Impacts Chapter (Chapter 3.0)
- The Environmental Justice Section (Section 4.17)
- The Safety and Security Section (Section 4.15)

4.3.1 Regulatory Framework

The community and neighborhood impact analysis and proposed mitigation measures for the Regional Connector Transit Corridor project was performed in accordance with all applicable NEPA, CEQA, and local guidelines.

At the federal level, the United States Department of Transportation (USDOT) provides specific NEPA guidance to assist with determinations of community and neighborhood impact significance. Other federal regulatory requirements include:

- Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970
- Americans with Disabilities Act of 1990

At the state level, the CEQA guidelines require analysis of potential project impacts that could physically divide an established neighborhood or community. Additional local regulations and plans that pertain to communities and neighborhoods that would potentially be affected by the Regional Connector Transit Corridor project are:

- Central City Community Plan (City of Los Angeles General Plan Land Use Element)
- Central City North Community Plan (City of Los Angeles General Plan Land Use Element)
- City of Los Angeles Planning and Zoning Code

Potential effects on communities and neighborhoods were evaluated by the potential for each alternative to affect the following criteria:

- Community mobility
- Emergency service response times
- Community resources and events
- Business viability

4.3.2 Affected Environment

The project area encompasses several downtown Los Angeles communities, including the Financial District, Bunker Hill, Civic Center, Historic Core, Little Tokyo, and the Arts District. Depending on which alternative is selected, these communities could have new light rail infrastructure added as part of the Regional Connector Transit Corridor project. Other areas that would be indirectly affected through improved transit service would include communities along the Metro Gold Line, Metro Blue Line, and the Metro Expo Line.

4.3.2.1 Demographic Overview

In 2000, the central downtown area's[1] population was approximately 23,175, representing less than 0.6 percent of the entire City of Los Angeles' population (Census Bureau 2000). In 2005, SCAG estimated that the central downtown area's population was approximately 24,794, which was about 0.6 percent of the City's population (City of Los Angeles Planning Department /Demographic Research Unit 2009). Table 4.3-1 shows the 2000 and 2005 population by census tract for central downtown. Figure 4.3-1 shows the locations of these tracts.

Figure 4.3-2 shows the ethnic makeup of the central downtown area.

The average age of the population in the central downtown area varies considerably throughout the different communities. In 2000, three main areas recorded relatively higher populations of seniors (over the age of 65):

- The Bunker Hill area
- The Little Tokyo area
- The northern portion of central downtown

Table 4.3-2 shows the median age of the downtown population by census tract for the year 2000 (Census Bureau 2000).

The most common language spoken at home throughout the central downtown area in 2000 was English, followed by Asian/Pacific Isle languages, Spanish, Indo-European languages, and other languages (Census Bureau 2000). Each community within the downtown area varies considerably regarding the language spoken at home. Figure 4.3-2 shows the percentage breakdown of the languages spoken at home by census tract for the year 2000.

4.3.2.1.1 Housing

There were an estimated 10,500 housing units in the central downtown area in 2008. Of the 10,500 housing units, 10,200 were multi-family units and only 200 were single-family units. The vacancy rate for all housing units was about 11 percent (City of Los Angeles Planning Department /Demographic Research Unit 2009).

Land designated for residential use is found in the east and south portions of central downtown and makes up only about five percent of the total land use (City of Los Angeles Planning Department 2003a). The residentially zoned properties in the central downtown area are found in Bunker Hill and Little Tokyo. To meet an increased demand for housing, some commercial buildings in the central downtown area have been redeveloped into residential units (City of Los Angeles Planning Department 2003a).

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[1] *Note: The total population of the analysis area for community and neighborhood impacts is shown. The area and population defined in the Central City Community Plan and the Central City North Community Plan will vary. Also, some of the census tracts included in the demographic data extend beyond the boundaries of the communities to be analyzed.*

Table 4.3-1. Population for the Central Downtown Area

Census Tract	Approximate Neighborhoods	2000 Population	2005 Estimated Population
2060.30	Little Tokyo, Arts District, Boyle Heights*	955	1,029
2060.40	Little Tokyo, Arts District, Boyle Heights*	3,445	3,753
2062	Little Tokyo, Central City East*	3,477	3,638
2063	Central City East*, Central Industrial District*	4,995	5,320
2073	Historic Core	3,739	4,068
2074	Civic Center	1,237	1,344
2075	Bunker Hill	4,098	4,326
2077.10	Financial District, South Park	1,229	1,316
Total		**23,175**	**24,794**

Source: Census Bureau, Summary File 1, 2000; 2SCAG 2009.
** Neighborhood included in census tract data but is too far from proposed alternatives to be impacted. More specific data is not available.*

4.3.2.1.2 Employment

The central downtown area employs a substantial number of people: over 170,000 in 2005. As shown in Table 4.3-3, most of the people working in the downtown area do not live there and must commute to work each day.

The areas within the central downtown that provide the largest number of jobs include:

- The Financial District
- The Civic Center
- The Historic Core/Jewelry District
- The Fashion District

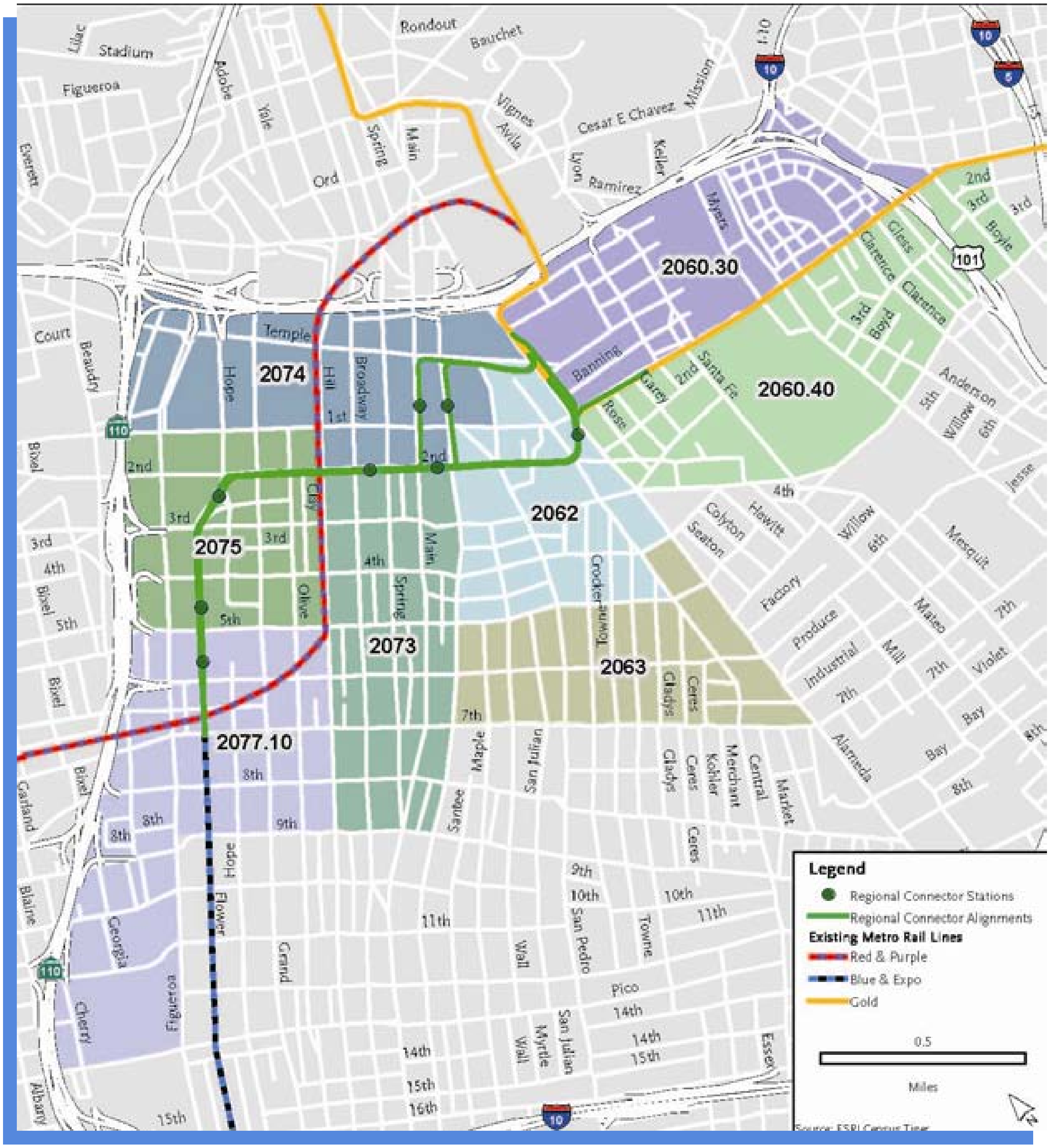
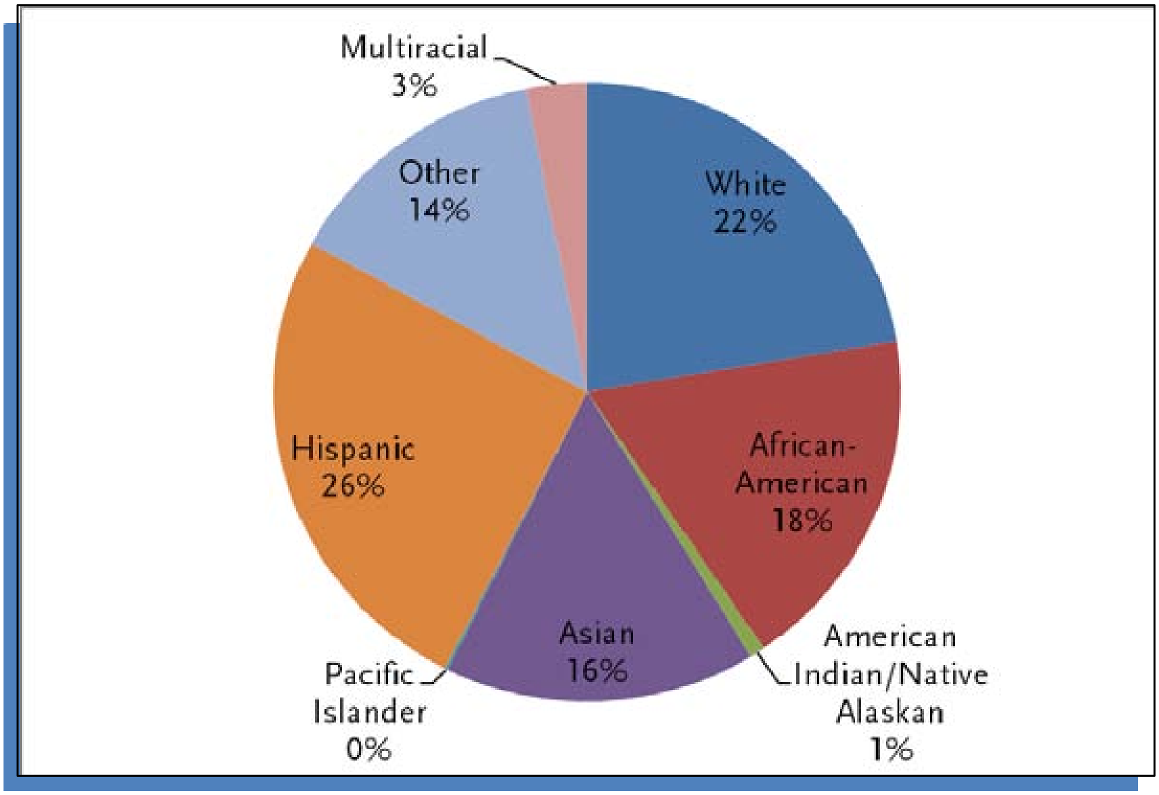


Figure 4.3-1. Census Tract Location



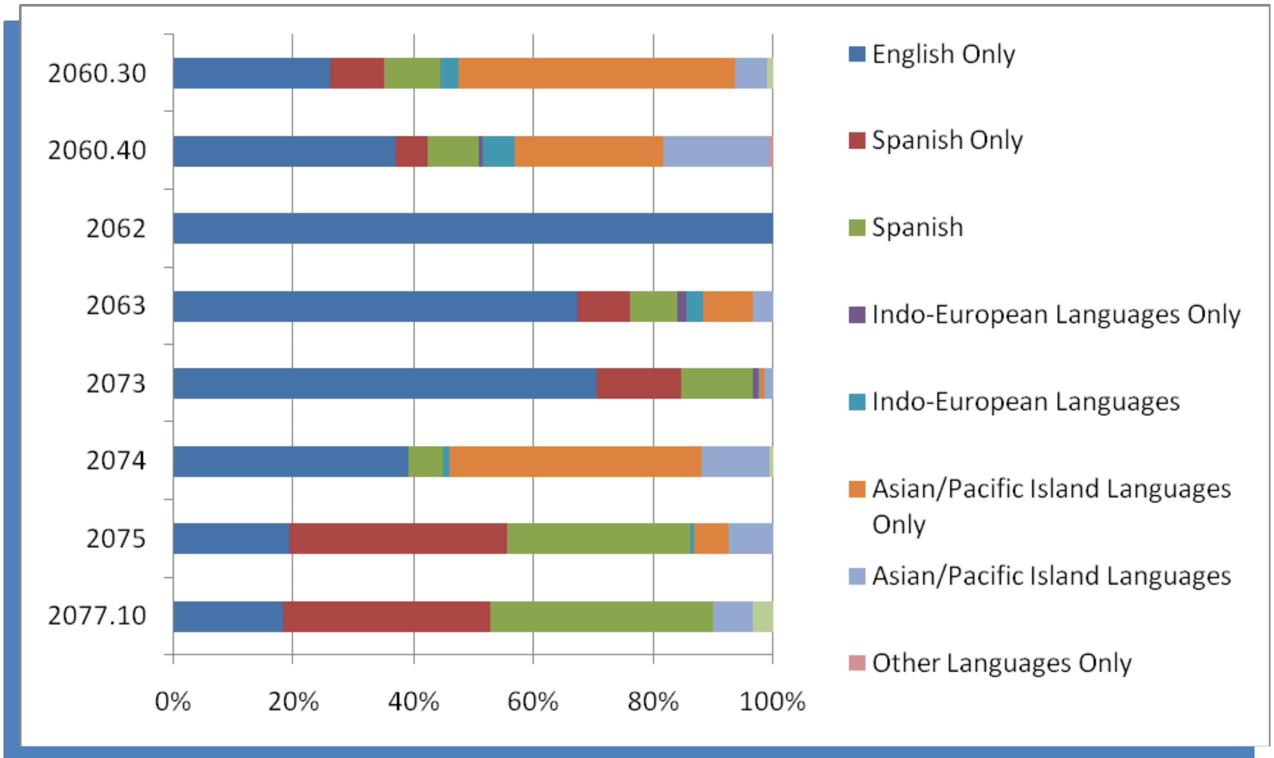
Source: Census Bureau, Summary File 1, 2000.

Figure 4.3-2. Ethnicity for Central Downtown

Table 4.3-2. Median Age of Central Downtown Population

Census Tract	Approximate Neighborhoods	Both Sexes	Male	Female
2060.30	Little Tokyo, Arts District, Boyle Heights*	28.2	28.7	27.1
2060.40	Little Tokyo, Arts District, Boyle Heights*	32.3	31.5	33.1
2062	Little Tokyo, Central City East*	45.1	43.6	50.4
2063	Central City East*, Central Industrial District*	42.1	43.3	38.4
2073	Historic Core	49.2	49.2	49.4
2074	Civic Center	35	34.5	38
2075	Bunker Hill	48.5	43.1	53.4
2077.10	Financial District, South Park	45.4	43.6	48

Source: Census Bureau, Summary File 1, 2000
** Neighborhood included in census tract data but is too far from proposed alternatives to be impacted. More specific data is not available.*



Source: Census Bureau, Summary File 3, 2000.

Figure 4.3-3. Languages Spoken at Home by Census Tract in Central Downtown

Table 4.3-3. Population, Households, and Employment for the Central Downtown Area

Census Tract	2005 Population	2005 Households	2005 Employment
2060.30	1,029	267	2,444
2060.40	3,753	1,125	2,855
2062	3,638	1,179	6,631
2063	5,320	1,591	4,670
2073	4,068	3,101	35,488
2074	1,344	8	38,760
2075	4,326	3,024	27,319
2077.10	1,316	635	53,760
Total	**24,794**	**10,930**	**171,927**

Source: SCAG 2009.

4.3.2.1.3 Community Mobility

The central downtown area experiences heavy pedestrian traffic on weekdays, particularly during the commute and lunch hours (City of Los Angeles Planning Department 2003a). Much of the pedestrian traffic occurs in areas with daytime employment such as Bunker Hill, the Financial District, and the Historic Core. Some pedestrian movement occurs between the Civic Center and Little Tokyo along Temple, 1st, and 2nd Streets (City of Los Angeles Planning Department 2003a).

The Fashion District attracts many pedestrians during both weekdays and weekends, as does Broadway between 2nd and 7th Streets. Due to the location of Wilshire Grand and Sheraton Hotels, 7th Street often experiences large volumes of pedestrians. Pedestrian activity decreases at night in the central downtown area because much of the daytime population leaves after business hours. The exceptions are Little Tokyo and the Arts District that have experienced a resurgence of evening activity due to increases in new housing in the area and a solid commercial base of restaurants.

The main pedestrian infrastructure in central downtown consists of sidewalks and crosswalks. An elevated pedestrian walkway is located on Bunker Hill that connects many of the large hotels and office buildings.

The central downtown area is served by over 100 bus lines, operated by ten different transit agencies, and a network of commuter rail, light rail, and heavy rail lines. Metrolink operates commuter rail trains from Union Station to multiple points in Los Angeles, Ventura, Orange, San Bernardino, San Diego, and Riverside Counties. Metro operates the Metro Red Line heavy rail subway to North Hollywood, the Metro Purple Line heavy rail subway to Wilshire/Western Station, the Metro Blue Line light rail service to Long Beach, and the Metro Gold Line light rail service to Pasadena and East Los Angeles. The Metro Expo Line light rail service to Culver City is expected to open in 2011.

Transit mobility within downtown, to and from the communities of downtown, and within the region as a whole is impaired by the lack of a train connection between the Metro Gold Line and Metro Blue Line. Passengers traveling between these two LRT lines must currently transfer via the Metro Red and Metro Purple Lines. This lack of a direct connection adversely affects travel times and the ability of transit to attract automobile commuters. For information on travel times within the project area, see the Alternatives Considered Chapter (Chapter 2.0).

The Regional Connector Transit Corridor project would eliminate transfers by enabling through service between the Metro Gold Line, Metro Blue Line, and Metro Expo Line. The Regional Connector Transit Corridor would add additional reliable transit service that, unlike buses, would not be subject to future deteriorating traffic conditions if surface street congestion increases.

For information on existing traffic patterns within the project area, see Appendix L, Transportation Impacts.

4.3.2.2 Community Events

Many community and cultural events occur in the Regional Connector Transit Corridor project area each year, including music festivals, parades, arts and theater performances, and exhibitions. These events often attract hundreds of people to the area. Large events scheduled in the project area during 2009 included:

- World City
- First Thursday San Pedro Art Walk
- Downtown Art Walk (monthly)
- St. Patrick's Day Parade
- Cherry Blossom Festival of Southern California
- Azusa Street Festival
- AT&T Fiesta Broadway
- Annual Children's Day
- Mixed Roots Film and Literary Festival
- Shakespeare Festival
- Grand Performances (recurring)
- Nisei Week Japanese Festival
- Los Angeles County Holiday Celebration

4.3.2.3 Crime and Emergency Services

Crime in the central downtown area has fluctuated in recent years, with between 5,000 and 7,000 arrests made annually. Law enforcement is provided from the Central Area Community Police Station and the new Los Angeles Police Department headquarters.

The following three fire stations are located in the central downtown area as well:

- Near Temple and Alameda Streets
- 1st Street and Fremont Avenue
- 7th and San Julian Streets

4.3.2.4 Community Profiles

The following subsections present brief profiles for each of the communities and districts within the central downtown area that have the potential to be directly affected by construction or operation of the Regional Connector Transit Corridor project. Figure 4.3-3 provides a map of the approximate locations of these communities. While distinctions have been made between the different districts, many districts continue to develop and expand their area of influence, often resulting in an overlap with other districts or communities. The boundaries of the districts discussed below are for descriptive purposes only and are not meant to delineate distinct borders. Not all of the communities shown on the map would experience negative impacts from the project, however all of them would benefit from the improved transit service the Regional Connector would provide. The communities that could potentially experience impacts are profiled in the following subsections.

4.3.2.4.1 Financial District

The Financial District contains most of the City's banks, large hotels, and skyscraper office buildings. It is also home to the Central Library, Maguire Gardens, retail stores, and social clubs. This area experiences a high volume of traffic during daytime hours because of its location next to the SR 110 freeway. While not as pedestrian friendly as some of the other districts, the Financial District lies within walking distance to the 7th Street retail area, Grand Avenue corridor, and Pershing Square. This neighborhood is within walking distance to the Metro Red Line, Metro Purple Line, Metro Blue Line, and future Metro Expo Line.

The Central Library, located at Hope Street, is one of the key features of the Financial District. North of the library is downtown's tallest building, and at 73 stories high, the Library Tower is visible for miles (City of Los Angeles Planning Department 2003a). The Bunker Hill Steps surround the building and connect the Financial District to Bunker Hill (City of Los Angeles Planning Department 2003a).

4.3.2.4.2 Bunker Hill

Bunker Hill is within close walking and public transit distance to the Financial District, the Historic District, and the Civic Center and includes a large portion of central downtown's population because of numerous apartments and condominiums.

Major downtown destinations located within Bunker Hill include the Walt Disney Concert Hall, Museum of Contemporary Art (MOCA), high-rise office towers, senior and market rate housing, hotels, and commercial/retail centers. Bunker Hill has over 3,200 residential units, mainly in mid- and high-rise buildings. Large development projects planned for this area include Civic Park and the Grand Avenue Development project that will develop this area into a regional arts, entertainment, and residential destination. The proposed Grand Avenue Development would be approximately 3.6 million square feet, including 449,000 square feet of retail space. Plans call for 2,600 new housing units—almost doubling the existing number of units in the area.

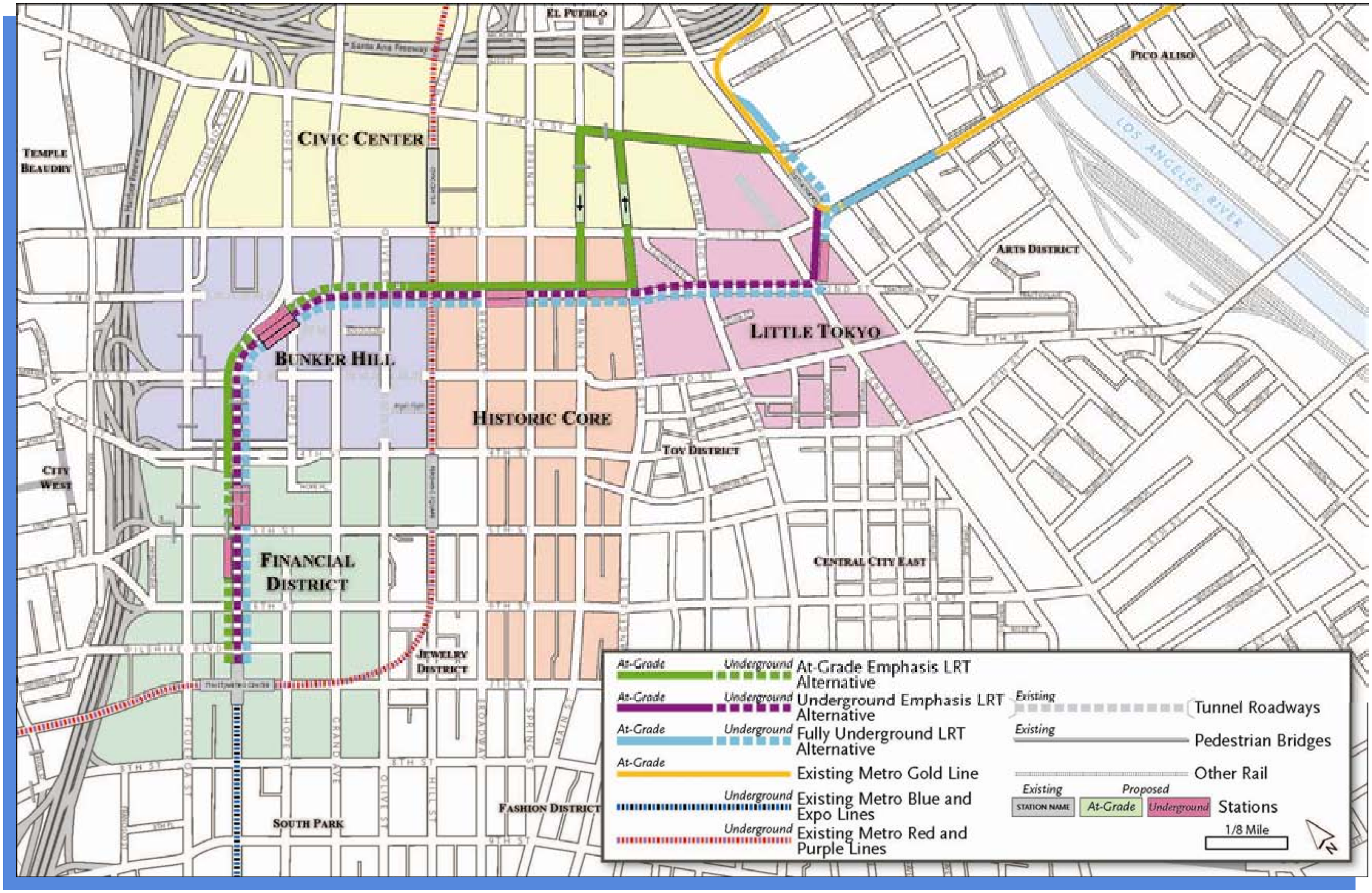


Figure 4.3-4 Downtown Communities

4.3.2.4.3 Toy District

The Toy District is a wholesale and retail area with over 500 businesses offering silk flowers, incense/oils, craft supplies, luggage, electronics, and traditional toys like dolls, die-cast cars, action figures, and video games (Central City East Association 2009). This area experiences high volumes of pedestrians. The Medallion project proposed for this district is expected to provide 192 residential lofts and over 200,000 square feet of retail space.

4.3.2.4.4 Civic Center

The Civic Center contains federal, state, and local government offices and has the second largest concentration of civic buildings in the country (City of Los Angeles Planning Department 2003a). Important community resources in this area include the Cathedral of Our Lady of the Angels on Temple Street, Los Angeles City Hall, the County Hall of Administration, the California State Department of Transportation (Caltrans) Headquarters, and a U.S. Federal District Courthouse planned for the block bounded by 2nd, Hill, and 1st Streets, and Broadway. The area includes the Civic Center Historic District centered around the City Hall building.

Most of the government facilities in this area are within a 10-minute walk of each other designated as the "10 minute diamond." Several cultural, arts, and music facilities are located in the Civic Center such as the Ahmanson Theater, Mark Taper Forum, and the Dorothy Chandler Pavilion (City of Los Angeles Planning Department 2003a).

4.3.2.4.5 Historic Core

The Historic Core approximates the area where Los Angeles originated in the early 1800s and contains a variety of historic and architecturally significant buildings. In addition, the Historic Core links many of the districts and communities of central downtown.

Two historic districts registered in the National Register of Historic Places (City of Los Angeles Planning Department 2003a) are located in this area, including:

- The Spring Street Financial District between 4th and 7th Streets, and
- The Broadway Theater District between 3rd and 9th Streets.

Broadway is the major corridor in the Historic Core, with clothes outlets, restaurants, Grand Central Market, and other shops frequented by the Hispanic population (City of Los Angeles Planning Department 2003a). To the east, a variety of offices, hotels, shops and government buildings are located along Los Angeles, Spring, and Main Streets. Many buildings here have been renovated and converted to residential uses with ground floor retail, restaurants, and art galleries. Most of the historic financial buildings of the 1920s are found on Spring Street. Several historic theatres are located in this area; however, some are currently vacant or are being used for retail purposes.

The southern end of the Historic Core is adjacent to the Fashion District and contains historic buildings now used to manufacture clothing. The Metro Red Line and Metro Purple Line travel beneath this district with a station on Hill Street between 4th and 5th Streets (City of Los Angeles Planning Department 2003a). The Skid Row community is located adjacent to the Historic

Core/Center City area and contains a large homeless population and many single-occupant hotel residential properties.

4.3.2.4.6 Little Tokyo

Little Tokyo is a unique cultural community in downtown Los Angeles because it has the largest Japanese-American community in the continental United States (City of Los Angeles Planning Department 2003). Little Tokyo is one of only three remaining Japantowns in the United States (in addition to San Francisco and San Jose). Little Tokyo has a range of mixed uses including retail, hotel, office, and commercial spaces.

The area also contains a substantial portion of the central downtown's residential units and has several new residential developments. The rehabilitation of existing spaces into residential uses is also occurring in Little Tokyo. Important developments in the early planning stages include a 4.5-acre site adjacent to the Little Tokyo/Arts District Station on the Metro Gold Line. Due to the proximity to Metro's transit lines, this development could potentially contain a high-density combination of offices and housing.

Little Tokyo contains a variety of important cultural venues and resources including the JANM, the Jodo Shu Betsuin Temple, the Los Angeles Hompa Hongwanji Temple, and the Japanese-American Cultural and Community Center. The Geffen Contemporary at the MOCA is located behind JANM. The Go For Broke Monument, located North of The Geffen Contemporary at MOCA at Temple and Alameda Streets is a monument dedicated to the Japanese-American veterans of World War II. Little Tokyo also houses the Little Tokyo Service Center that provides affordable housing and community services to residents of the area.

The Little Tokyo Historic District was listed on the National Register of Historic Places in 1986. The district spans from the north side of 1st Street from Judge John Aiso Street to Central Avenue and the east side of Judge John Aiso Street from 1st Street to midblock between 1st and Temple Streets. Buildings in the Historic District include commercial buildings on the north side of 1st Street, the Union Church on San Pedro Street, and the former Nishi Hongwanji Temple (the first Buddhist Temple built in Los Angeles) located at 1st and Central Streets.

4.3.2.4.7 Arts District

The Arts District is technically outside central downtown and considered a part of the Central City North Community Plan area; however, it is discussed in this section because it is adjacent to Little Tokyo and could be affected by the project. The Arts District consists mostly of old warehouses that have been converted to artists' lofts and studios (City of Los Angeles Planning Department 2003b). The largest concentration of artists is within the area between 1st, Palmetto, and Alameda Streets, and the Los Angeles River. This area is also sometimes referred to as the Artist-in-Residence District (City of Los Angeles Planning Department 2003b).

4.3.3 Environmental Impacts/Environmental Consequences

The following sections summarize the evaluation of potential community and neighborhood impacts for each alternative. Table 4.3-4 summarizes the results of the analysis.

Table 4.3-4. Summary of Potential Impacts to Community and Neighborhoods

Alternative	Physically Divide Community	Community Mobility	Emergency Services Response	Community Resources and Events	Business Viability	Mitigation Required
No Build	None	Decline	None	None	None	None
TSM	None	None	None	None	None	None
At-Grade Emphasis LRT	None	Adverse construction effects not significant after mitigation	Adverse construction effects not significant after mitigation	Adverse construction effects not significant after mitigation	Adverse construction effects not significant after mitigation	Mitigation measures proposed
Underground Emphasis LRT	None	Adverse construction effects not significant after mitigation	Adverse construction effects not significant after mitigation	Adverse construction effects not significant after mitigation	Adverse effects not significant after mitigation	Mitigation measures proposed
Fully Underground LRT	None	Adverse construction effects not significant after mitigation	Adverse construction effects not significant after mitigation	Adverse construction effects not significant after mitigation	Adverse effects not significant after mitigation	Mitigation measures proposed

4.3.3.1 No Build Alternative

The No Build Alternative would not involve any new transportation infrastructure, construction, or major service changes beyond what is identified in Metro's 2009 LRTP. As such, significant adverse impacts are not anticipated within the project area. However, community mobility would deteriorate with the worsening regional traffic congestion that is expected to occur between now and 2035. Also, the communities in the project area would not benefit from the additional access, business, and job growth stimulation that the proposed build alternatives could provide.

4.3.3.1.1 NEPA Finding

The No Build Alternative would not have adverse construction, operation, or cumulative effects on communities or neighborhoods.

4.3.3.1.2 CEQA Determination

The No Build Alternative would have significant adverse construction, operation, or cumulative effects on communities or neighborhoods.

4.3.3.2 TSM Alternative

The TSM Alternative includes the same provisions as the No Build Alternative, plus two new shuttle bus lines that would provide additional mobility benefits to Little Tokyo, the Civic Center, Bunker Hill, the Historic Core, and the Financial District. However, the proposed bus lines would not improve regional mobility as much as the proposed build alternatives. The increased availability of transit service could also stimulate local businesses. However, these benefits may not be permanent if worsening traffic congestion causes a reduction in operating speeds and service reliability.

4.3.3.2.1 NEPA Finding

The TSM Alternative would not have adverse construction, operation, or cumulative effects on communities or neighborhoods.

4.3.3.2.2 CEQA Determination

The TSM Alternative would not have significant adverse construction, operation, or cumulative effects on communities or neighborhoods.

4.3.3.3 At-Grade Emphasis LRT Alternative

The At-Grade Emphasis LRT Alternative would require the construction of a new light rail alignment and three new stations in the following areas:

- The Financial District along Flower Street
- Bunker Hill
- The Civic Center area composed of two one-way stations located on adjacent streets

Construction of these stations would require temporary sidewalk and street closures. During construction, installation of the at-grade tracks and other necessary light rail infrastructure would require street closures on Temple, Main, Los Angeles, and 2nd Streets in the Civic Center and Historic Core areas. The alignment would run underground from Flower Street and the Financial District through the Bunker Hill area onto 2nd Street. Cut and cover excavation activities for the underground portion of the alignment would result in road closures in the Financial District, Bunker Hill, and the vicinity of the proposed underpass in Little Tokyo. These combined activities could reduce pedestrian and vehicle mobility between communities throughout the project area during construction, which would constitute a potentially significant construction impact.

Road closures associated with construction activities could result in increased response times for emergency services (e.g., police and fire). Any increase in response times for emergency services would be a significant construction impact.

Road and sidewalk closures and the addition of construction vehicles and equipment to central downtown streets could also adversely affect annual festivals and events in the downtown area. Construction could also disrupt traffic patterns and make public access to certain community resources (e.g., the MOCA Geffen Contemporary building and the Go For Broke Monument) more difficult. This potential construction impact could be significant.

Construction activities would likely result in a decrease in accessibility to many businesses and could reduce on-street and off-street parking. This could negatively affect business activity levels because the number of customers may temporarily decline, which would be a potentially significant construction impact to business viability.

All attempts would be made to provide adequate detours and to minimize road closures, however, some consumers might avoid the area altogether which could have an indirect affect on businesses within the project area. Short-term adverse construction impacts would be offset by the long-term benefits of new transit access to businesses and the enhancement of downtown as a business destination.

4.3.3.3.1 NEPA Finding

The At-Grade Emphasis LRT Alternative would have adverse construction-related effects on community mobility, emergency service response times, community resources and events, and business viability. However, these impacts would be temporary and could be reduced to a less-than-significant level by the mitigation measures proposed in Section 4.3.4.

4.3.3.3.2 CEQA Determination

The At-Grade Emphasis LRT Alternative would not have significant adverse construction, operation, or cumulative effects on communities or neighborhoods after mitigation measures are considered.

4.3.3.4 Underground Emphasis LRT Alternative

This alternative would require the construction of a new light rail alignment and the following three new underground stations:

- Near the Financial District
- Bunker Hill
- The Historic Core/Little Tokyo

Construction of these stations would require temporary sidewalk and street closures. Installation of underground tracks would require tunnel construction along 2nd and Flower Streets. The segment on Flower Street would require temporary cut and cover excavations and concrete decking along the entire length of the roadway from 7th Street/Metro Center Station to the new portal just south of 3rd Street. Temporary street closures and construction activities similar to cut and cover would be needed in the vicinity of the proposed underpass at 1st and Alameda Streets. Streets and sidewalks in the vicinity of the temporary excavation areas would likely be periodically closed during construction. Along 2nd Street, TBMs would be used for the majority of the alignment. As such, construction impacts to surface traffic and mobility would be less pronounced in the Historic Core than in the Financial District and Little Tokyo. In summary, road and sidewalk closures and traffic detours could reduce mobility for pedestrian and vehicle traffic in all neighborhoods in the project area which could be a significant potential impact.

Road closures associated with construction activities could result in increased response times for emergency services (e.g., police and fire). Any increase in response times for emergency services would be a significant construction impact.

Road and sidewalk closures and the introduction of construction vehicles and equipment would have the potential to create temporary adverse affects on festivals and events in the downtown area. It could also result in a significant impact to traffic patterns and make it more difficult for the public to access certain community resources like the JANM and the MOCA Geffen Building. Little Tokyo stakeholders have expressed concern about retaining the character of the existing community and cultural events in the area. Measures to address these concerns would be considered for implementation once the ongoing coordination process is complete within the Little Tokyo community.

Businesses around each of the new stations and along the proposed alignment could be affected by construction activities, construction-related traffic, and road and sidewalk closures. Construction activities would likely result in a temporary decrease in accessibility to many businesses and could reduce on-street and off-street parking which could negatively affect business activity levels as the number of customers may temporarily decline. Metro would provide adequate detours and minimize road closures; however, some indirect effects to businesses may occur as people may avoid the project area altogether. This potential impact could be significant and unavoidable during the construction phase. This effect could be partially offset by the introduction of construction employees into the area who could potentially be new customers of neighborhood restaurants and retail establishments.

Some existing commercial properties would need to be acquired under this alternative in Little Tokyo and the Historic Core. Displaced businesses could include Office Depot, Señor Fish, and Starbucks Coffee in Little Tokyo, and the businesses on the southeast corner of 2nd and Spring Streets in the Historic Core. The businesses that would be removed in Little Tokyo do not contribute to the community identity as a Japanese-American cultural and community center. Properties would be acquired according to the Uniform Relocation Act, and owners would be compensated. However, loss of these businesses could indirectly affect the viability of surrounding businesses because less people could be drawn to the general area which could be a significant and unavoidable potential impact.

4.3.3.4.1 NEPA Finding

The Underground Emphasis LRT Alternative would have temporary adverse construction-related effects on:

- Community mobility
- Emergency service response times
- Community resources and events

- Business viability

The alternative would also have a short-term adverse operation impact on business viability due to acquisitions, (though not permanent). These impacts could be reduced to a less-than-significant level by the mitigation measures proposed in Section 4.3.4.

4.3.3.4.2 CEQA Determination

The Underground Emphasis LRT Alternative would not have significant adverse construction, operation, or cumulative effects on communities or neighborhoods after consideration of proposed mitigation measures.

4.3.3.5 Fully Underground LRT Alternative

This alternative was developed in response to community concerns voiced during the DEIS/DEIR analysis process. It is a modified version of the Underground Emphasis LRT Alternative that allows the alignment and junction to run underground at 1st and Alameda Streets. The Fully Underground LRT Alternative is identical to the Underground Emphasis LRT Alternative (Broadway Station Option) west of Central Avenue. However, impacts would vary in the Little Tokyo area, as described below.

This alternative would require the construction of new light rail alignment and the following four new underground stations:

- Financial District
- Bunker Hill area
- Historic Core
- Little Tokyo

Construction of these stations and underground tracks would require the same sidewalk and street closures and have the same effects on communities and neighborhoods as described for the Underground Emphasis LRT Alternative. In addition, the Fully Underground LRT Alternative would involve cut and cover or open-cut construction 1st Street between Alameda and Garey Streets and at Temple and Alameda Streets for the new underground junction and portals.

Compared to the Underground Emphasis LRT Alternative, this alternative would involve a larger construction area, and potentially greater impacts to surface traffic, since two portals would need to be constructed instead of one. Renderings of the portals are provided in the Visual Impacts section, Section 4.4. Streets and sidewalks in the vicinity of the temporary excavation areas would likely be periodically closed during construction. Along 2nd Street, TBMs would be used for the majority of the alignment. As such, construction impacts to surface traffic and mobility would be less pronounced in the Historic Core than in the Financial District and Little Tokyo. In summary, road and sidewalk closures and traffic detours could reduce mobility for pedestrian and vehicle traffic in all neighborhoods in the project area which could cause a significant potential impact.

Road closures associated with construction activities could result in increased response times for emergency services (e.g., police and fire). Any increase in response times for emergency services would be a significant construction impact.

Road and sidewalk closures and the introduction of construction vehicles and equipment would have the potential to create temporary adverse affects on festivals and events in the downtown area. It could also result in a potential significant impact to traffic patterns and make it more difficult for the public to access certain community resources like the JANM and the MOCA Geffen Building. Little Tokyo stakeholders have expressed concern about retaining the character of the existing community and cultural events in the area. Measures to address these concerns would be considered for implementation once the ongoing coordination process is complete within the Little Tokyo community.

Businesses around each of the new stations and along the proposed alignment could be affected by construction activities, construction-related traffic, and road and sidewalk closures. Construction activities would likely result in a greater temporary decrease in accessibility to many businesses and a greater impact on-street and off-street parking than the Underground Emphasis LRT Alternative due to the additional construction needed on 1st Street.

Some existing commercial properties would need to be acquired under this alternative in Little Tokyo and the Historic Core. Displaced businesses could include Office Depot, Señor Fish, Weilands Brewery, Café Cuba, and Starbucks Coffee in Little Tokyo, and the businesses on the southeast corner of 2nd and Spring Streets in the Historic Core. This would be a greater number of businesses than would be displaced by the Underground Emphasis LRT Alternative. The businesses that would be removed in Little Tokyo do not contribute to the community identity as a Japanese-American cultural and community center. Properties would be acquired and owners would be compensated according to the Uniform Relocation Act. However, loss of these businesses could indirectly affect the viability of surrounding businesses because less people could be drawn to the general area which could be a significant and unavoidable potential impact.

4.3.3.5.1 NEPA Finding

The Fully Underground LRT Alternative would have temporary adverse construction impacts on community mobility, emergency service response times, community resources and events, and business viability. These impacts could be reduced to a less-than-significant level by the mitigation measures proposed in Section 4.3.4.

4.3.3.5.2 CEQA Determination

The Fully Underground LRT Alternative would not have significant adverse construction, operation, or cumulative effects on communities or neighborhoods after mitigation measures are considered.

4.3.4 Mitigation Measures

The following mitigation measures could be implemented to avoid, minimize, or mitigate potentially significant impacts identified in Section 4.3.3. The mitigation measures address potential construction-related impacts on the viability of existing businesses and community mobility for all of the build alternatives, as well as the operation-related impact on community mobility for the At-Grade Emphasis LRT Alternative. Additional measures may be considered once the ongoing coordination process is completed within the communities in the project area.

- Whenever possible, develop detours for any road or sidewalks to be closed during construction. Post signs (in appropriate languages) alerting pedestrians and vehicles of road and sidewalk closures and detours. Ensure that pedestrian detours are accessible to seniors and disabled persons. Develop Worksite Traffic Control Plans in conjunction with the LADOT to accommodate automobile and pedestrian traffic.
- Maintain access to community facilities affected by construction activities.
- Provide early notification to emergency service providers of any road closures or detours.
- Develop a community outreach plan to notify local communities of construction schedules, road and sidewalk closures, and detours. Coordinate with local communities during preparation of traffic management plans to minimize potential construction impacts to community resources and special events. Consider limiting construction activities during special events.
- Develop a construction mitigation plan with community input to address construction impacts unique to the Little Tokyo community. Determine truck hauling routes and schedules that would minimize impacts on sensitive uses in all parts of the project area.
- During construction, provide temporary replacement parking to offset the loss of parking due to acquisitions on the block bounded by 1st, 2nd, and Alameda Streets, and Central Avenue. Temporary parking could be added by constructing surface lots on nearby vacant parcel or restriping nearby streets to allow diagonal curb parking.
- Provide crossing guards in the vicinity of construction sites, haul routes, and other relevant sites as proposed in the California DOT Traffic Manual, Section 10-07.3, Warrants for Adult Crossing Guards.
- Erect barriers and provide security personnel during construction to minimize trespassing and vandalism. Barriers could be enhanced with artwork and attractive design features where possible.

4.4 Visual and Aesthetic Impacts

This section summarizes the existing visual and aesthetic environment within the project area and evaluates the potential for visual and aesthetic impacts resulting from construction and operation of the proposed Regional Connector Transit Corridor alternatives. Potential visual impacts to historic resources are summarized in Section 4.12.1 Cultural Resources - Built Environment. Information in this section is based on the Visual and Aesthetic Impacts Technical Memorandum prepared for the project and contained in Appendix P, Visual and Aesthetic Impacts of this DEIS/DEIR.

4.4.1 Regulatory Framework

Guidance for assessing potential visual impacts of the Regional Connector Transit Corridor project was found in the National Historic Preservation Act (NHPA) and CEQA, and was used to evaluate potential visual and aesthetic impacts under NEPA.

Multiple federal agencies have developed analytical frameworks for visual resource management, including:

- United States Department of Agriculture (USDA), Forest Service (USFS 1974, 1995)
- United States Department of Interior (USDOI), Bureau of Land Management (BLM 1978)
- United States Department of Transportation (USDOT), Federal Highway Administration (FHWA 1981)

The methodology and assumptions used to assess visual and aesthetic impacts of the Regional Connector Transit Corridor Project alternatives build on the guidance developed by these federal agencies and the extensive work of Lawrence Headley of LH&A for the Port of Los Angeles and other Los Angeles projects (Headley 2008, 2006, and 2005). Analyzing potential visual impacts includes evaluating the following effects:

- Conflicts with or compliments the existing visual character
- Changes in visual quality
- Intrudes on or blocks sensitive views (emphasizes views protected by local jurisdictions)
- Creates shadows
- Creates new light or glare sources

More information regarding the regulatory and analytical framework is available in Appendix P.

4.4.2 Affected Environment

The area of potential effects (APE) for the visual impact analysis consists of the area one city block adjacent to each side of the proposed alignments.

4.4.2.1 Visual Resources

The build alternatives' existing visual and aesthetic environment is characterized by an established urban landscape. Research was completed to locate previously identified visual and aesthetic resources. These resources include, but are not limited to, structures of architectural or historic significance or visual prominence; public plazas, art, and gardens; heritage oaks or other trees or plants protected by the City of Los Angeles; consistent design elements (such as setbacks, massing, height, and signage) along a street or district; pedestrian amenities; and landscaped medians or park areas. Based on site reviews, the predominant visual resources within the APE are recognized historic buildings. Figures 4.4-6 through 4.4-8 show the visual resources identified within the APE.

4.4.2.2 Scenic Vistas

The City of Los Angeles General Plan and the Scenic Highways Plan within the *General Plan's Circulation Element* were reviewed to determine whether the project would affect scenic vistas.

Based on this review, it was determined that there are no scenic highways in downtown Los Angeles. Although Objective 11 of the *General Plan's Circulation Element* is to "preserve and enhance access to scenic resources and regional open space," there are no such features adjacent to the TSM or build alternatives.

4.4.2.3 Scenic Resources

The following buildings, which are recognized as historic resources in Section 4.12.1, Cultural Resources – Built Environment, and open spaces have been identified as scenic resources along the proposed alignment corridors for the TSM and build alternatives. Figures 4.4-1 through 4.4-5 illustrate some of the existing visual conditions in the project area.

Financial District:

- Fine Arts Building
- 818 Building
- Roosevelt Lofts
- Pegasus
- 811 Wilshire Boulevard
- Engine Company No. 28
- The Standard Hotel
- California Club
- Los Angeles Central Library and Maguire Gardens
- City National Plaza
- Citigroup Center Plaza

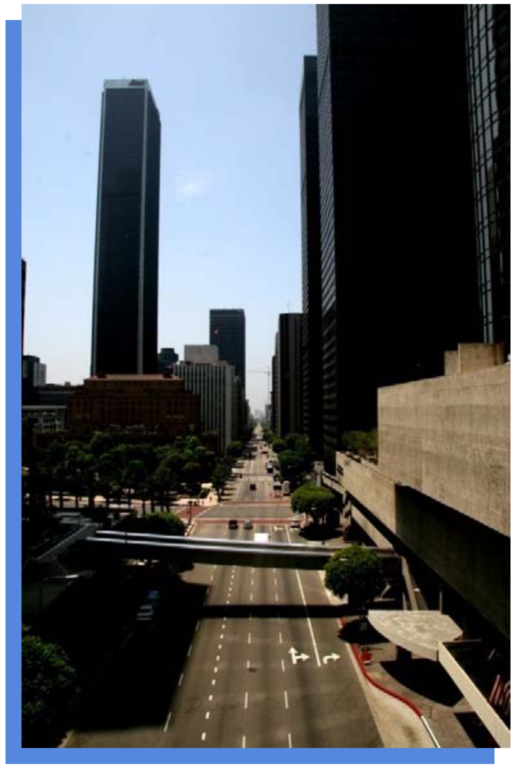


Figure 4.4-1. Financial District/Flower Street Corridor

Bunker Hill:

- Walt Disney Concert Hall
- 2nd Street Tunnel
- Grassy Open Space at General Thaddeus Kosciuszko Way

Historic Core:

- Los Angeles Law Center
- Times Annex
- Times Building
- Higgins Building
- St. Vibiana Cathedral
- Redwing Shoes

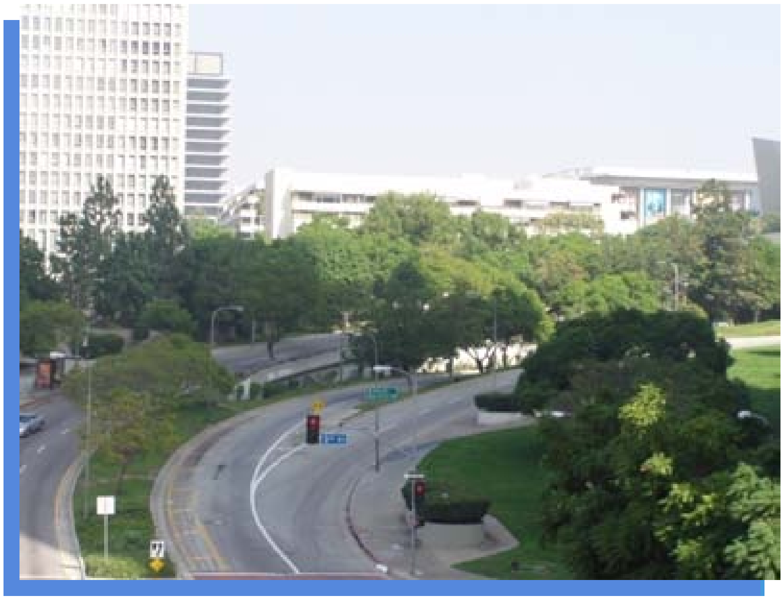


Figure 4.4-2. Open Space at West End of 2nd and 3rd Street Tunnels

Figure 4.4-3. 2nd Street Corridor and the Los Angeles Times Building

Civic Center:

- City Hall South
- Los Angeles City Hall
- U.S. Courthouse
- Fletcher Bowron Square
- Parker Center
- Tinker Toy Parking Structure

Figure 4.4-4. Los Angeles City Hall

Little Tokyo:

- Little Tokyo Historic District
- Los Angeles Hompa Hongwanji Temple

More information regarding the existing visual and aesthetic environment within the project area is available in Appendix P.

Figure 4.4-5. Japanese Village Plaza with “Friendship Knot” at San Pedro & 2nd Street

4.4.3 Environmental Impacts/Environmental Consequences

Potential impacts to historic resources are evaluated in Section 4.12.1 Cultural Resources - Built Environment. Scenic byways, scenic vistas, and protected public view corridors are not located within the project area. Therefore, the project would neither impede views from any nationally recognized scenic highways, designated scenic routes, corridors, or parkways nor would it affect any otherwise recognized or valued public viewing locations.

Table 4.4-2 summarizes visual and aesthetic impacts associated with each of the five alternatives. Further information regarding visual and aesthetic impacts is provided in Appendix P.

4.4.3.1 No Build Alternative

New transit projects would not be constructed or begin operation in the project area under this alternative. Therefore, direct or indirect visual impacts would not occur to scenic vistas, scenic resources, nighttime lighting, and shading and shadowing. The No Build Alternative would not result in visual impacts to these resources.

4.4.3.1.1 NEPA Finding and CEQA Determination

The No Build Alternative would have no effects with respect to visual and aesthetic conditions.

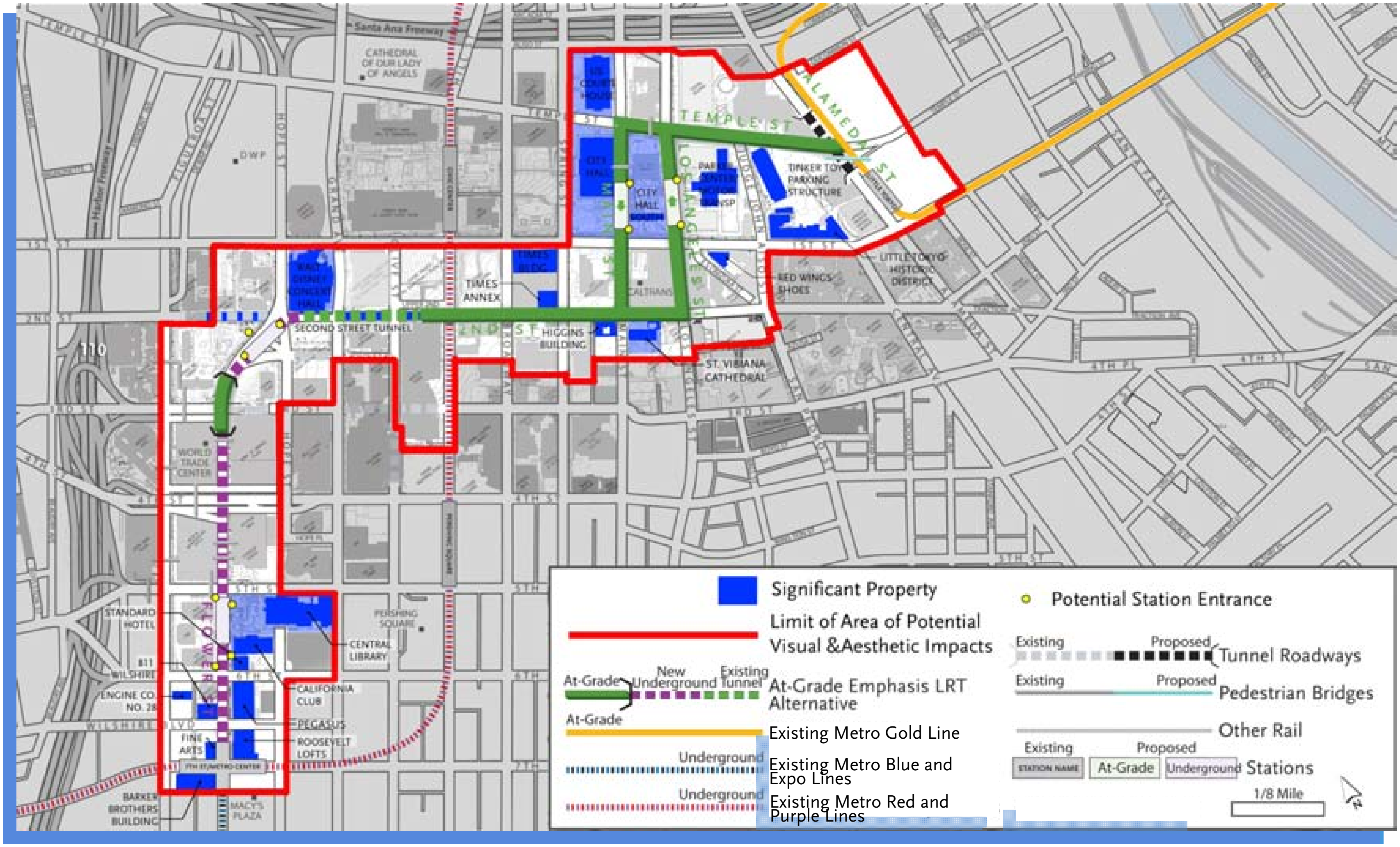


Figure 4.4-6. Visual Resources Associated with the At-Grade Emphasis LRT Alternative

** Light blue areas are plazas, open space, and courtyards indentified as visual resources.*

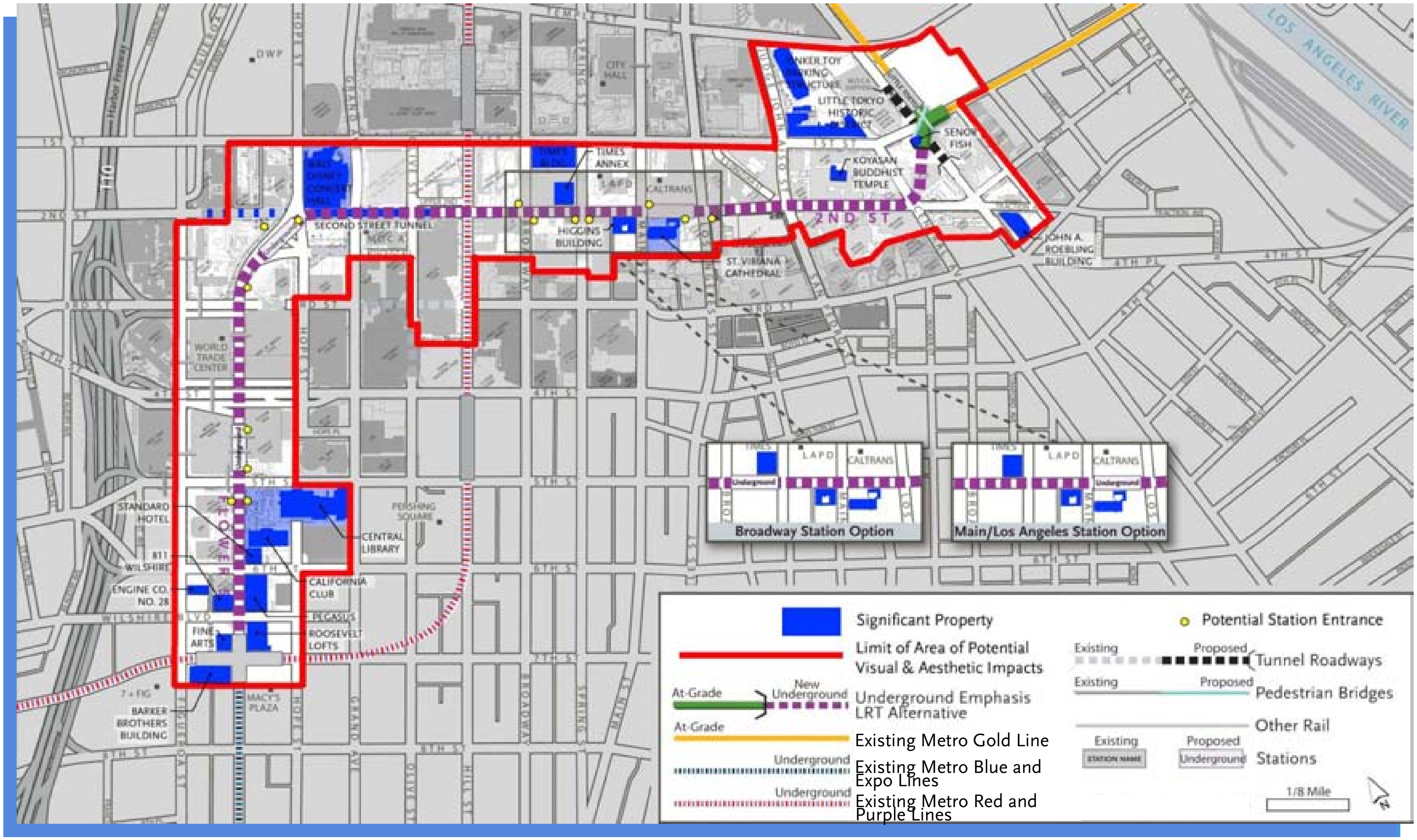


Figure 4.4-7. Visual Resources Associated with the Underground Emphasis LRT Alternative

** Light blue areas are plazas, open space, and courtyards indentified as visual resources.*

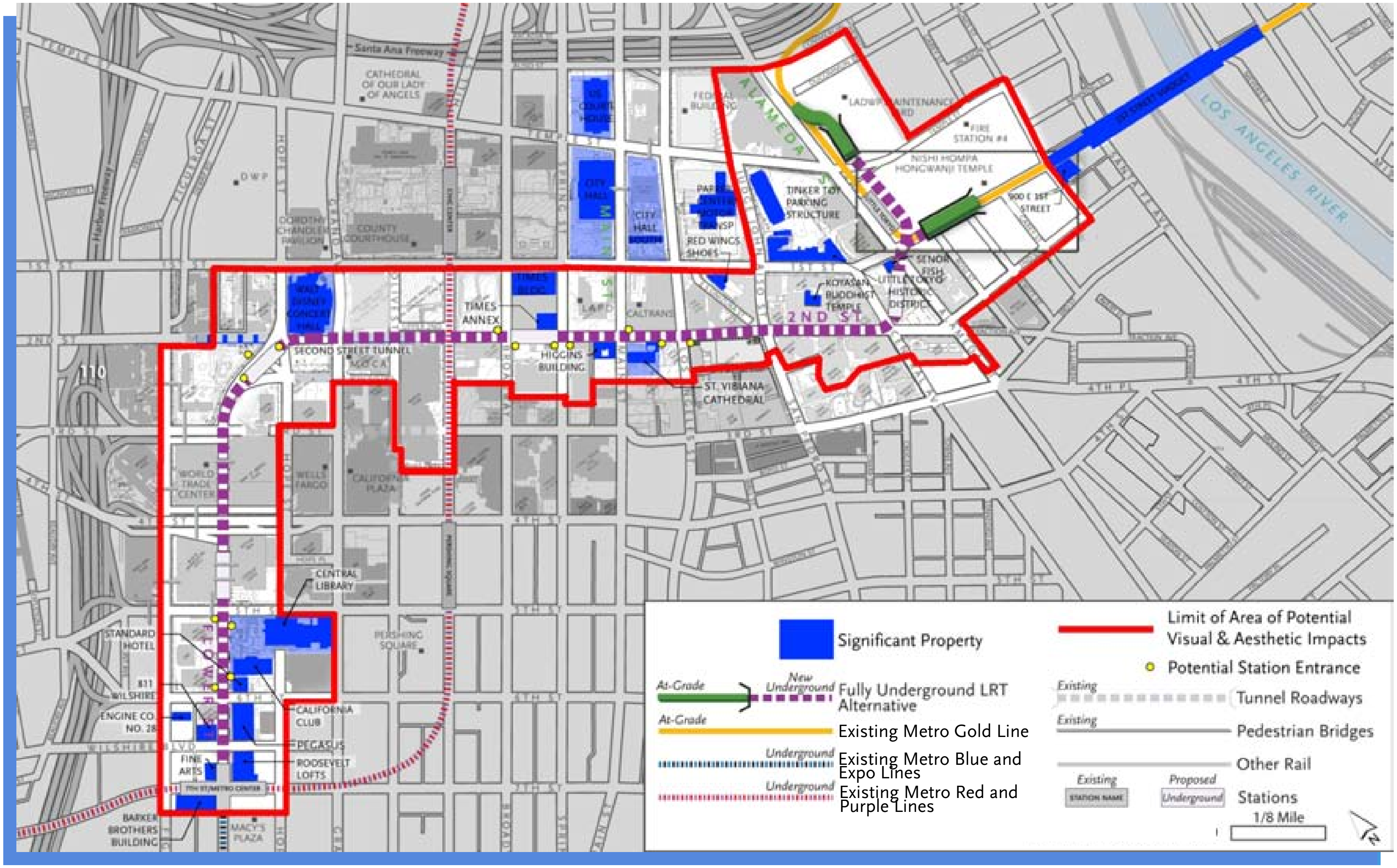


Figure 4.4-8. Visual Resources Associated with the Fully Underground LRT Alternative

** Light blue areas are plazas, open space, and courtyards indentified as visual resources.*

4.4.3.2 TSM Alternative

The TSM Alternative would result in minor visual modifications to the existing environment due to construction of enhanced bus stops. Examples of how these improvements might appear are shown in Figures 4.4-9a and 4.4-9b. Direct or indirect construction or operation impacts would not occur to scenic vistas, scenic resources, nighttime lighting, and shading and shadowing under the TSM Alternative because there would not be any new major construction or new light rail operation.

4.4.3.2.1 NEPA Finding and CEQA Determination

The TSM Alternative would not have adverse effects on the visual and aesthetic conditions in the project area.

The TSM Alternative would not have significant effects on the visual and aesthetic conditions of the project area. The visual character of the corridor would not change with either construction or operation of the TSM Alternative.

Figure 4.4-9a and Figure 4.4-9b. Enhanced Bus Stop

4.4.3.3 At-Grade Emphasis LRT Alternative

4.4.3.3.1 Construction

Construction of the At-Grade Emphasis LRT Alternative would involve both at-grade and underground construction activities. At-grade construction would include installing tracks and guideway structures and constructing station platforms and ancillary facilities along roadways in the Historic Core, Civic Center, and Little Tokyo areas of downtown Los Angeles. At-grade construction activities would also include streetscape improvements along the entire alignment.

For above-ground construction, activities, equipment, and staging locations would be visible to nearby land uses and passersby. Proposed construction staging locations for the at-grade portion of this alternative include the Main/1st Street station, the Los Angeles/1st Street station, and the Temple and Alameda junction. At each of these three staging locations, construction equipment, worker vehicles, and construction trailers would be visible to nearby land uses and passersby for a period of two to three years.

For underground construction activities, cut-and-cover construction would be conducted primarily below ground along approximately 1,600 feet of Flower Street north of the existing 7th Street/Metro Center Station and extend to the proposed 2nd/Hope Street station. At any given time, two to three blocks would be closed during cut-and-cover construction activities. Above-ground activities associated with cut-and-cover construction would be visible to nearby land uses and passersby; however, the bulk of construction would occur below ground and, therefore, would not obstruct views or substantially alter the visual character of the Flower Street corridor in the Financial District.

Also associated with underground construction would be construction staging areas proposed at the Flower/6th/5th Street station site and the 2nd/Hope Street station site. Construction staging locations would be visible to nearby land uses and passersby; however, the construction sites themselves would be sheltered from direct public view by temporary construction walls.

Table 4.4-1 summarizes construction impacts on scenic resources associated with construction of the At-Grade Emphasis LRT Alternative.

Both above and below ground construction activities—including installation of tracks and poles, station construction, and pedestrian and train portal construction—would temporarily disrupt the visual character and views along the corridors. However as shown in Figures 4.4-1 to 4.4-5, the project would be constructed in a heavily urbanized environment consisting of high- and mid-rise buildings where construction activities are not uncommon. Construction of the project would not noticeably reduce visual quality or alter viewing context. Therefore, temporary construction impacts would be less than significant.

During construction, nighttime lighting would predominantly consist of security lighting, and light would be directed on-site. As such, nighttime lighting impacts would be less than significant during construction. Heights of construction-related facilities and equipment located above ground would be limited; as such, the potential for construction activities to result in shading and shadows beyond those currently created by the high- and mid-rise buildings along the alignment's corridors would be minimal. Therefore, no shade or shadow impacts would result.

Table 4.4-1. Scenic Resources Potentially Affected by Construction of the At-Grade Emphasis LRT Alternative

Resources	Cut and Cover for Guideway	Construction Staging	Stations and Portals	Tunnel Boring
Financial District				
Fine Arts Building	NO	NO	NO	NO
818 Building	NO	NO	NO	NO
Roosevelt Lofts	NO	NO	NO	NO
Pegasus	LTS	NO	NO	NO
811 Wilshire Blvd	LTS	NO	NO	NO
Engine Co. No. 28	LTS	NO	NO	NO
Standard Hotel	LTS	NO	NO	NO
California Club	LTS	NO	NO	NO
LA Central Library & Maguire Gardens	LTS	LTS	LTS	NO
City National Plaza	LTS	LTS	LTS	NO
Citigroup Center Plaza	LTS	LTS	LTS	NO
Bunker Hill				
Walt Disney Concert Hall	NO	LTS	LTS	NO
2nd Street Tunnel	LTS	LTS	LTS	NO
Grassy Open Space at General Thaddeus Kosciuszko Way	LTS	LTS	LTS	NO
Historic Core				
LA Law Center	NO	NO	NO	NO
Times Annex	NO	NO	NO	NO
Times Building	NO	NO	NO	NO
Higgins Building	NO	NO	NO	NO

Table 4.4-1. Scenic Resources Potentially Affected by Construction of the At-Grade Emphasis LRT Alternative (continued)

Resources	Cut and Cover for Guideway	Construction Staging	Stations and Portals	Tunnel Boring
St. Vibiana Cathedral	NO	NO	NO	NO
Redwing Shoes	NO	NO	NO	NO
Civic Center				
Civic Center Historic District	NO	LTS	LTS	NO
City Hall South	NO	LTS	LTS	NO
Los Angeles City Hall	NO	LTS	LTS	NO
U.S. Courthouse	NO	LTS	LTS	NO
Fletcher Bowron Square	NO	LTS	LTS	NO
Parker Center	NO	LTS	LTS	NO
Tinker Toy Parking Structure	NO	LTS	LTS	NO
Little Tokyo				
Little Tokyo Historic District	NO	LTS	NO	NO
Union Center Arts	NO	LTS	NO	NO

NO = No impact
LTS = Less than significant impact

4.4.3.3.2 Operations

Scenic Resources:

Views of scenic resources could be minimally disrupted during project operations due to the presence of overhead contact wire and catenary poles, at-grade stations, pedestrian portals and train portals. However, buildings within these districts that are scenic resources are much greater in scale than the components of the LRT system that the LRT system would not degrade any views. Open space and plazas would experience low visual impacts. In addition, the LRT facilities would be consistent with the historical context of many of the structures and reminiscent of the historic system of trolleys and street cars. Therefore, visual resource impacts would not be adverse or significant. Other buildings within the Area of Potential Visual Impact do not have a direct line of sight of the project or are located too far from the at-grade portions of the At-Grade Emphasis LRT Alternative alignment to be visually affected. These include the

Times Building, St. Vibiana Cathedral, Union Arts Center, and San Pedro Farm Building. Therefore, no visual impacts to these buildings would occur.

Visual Character:

The At-Grade Emphasis LRT Alternative would be located in a heavily urbanized environment (as shown in Figures 4.4-1 to 4.4-5) and adding a fixed guideway, whether at grade or underground, would not noticeably reduce visual quality or alter the viewing context in the Financial District, Bunker Hill, Historic Core, Civic Center, or Little Tokyo areas of downtown Los Angeles. The introduction and operation of these improvements would contribute to the existing urban character and high-density, pedestrian friendly environment that already exists in downtown Los Angeles. There would not be a significant effect on the visual character of the historic districts because potential impacts to historic buildings that contribute to the historic districts would be less than significant. Therefore, visual character impacts associated with the At-Grade Emphasis LRT Alternative would be less than significant.

Nighttime Lighting/Shade and Shadow:

Nighttime lighting associated with the alternative would primarily consist of security lighting, which would be similar to the existing lighting located throughout downtown Los Angeles. Above-ground structures, including station platforms and catenary structures (which include poles and wires), would be limited to approximately two stories in height; therefore, the potential for the project to result in increased shading and shadows beyond those currently created by the high- and mid-rise buildings along the alignment corridors would be minimal and no shade or shadow impacts would result.

4.4.3.3.3 NEPA Finding and CEQA Determination

The At-Grade Emphasis LRT Alternative would result in minor changes in visual character, however, they would not be considered adverse when potential mitigation measures are considered.

The At-Grade Emphasis LRT Alternative would not have significant adverse effects with respect to visual and aesthetic conditions with implementation of proposed mitigation measures.

4.4.3.4 Underground Emphasis LRT Alternative

4.4.3.4.1 Construction

Scenic Resources:

The Underground Emphasis LRT Alternative would involve primarily underground construction due to the proposed configuration of the alignment, except for cut-and-cover construction at station locations, construction staging areas, and potential TBM launch sites. However, most construction would occur below ground, and temporary construction walls would prevent direct public view of construction staging and TBM launch sites. TBM operation would be entirely below ground and not visible to nearby land uses or passersby in the Historic Core and Little Tokyo areas of downtown Los Angeles. Therefore, potential impacts on scenic resources associated with construction of the Underground Emphasis LRT Alternative would not be adverse or significant.

Visual Character:

Construction activities, including cut-and-cover construction, installation of the tracks and poles in the at-grade segment of the Underground Emphasis LRT Alternative, and station and pedestrian portal construction, would temporarily alter the existing visual character and views along the corridors. However as shown in Figures 4.4-1 to 4.4-5, the project would be constructed in a heavily urbanized environment consisting of high- and mid-rise buildings where construction activities are not uncommon. Construction of the project would not noticeably reduce visual quality or alter viewing context. Therefore, temporary construction impacts would be less than significant.

Nighttime Lighting/Shade and Shadow:

During construction, nighttime lighting would predominantly consist of security lighting, and light would be directed on-site. As such, nighttime lighting impacts would not be adverse or significant during construction. As with the At-Grade Emphasis LRT Alternative, shade and shadow impacts associated with construction-related facilities and equipment located above ground would be minimal compared to those currently created by the high- and mid-rise buildings along the alignment's corridors. Therefore, no shade or shadow impacts would result.

4.4.3.4.2 Operations

Scenic Resources:

The Underground Emphasis LRT Alternative would operate primarily underground, with a short at-grade segment in Little Tokyo near the existing Little Tokyo/Arts District Station and, therefore, would result in only minimal potential visual impacts to scenic resources. At-grade overhead contact systems, catenary poles, and trackway (standard features required for a light rail system to operate) would be located only at the easternmost end of the Underground Emphasis LRT Alternative alignment. The block bordered by Alameda Street, 2nd Street, 1st Street, and Central Avenue is the only block that would have exposed overhead contact wires, catenary poles, and track.

Older buildings on this block include the Señor Fish and John A. Roebling structures. The Cultural Resources – Built Environment Technical Memorandum describes these buildings and potential project impacts. The portal area structures and surrounding streetscape and landscaping would incorporate historical and visual references to the surrounding Little Tokyo and Arts District neighborhoods, complementing these important communities. Given that most features associated with the Underground Emphasis LRT Alternative would be located below ground, and that only one city block would experience potential visual changes associated with the above-ground operations of this alternative, no adverse visual impacts to scenic resources would occur. Therefore, any potential impacts to visual resources would be less than significant.

Visual Character:

The Underground Emphasis LRT Alternative is located in a heavily urbanized environment (as shown in Figures 4.4-1 to 4.4-5), and adding primarily underground structures and a limited fixed guideway would not noticeably reduce visual quality or alter the viewing context in the Financial District, Bunker Hill, Historic Core, and Little Tokyo areas of downtown Los Angeles. Construction and operation of these features would contribute to the existing urban character and high-density, pedestrian friendly environment that already exists in downtown Los Angeles. Therefore, potential visual character impacts associated with the Underground Emphasis LRT Alternative would not be adverse or significant.\

Nighttime Lighting/Shade and Shadow:

Nighttime lighting associated with the alternative would predominantly consist of security lighting at pedestrian portal locations, and would be directed on-site. Therefore, no nighttime lighting impacts would occur during operation. Above-ground structures, including pedestrian portals and one block with at-grade light rail system, would be limited to no more than two stories in height; therefore, the potential for the project to result in increased shading and shadows beyond those currently created by the high- and mid-rise buildings along the alignment corridors would be minimal and no shade or shadow impacts would result.

4.4.3.4.3 NEPA Finding and CEQA Determination

The Underground Emphasis LRT Alternative would not have adverse impacts on the visual and aesthetic conditions of the project area.

The Underground Emphasis LRT Alternative would not have significant effects on the visual and aesthetic character of the project area.

4.4.3.5 Fully Underground LRT Alternative

4.4.3.5.1 Construction

As with the Underground Emphasis LRT Alternative, construction of Fully Underground LRT Alternative would require mostly underground construction due to the proposed configuration of the alignment. Cut-and-cover construction, construction staging locations, and potential TBM launch sites would also be similar to the Underground Emphasis LRT Alternative.

However the Fully Underground LRT Alternative would include a center platform station constructed under the block bounded by 1st, 2nd, and Alameda Streets, and Central Avenue, with tracks to the north and east proceeding at the same grade. The tracks leaving this block would split into two different directions. One set of tracks would head east within 1st Street, where it would rise up to an at-grade elevation and join the Metro Gold Line to I-605 about one and a half blocks east of Alameda. The other set of tracks would head northerly east of and parallel to Alameda Street, joining the Metro Gold Line to Azusa and heading north to Union Station.

Construction staging areas and associated temporary construction walls would be located on the block bounded by 1st, 2nd, and Alameda Streets, and Central Avenue. These areas would not be visible to anyone but those in the vicinity of this block. There would be no impact to scenic resources in this vicinity because there are no nearby resources.

In the vicinity of the at-grade segment of this alignment, the Los Angeles Hompa Hongwanji Temple, an important community/cultural resource, is located at approximately 800 East 1st Street. Construction of the portal within 1st Street would involve cut-and-cover methods and occur in the vicinity of the temple, which could have moderate potential visual impacts. Nonetheless, potential impacts on scenic resources associated with construction of the Fully Underground LRT Alternative would not be adverse or significant.

Table 4.4-2 Summary of Potential Visual and Aesthetic Impacts

Impacts	No Build	TSM		At-Grade Emphasis LRT		Underground Emphasis LRT		Fully Underground LRT	
		Construction	Operation	Construction	Operation	Construction	Operation	Construction	Operation
Scenic Vistas	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Scenic Resources	NO	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS
Visual Character	NO	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS
Nighttime Illumination	NO	NO	NO	LTS	NO	LTS	NO	LTS	NO
Shade and Shadows	NO	NO	NO	NO	NO	NO	NO	NO	NO
Indirect Impacts	NO	NO	NO	NO	NO	NO	NO	NO	NO
Direct Impacts	NO	NO	NO	NO	NO	NO	NO	NO	NO
Cumulative Impacts	NO	NO	NO	NO	NO	NO	NO	NO	NO

[1] Scenic vistas were not located in the project area; therefore, an analysis of impacts was not included.
NO = No impact.
LTS = Less than significant impact.

During construction, nighttime lighting would be the same as previously described for the other build alternatives and would not have adverse impacts. Shade and shadow impacts would also be the same as previously described and would not be adverse.

4.4.3.5.2 Operations

As shown in Table 4.4-2, potential permanent visual impacts of the Fully Underground LRT Alternative would be the same as for the Underground Emphasis LRT Alternative. Both alternatives follow the same alignment and configuration for most of the corridor. As illustrated in Figures 4.4-10 and 4.4-11, portions of the proposed alignment in the vicinity of Little Tokyo, along Alameda and east of Alameda would have prominent, visible street-level features, including pedestrian entrances to an underground station, and tunnel portals on 1st Street and northeast of Temple and Alameda Streets. As shown in Figures 4.4-10 and 4.4-11, implementation and operation of the alternative would contribute to the existing urban character and high-density, pedestrian friendly environment that already exists in downtown Los Angeles. Typical underground station entrance and underground alignment renderings are shown in Chapter 2 as Figures 2-5 through 2-7.

The Fully Underground LRT Alternative would add primarily underground structures and a limited fixed guideway which would not impact scenic resources, noticeably reduce visual quality, or alter the viewing context in the heavily urbanized areas of Little Tokyo or the Arts District areas. Therefore, potential visual character impacts associated with the Fully Underground LRT Alternative –would not be adverse or significant .

The visual character of the corridor would slightly change with the Fully Underground LRT Alternative. The principal features visible aboveground would be station entrances, visual alterations in the vicinity of the proposed 2nd Street/Central Avenue station, and the train portals in 1st Street and just east of Alameda Street between Temple and Commercial Streets.

4.4.3.5.3 NEPA Finding and CEQA Determination

The Fully Underground LRT Alternative would not have adverse effects on the visual and aesthetic character of the project area.

The Fully Underground LRT Alternative would not have significant effects on the visual and aesthetic character of the project area.

4.4.4 Mitigation Measures

4.4.4.1 Potential Construction-Related Mitigation Measures

Significant construction-related visual impacts were not identified for the No Build and TSM Alternatives. Therefore, mitigation measures would not be required.

4.4.4.2 Potential Operation-Related Mitigation Measures

Significant operation-related visual impacts were not identified for the No Build or TSM Alternatives. Therefore, mitigation measures would not be required.

While no significant impacts to the Historic Core, Civic Center, or Little Tokyo communities would result from operation of the At-Grade Emphasis LRT Alternative, Underground Emphasis LRT Alternative, or the Fully Underground LRT Alternative, the following mitigation measures would further reduce less than significant impacts.

- Metro would coordinate with the Little Tokyo community to obtain input on the urban design of the project within the community.
- Urban design measures would be developed to integrate the LRT facilities into each community as appropriate. Designs might address elements such as catenary poles, materials, or station colors.

4.5 Air Quality

This section describes the air quality conditions for the project area and analyzes both short-term impacts of emissions during construction and long-term impacts associated with operations of each Regional Connector alternative. It also summarizes potential impacts to air quality and inhalation health risks. The analysis includes the preparation of emissions inventories for construction and operations, health risk assessments for construction activities, and a carbon monoxide (CO) hot spots analysis. Information in this section is based on the Air Quality Impacts and Health Risk Assessment Technical Memorandum prepared for the project and contained in Appendix Q of this DEIS/DEIR.

4.5.1 Regulatory Framework and Standards of Significance

Federal, state, and local governments all share responsibility for air quality management. The Clean Air Act (CAA) and the California Clean Air Act (CCAA) are the primary statutes that establish ambient air quality standards. They establish regulatory authorities to design and enforce air quality regulations.

4.5.1.1 Regulatory Framework

Under authority of the CAA, EPA established National Ambient Air Quality Standards (NAAQS) for the following criteria pollutants that are considered harmful to public health and welfare: carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO_2), ozone (O_3)[2] (commonly known as "smog"), particulate matter (PM_{10} and $PM_{2.5}$), and sulfur dioxide (SO_2,). Ozone is a secondary pollutant, meaning that it is formed in the atmosphere from reactions of precursor compounds under certain conditions. Primary precursor compounds that lead to formation of O_3 include volatile organic compounds (VOC) and oxides of nitrogen (NOx). Fine particulate matter ($PM_{2.5}$) can be emitted directly from sources (engines) or can form in the atmosphere from precursor compounds. $PM_{2.5}$ precursor compounds include SO_x, NO_x, VOC, and ammonia.

[2] Ozone is a secondary pollutant, formed from "precursor compounds" - volatile organic compounds (VOCs) and oxides of nitrogen (NOx) - in the presence of sunlight. Because the formation of ozone is complex and difficult to assess on a project level, air quality impact analyses address ozone by analyzing emissions of NOx and VOC precursors instead.

Figure 4.4-10. Fully Underground LRT Alternative – Aerial View Facing North without Existing Tracks

Figure 4.4-11. Fully Underground LRT Alternative – Aerial View Facing East without Existing Tracks

The CAA specifies dates for achieving compliance with NAAQS and identifies specific emission reduction goals for noncompliant areas. The Southern California Air Basin (SoCAB) is designated as a federal non-attainment area for O_3, PM_{10}, and $PM_{2.5}$, and is in attainment for all other pollutants, including CO, NO_2, SO_2, and Pb.

Approval, funding, and implementation of Federal Highway Administration (FHWA) and Federal Transit Authority (FTA) projects are subject to transportation conformity regulations under the CAA (40 CFR 93, Subpart A). If a potential project is included in a conforming Regional Transportation Plan (RTP) and Regional Transportation Improvement Program (RTIP), the project is already included in emission budgets developed for the region. Thus, a unique, regional analysis of project emissions would not be required. However, analysis regarding possible localized impacts is still required.

The State of California also has air quality regulations outlined in the CAAQS, which are at least as stringent as, and often more stringent than NAAQS. Further information on NAAQS, CAAQS, and CAA standards are provided in Appendix Q. Other applicable local plans and regulations include:

- SCAG Regional Transportation Plan
- SCAG Regional Transportation Improvement Program
- SCAQMD Air Quality Management Plans

Under the Clean Air Act Amendments of 1990, which direct the EPA to implement environmental measures to ensure acceptable levels of air quality, a project cannot:

- Cause or contribute to any new violation of any NAAQS in any area;
- Increase the frequency or severity of any existing violation of any NAAQS in any area; or
- Delay timely attainment of any NAAQS or any required interim emission reductions or other milestones in any area.

4.5.1.2 Standards of Significance

NAAQS are used to determine air quality impacts under NEPA. The most recent thresholds of significance published by the SCAQMD were released in 2009. These thresholds supersede the City of Los Angeles thresholds; therefore, this analysis uses the most recent significance thresholds from the SCAQMD to determine air quality impacts under CEQA.

Significance thresholds developed by the SCAQMD for local air quality impacts from construction activities (SCAQMD 2003 and SCAQMD 2006) and for both carcinogenic and non-carcinogenic toxic air contaminants (TACs) were used in this analysis.

In accordance with Transportation Conformity (40 CFR 93, Subpart A), localized concentrations of CO were analyzed for this project. The analysis looks at surface traffic intersections, with the highest potential CO concentrations, that would be altered by the project, either during construction or after project completion.

4.5.2 Affected Environment

The air quality area of analysis includes the four-county region covered by the SoCAB (all of Orange County and the urban, non-desert portions of Los Angeles, Riverside, and San Bernardino Counties). The SoCAB area has high levels of air pollution, particularly from June through September. Pollutant concentrations in the SoCAB vary by location, season, and time of day. Concentrations of O_3, for example, tend to be lower along the coast and in far inland areas of the basin and adjacent desert and higher in and near inland valleys.

Over the past 30 years, substantial progress has been made in reducing air pollution levels in Southern California. Previously, the EPA designated SoCAB as a non-attainment area for all NAAQS except SO_2. The EPA now designates SoCAB as in attainment for NO_2, lead, SO_2, and CO. PM_{10}, $PM_{2.5}$, and O_3 levels, while reduced substantially from their peak, remain above relevant NAAQS and CAAQS.

In completing the health risk assessment required under CEQA, this study identified sensitive receptors within the project area. Sensitive receptors are typically locations where the elderly, children, or other groups with a greater susceptibility to adverse health effects could be located. These locations include schools, hospitals, convalescent homes, parks, and daycares. More information on the sensitive receptors in the project area is available in Appendix Q.

4.5.3 Environmental Impacts/Environmental Consequence

The following sections summarize the evaluation of potential air quality impacts for each alternative. Table 4.5-1 summarizes the results of the analysis.

4.5.3.1 Transportation Conformity

A transportation conformity determination is required for approval, funding, or implementation of FWHA/FTA projects. The Regional Connector Transit Corridor project would decrease the overall number of vehicles in the region, and it would not cause an increase in diesel vehicles. As a result, the proposed project would neither cause new PM_{10} or $PM_{2.5}$ hot spots nor increase the frequency or severity of existing PM_{10} or $PM_{2.5}$ violations. No localized adverse impacts from CO are expected under this project. The proposed project would implement the various PM_{10} and $PM_{2.5}$ control measures contained in the RTP and RTIP and meet the requirements of §93.117. No further action is required for transportation conformity.

4.5.3.2 Mobile Source Air Toxics (MSAT)

The FHWA published an *Interim Guidance Update on Mobile Source Air Toxic Analyses in NEPA Documents* on September 30, 2009. This guidance document establishes a tiered approach for analyzing mobile source air toxics (MSAT) in NEPA, with the first tier being no analysis for projects with no potential for meaningful MSAT effects. The Regional Connector Transit Corridor project would have no MSAT effects because VMT for each of the build alternatives would decrease compared to the No Build Alternative. The proposed project falls within the first tier of MSAT analysis, so no further action is required.

Table 4.5-1. Summary of Potential Impacts to Air Quality

Alternative	Construction Effects	Operational Effects	Mitigation Measures
No Build	None	None	None
TSM	None	Adverse	None
At-Grade LRT	Temporary regional adverse effects	Beneficial effects	Adverse construction-related regional impacts remain with mitigation
Underground LRT	Temporary regional adverse effects	Beneficial effects	Adverse construction-related regional impacts remain with mitigation
Fully Underground LRT	Temporary regional adverse effects	Beneficial effects	Adverse construction-related regional impacts remain with mitigation

4.5.3.3 Construction Emissions Results

Potential construction emissions were estimated and compared to thresholds of significance published by the SCAQMD. The SCAQMD also recommends that localized impacts be evaluated for significance. Thus, this section summarizes construction air quality impacts locally and regionally.

The build alternatives would result in temporary emissions associated with construction. Construction would occur between and including the years 2014 and 2017. Construction emissions were analyzed with the methodology developed by the SCAQMD in its CEQA Air Quality Handbook (1993). Fugitive dust and engine exhaust emissions were characterized into the following main categories:

- Grading and excavation
- Heavy-duty equipment on unpaved areas
- Paved road dust (haul/delivery trucks)
- Loading/unloading of trucks
- Vehicle trips (including construction worker commuting and haul/delivery trucks)

Although the analysis used the CEQA Air Quality Handbook to estimate emissions, several emission factors and calculation methods in the Handbook are outdated. Thus, the analysis used current versions of the EMFAC and OFFROAD models, to generate on- and off-road emission factors, respectively, instead of the mobile source emission factors established in the CEQA Air Quality Handbook. The analysis used the Midwest Research Institute (MRI) Improvement of Specific Emission Factors report as necessary to update the fugitive dust emission factors identified in the CEQA Air Quality Handbook. (MRI 1996). The analysis used EPA's Compilation of Air Pollutant Emission Factors (AP-42) to estimate emissions from fugitive dust (EPA 1995).

Dust emissions and dirt track-out will be minimized through compliance with SCAQMD Rule 403. Although projects are required to follow all of the Best Available Control Measures described in the rule, several of the key measures applicable to this project are as follows:

- For cut and fill at large sites, pre-water with sprinklers or water trucks and allow time for penetration.
- Apply water or stabilizing agent in sufficient quantities to prevent the generation of visible dust plumes.
- Track-out shall not extend 25 feet or more in cumulative length from the point of origin from an active operation. All track-out from an active operation shall be removed at the conclusion of each workday or evening shift.
- If the disturbed surface area is five acres or more, or if the daily import or export of bulk material is 100 cubic yards or more, then at least one of the following precautions must also be taken.
- Install a pad consisting of washed gravel (minimum-size: one inch) maintained in a clean condition to a depth of at least size inches and extending at least 30 feet wide and at least 50 feet long.
- Pave the surface extending at least 100 feet and at least 20 feet wide.
- Use a wheel shaker/wheel spreading device consisting of raise divides at least 24 feet long and 10 feet wide to remove bulk material from tires and vehicle undercarriages before vehicles exit the site.
- Install and use a wheel washing system to remove bulk material from tires and vehicle undercarriages before vehicles exit the site.

4.5.3.3.1 Regional Construction Emissions

Emissions from construction of the project are analyzed under CEQA. Thresholds of significance developed for CEQA were also used for the NEPA analysis, since CEQA requirements are at least as stringent as NEPA requirements. Construction emissions would not occur if not for the project, so baseline emissions are assumed to be zero. Short-term, peak, daily emissions of VOC, NOx, CO, and $PM_{2.5}$ would exceed thresholds of significance for CEQA under all build alternatives. In addition, emissions of PM_{10} would exceed thresholds of significance for CEQA for the At-Grade Emphasis LRT Alternative. Emissions are summarized in Table 4.5-2.

4.5.3.3.2 SCAQMD Localized Significance Thresholds (LST)

In June 2003 (revised July 2008), the SCAQMD developed a methodology to evaluate localized construction impacts on air quality that would account for air dispersion. Maximum daily emissions for each project construction activity, considering their locations, were compared to relevant LSTs. The comparison assumes a one-acre site for each construction activity and a distance of 25 meters to the nearest sensitive receptor. This approach provides conservative results for the LST analysis. After mitigation measures, emissions of all pollutants would be less than LST thresholds. Thus, construction-related pollutant concentrations would not be significant.

Table 4.5-2. Summary of Unmitigated Peak Daily Construction Emissions

Alternative	Unmitigated Peak Daily Construction Emissions (lbs/day)					
	VOC	NO_X	CO	SO_2	PM_{10}	$PM_{2.5}$
At-Grade Emphasis LRT Alternative	**289**	**2,175**	**1,150**	4	**151**	**126**
Underground Emphasis LRT Alternative						
2nd/Hope Station SEM Broadway Station Option	**308**	**2,336**	**1,249**	4	111	**89**
2nd/Hope Station Cut and Cover Broadway Station Option	**313**	**2,375**	**1,272**	4	113	**90**
2nd/Hope Station SEM Los Angeles Station Option	**308**	**2,332**	**1,247**	4	110	**89**
2nd/Hope Station Cut and Cover Los Angeles Station Option	**313**	**2,371**	**1,270**	4	113	**90**
Fully Underground LRT Alternative						
2nd/Hope Station SEM	**376**	**2,699**	**1,542**	5	129	**102**
2nd/Hope Station Cut and Cover	**386**	**2,777**	**1,593**	5	133	**105**
SCAQMD Significance Threshold	75	100	550	150	150	55

Note: Emissions greater than threshold of significance are shown in ***bold****.*

4.5.3.4 Operational Emissions Results

4.5.3.4.1 NEPA Finding

NEPA analysis requires comparing emissions for the future project year (2035) to those for the No Build Alternative (2035). Incremental annual operational emissions associated with each of the proposed alternatives above the No Build Alternative are summarized in Table 4.5-3 for NEPA. Each of the alternatives reduced highway VMT when compared to the No Build Alternative. The TSM Alternative, however, would result in additional compressed natural gas

(CNG) bus emissions. NOx emissions would increase beyond the NEPA significance threshold under the TSM Alternative.

4.5.3.4.2 CEQA Determination

The CEQA analysis completed for the Regional Connector Transit Corridor project includes incremental daily operational emissions associated with each of the proposed alternatives above the No Build Alternative (2035), which are summarized in Table 4.5-4. The determination of significant impacts within the CEQA analysis of daily, traffic-related operational emissions is based on a comparison to the No Build Alternative, which accounts for regional growth and increases in background traffic that would occur independent of the project.

Table 4.5-3. Incremental Annual Operational Emissions Compared to No Build Alternative

Alternative	Incremental Emissions (tons per year)[1,2]					
	VOC	CO	NOx	SO_2	PM_{10}	$PM_{2.5}$
TSM	(2)	(85)	**16**	(1)	(43)	(7)
At-Grade Emphasis	(2)	(105)	(7)	(1)	(51)	(11)
Underground Emphasis	(2)	(109)	(7)	(1)	(53)	(12)
Fully Underground[3]	(2)	(112)	(7)	(1)	(55)	(12)
NEPA Threshold	10	100	10	100	70	100

Notes:
[1] Incremental emissions are determined by subtracting the given alternative emissions from the No Build Alternative emissions.
[2] Emission reductions (beneficial impacts) are shown in parentheses.

Table 4.5-4. Incremental Daily Operational Emissions Compared to the No Build Alternative (2035)

Alternative	Incremental Emissions[1,2] (lbs/day)					
	VOC	CO	NOx	SO_2	PM_{10}	$PM_{2.5}$
TSM	0	(400)	0	(100)	(200)	0
At-Grade Emphasis	0	(500)	(100)	(100)	(300)	0
Underground Emphasis	0	(600)	(100)	(100)	(300)	0
Fully Underground	0	(600)	(100)	(100)	(300)	0
CEQA Threshold	55	550	55	150	150	55

Notes:
[1] Incremental emissions are determined by subtracting the given alternative emissions from the No Build Alternative emissions.
[2] Emission reductions (beneficial impacts) are shown in parentheses.

4.5.3.4.3 CO Hot Spot Analysis

Five intersections with the most potential for adverse impacts were analyzed using the CAL3QHC model. This is the EPA preferred model for CO hot spots modeling. The results of the analysis are provided in Table 4.5-5. Concentrations of CO at the intersections would not exceed the CAAQS or NAAQS for any of the alternatives. Thus, the CO hot spots would not be significant.

Table 4.5-5. Summary of CO Hot Spots Analysis (Localized Concentrations of CO)

ID	Intersection	Max. CO Conc. (ppm)[1]		Significance	
		1-Hour	8-Hour	1-Hour[2]	8-Hour[3]
Existing Conditions (2009)					
5	1st Street and Main Street	4.20	3.17	no	no
12	2nd Street and Hill Street	3.90	2.96	no	no
57	Temple Street and Main Street	4.20	3.17	no	no
58	Temple Street and Los Angeles Street	4.20	3.17	no	no
60	Temple Street and Alameda Street	4.20	3.17	no	no
No Build Alternative (2035)					
5	1st Street and Main Street	1.40	1.04	no	no
12	2nd Street and Hill Street	1.30	0.97	no	no
57	Temple Street and Main Street	1.40	1.04	no	no
58	Temple Street and Los Angeles Street	1.30	0.97	no	no
60	Temple Street and Alameda Street	1.40	1.04	no	no
TSM Alternative (2035)					
5	1st Street and Main Street	1.40	1.04	no	no
12	2nd Street and Hill Street	1.30	0.97	no	no
57	Temple Street and Main Street	1.40	1.04	no	no
58	Temple Street and Los Angeles Street	1.30	0.97	no	no
60	Temple Street and Alameda Street	1.40	1.04	no	no

Table 4.5-5. Summary of CO Hot Spots Analysis (Localized Concentrations of CO) (continued)

ID	Intersection	Max. CO Conc. (ppm)[1]		Significance	
		1-Hour	8-Hour	1-Hour[2]	8-Hour[3]
At-Grade Emphasis LRT Alternative (2035)					
5	1st Street and Main Street	1.40	1.04	no	no
12	2nd Street and Hill Street	1.30	0.97	no	no
57	Temple Street and Main Street	1.50	1.11	no	no
58	Temple Street and Los Angeles Street	1.30	0.97	no	no
60	Temple Street and Alameda Street	1.40	1.04	no	no
Underground Emphasis LRT Alternative (2035)					
5	1st Street and Main Street	1.40	1.04	no	no
12	2nd Street and Hill Street	1.30	0.97	no	no
57	Temple Street and Main Street	1.40	1.04	no	no
58	Temple Street and Los Angeles Street	1.40	1.04	no	no
60	Temple Street and Alameda Street	1.40	1.04	no	no
Fully Underground LRT Alternative (2035)					
5	1st Street and Main Street	1.40	1.04	no	no
12	2nd Street and Hill Street	1.30	0.97	no	no
57	Temple Street and Main Street	1.40	1.04	no	no
58	Temple Street and Los Angeles Street	1.40	1.04	no	no
60	Temple Street and Alameda Street	1.40	1.04	no	no

Notes:
[1]Maximum concentrations for a given year include the ambient background CO concentrations (1-hour and 8-hour) for that year.
[2]1-Hour CAAQS = 9.0 ppm; 1-Hour NAAQS = 9 ppm
[3] 8-Hour CAAQS = 20 ppm; 8-Hour NAAQS = 35 ppm

4.5.3.5 No Build Alternative

The No Build Alternative would not result in any construction emissions. The No Build Alternative would not create new emissions or have negative operational air quality impacts.

However, the No Build Alternative would not reduce regional VMT-related emissions like other alternatives.

The No Build Alternative would involve neither construction nor new transit operations. Therefore, there would not be cumulative impacts under the No Build Alternative.

4.5.3.5.1 NEPA Finding and CEQA Determination

The No Build Alternative would not result in adverse or significant air quality impacts.

4.5.3.6 TSM Alternative

The TSM Alternative would not involve any construction beyond installation of bus stops, so no construction emissions would occur. Emissions from operation of buses associated with the TSM Alternative are considered together with highway emissions. The resulting emissions were compared to thresholds of significance for CEQA and NEPA. Emissions of criteria pollutants under this alternative would not exceed CEQA thresholds; thus, they would not be significant, as shown in Table 4.5-3. However, as shown in Table 4.5-4, the projected NO_x emissions increase of 16 tons per year would exceed the NEPA significance threshold of 10 tons per year.

This alternative would result in substantial reductions in peak daily emissions of CO, SO_2, and PM_{10}. Impacts from emissions of these pollutants would not be cumulatively significant. However, the federally-approved RTP and RTIP include an electric light rail project like the Regional Connector project. Not developing such a project would result in higher VMT and emissions than listed in the RTP Programmatic Environmental Impact Report. Thus, cumulative impacts could be adverse under NEPA.

4.5.3.6.1 NEPA Finding and CEQA Determination

The TSM Alternative would not have adverse construction effects on air quality. This alternative would have adverse operational effects on air quality under NEPA criteria for both buses and regional traffic. It is possible that using alternative fuels to run the new shuttle buses would offset the NEPA significance of this impact, which would be determined through modeling. However, this potential future scenario was not analyzed as this time. As such, the operational emissions may remain adverse after mitigation.

The TSM Alternative would not have significant construction or operational effects on air quality under CEQA criteria.

4.5.3.7 Build Alternatives

Table 4.5-2 shows construction emissions by peak day of operation. The analysis estimates emissions from off-road construction equipment, fugitive dust, construction worker commuting, and haul trucks. Emissions of VOC, NO_x, CO, and $PM_{2.5}$ would be significant according to SCAQMD thresholds for all build alternatives, and mitigation measures would need to be implemented. In addition, emissions of PM_{10} would be significant according to SCAQMD thresholds for the At-Grade Emphasis LRT Alternative.

Construction emissions on a regional level were evaluated and compared to SCAQMD's LSTs. LST evaluation indicates that NO_x, PM_{10}, and $PM_{2.5}$ emissions would be greater than maximum allowable levels during several construction phases. Therefore, LST impacts of these pollutants would be significant and would have to be mitigated. LST data is provided in Appendix Q.

The CEQA analysis completed for the Regional Connector Transit Corridor build alternatives included incremental daily operational emissions associated with each of the proposed alternatives above the No Build Alternative (2035), which are summarized in Table 4.5-3 according to CEQA thresholds and Table 4.5-4 according to NEPA thresholds.

The determination of significant impacts within the CEQA analysis of daily, traffic-related operational emissions is based on a comparison to the No Build Alternative, which accounts for regional growth and increases in background traffic that would independently occur from the project. Compared to the No Build Alternative, the daily incremental emissions associated with each action alternative would either decrease or remain unchanged for all pollutants under all alternatives (Table 4.5-3); thus all operational emission impacts are less than significant under CEQA. Overall, vehicular travel would decrease as a result of the project. This result would be consistent with air quality goals in the region.

NEPA analysis requires comparing emissions for the future project year (2035) to those for the No Build Alternative (2035), which is presented in Table 4.5-4. Incremental annual operational emissions associated with each of the proposed alternatives would improve compared to the No Build Alternative.

4.5.3.7.1 NEPA Finding and CEQA Determination

Even with implementation of mitigation during construction, regional construction emissions of VOC, NO_x, CO, and $PM_{2.5}$ would remain significant and unavoidable under CEQA. With implementation of mitigation, localized construction emissions would be reduced below the maximum allowable emissions under the LST methodology and therefore less than significant.

All of the build alternatives would have no adverse or significant effects from operational emissions. Although regional construction emissions under the build alternatives would be significant and unavoidable, the net benefits to air quality associated with the reduction in regional VMT would override the temporary adverse construction impacts and provide a net beneficial effect.

4.5.4 Mitigation Measures

4.5.4.1 Construction Mitigation Measures

Emissions of VOC, NO_x, CO, and $PM_{2.5}$ would be significant during construction for the build alternatives and emissions of PM_{10} would be significant during construction for the At-Grade Emphasis LRT Alternative. Exhaust emissions from the operation of off-road vehicles are responsible for most of the emissions during construction. As a result, reducing emissions from these sources is essential.

Off-road engines could be retrofitted with add-on control devices such as catalytic oxidizers and diesel particulate filters, which would typically reduce NO_x emissions by up to 40 percent and PM_{10} emissions by 85 percent; however, it would not reduce emissions of VOC and CO. It is expected that $PM_{2.5}$ emissions would be reduced to similar levels as PM_{10}.

To control emissions of other pollutants (VOC and CO), Metro could require contractors to use to use up-to-date (2014 to 2017) equipment during project construction. It is not uncommon for old construction equipment to be used at project sites because diesel engines have long lifetimes and can last over 30 years. Engine technology has improved with time, and requiring construction contractors to use up-to-date (2014 to 2017) engines could significantly reduce emissions.

4.5.4.1.1 Regional Construction Emissions

Separate emissions were calculated to evaluate how using up-to-date engines during the year 2014 to 2017 project construction period could reduce emissions of criteria pollutants. The results of this analysis are provided in Table 4.5-6.

Table 4.5-6. Mitigated (2014-2017) Maximum Daily Construction Emissions for All Alternatives

Alternative	Mitigated Daily Emissions (lbs/day)					
	VOC	NOx	CO	SO_2	PM_{10}	$PM_{2.5}$
At-Grade Emphasis LRT Alternative	**119**	**432**	**908**	4	27	12
Underground Emphasis LRT Alternative						
2nd/Hope Station SEM Broadway Station Option	**144**	**473**	**978**	4	27	12
2nd/Hope Station Cut and Cover Broadway Station Option	**147**	**488**	**998**	4	28	12
2nd/Hope Station SEM Los Angeles Station Option	**144**	**469**	**977**	4	27	12
2nd/Hope Station Cut and Cover Los Angeles Station Option	**146**	**485**	**997**	4	28	12
Fully Underground LRT Alternative						
2nd/Hope Station SEM	**189**	**602**	**1,266**	5	35	16
2nd/Hope Station Cut and Cover	**193**	**626**	**1,304**	5	36	16
SCAQMD Significance Threshold	75	100	550	150	150	55

Note: Emissions greater than threshold of significance are shown in ***bold****.*

With implementation of mitigation, emissions of VOC, NOx, and CO would still exceed the CEQA thresholds of significance for construction and are therefore significant and unavoidable for the all three LRT alternatives. Although the regional construction impacts remain significant, the benefits of the project outweigh the temporary adverse effects associated with construction.

The proposed Regional Connector Transit Corridor project would improve transportation in the region, helping to remove vehicles from the region's roadways. Future operational emissions under the build alternatives are less than the baseline emissions for several pollutants.

4.5.4.1.2 Localized Significance Thresholds

Mitigated emissions were also compared to the SCAQMD's LST to evaluate significance. Mitigated emissions levels for each construction site would be less than the maximum allowable emissions under the LST methodology. Therefore, with implementation of mitigation, localized emissions from construction activities would be less than significant for the At-Grade Emphasis LRT Alternative. Data is available in Appendix Q.

4.5.4.2 Operational Mitigation Measures

Operational NOx emissions for the TSM Alternative would be significant under NEPA. Use of alternative fuels for the TSM buses may offset the significance of this impact, but this will need to be confirmed through future modeling. As such, it is assumed that the TSM Alternative's NOx emissions may remain significant after mitigation. Operational emissions were not found to be significant for either CEQA or NEPA for any of the other alternatives. As a result, no further mitigation measures are required for operational emissions.

4.6 Climate Change

This section summarizes the existing climate and greenhouse gas (GHG) conditions in the project area, and the potential impacts of the proposed alternatives on these conditions. The information in this section is based on the Climate Change Technical Memorandum, which is incorporated into this DEIS/DEIR as Appendix R.

4.6.1 Regulatory Framework

NEPA does not include specific requirements for analysis of potential impacts related to global climate change (GCC), and a specific quantitative threshold of significance was not established for this project. Incremental project emissions were determined for motor vehicles and project electricity use based on the change in VMT between each build alternative and the No Build Alternative. Changes in motor vehicle VMT were determined by the project traffic analysis for each alternative and include the potential project impacts for automobile and bus transit VMT and operation of light rail trains and new stations.

CEQA guidance provided by the SCAQMD and the California Natural Resources Agency requires examination of direct, indirect, and life-cycle emissions that would occur during project construction and operation. Significant impacts would occur if a project would exceed emissions thresholds determined by the lead agency or other applicable adopted state, regional, or local plan for the reduction or mitigation of GHG emissions. CEQA guidelines require quantification of GHG emissions over time in a specified geographic area, establishment of a significance threshold for cumulative contributions to climate change, analysis of GHG emissions as they pertain to specific project actions, and specification and monitoring of any mitigation measures needed to achieve specified emissions levels.

In addition, the following regulations and standards would apply to the climate change analysis for the Regional Connector project:

- Federal
  - Massachusetts et al. v. Environmental Protection Agency et al.
  - Mandatory GHG Reporting Rule (USEPA)
  - Endangerment Finding (USEPA)
  - American Clean Energy and Security Act of 2009
  - Clean Energy Jobs and American Power Act
- State
  - California Assembly Bill 1493
  - California Executive Order S-3-05
  - Global Warming Solutions Act of 2006 (Assembly Bill 32)
  - Senate Bill 97
  - CARB Interim Significance Thresholds
  - Senate Bill 375
- Local
  - SCAQMD Guidelines and Regulations

4.6.2 Affected Environment

As required by CEQA, existing (2009) emissions from regional traffic were estimated in the analysis to compare against future build alternatives. Data on VMT in the region and emission factors from the EMFAC2007 model were used to estimate emissions of GHG. The emissions calculations were based on the total VMT in the region and the average speed on the highway network. Since the EMFAC model only generates emissions of CO_2 and CH_4, the California Climate Action Registry (CCAR) General Reporting Protocol was used to estimate emissions of N_2O. Table 4-6.1 summarizes the results of the baseline GHG emissions.

4.6.3 Environmental Impacts/Environmental Consequences

Although thresholds of significance for GHG are not well-established, methodologies and protocols for analyzing GHG emissions have been extensively documented and were used in this analysis. The analysis used protocols established by the California Climate Action Registry (CCAR), namely the General Reporting Protocol (CCAR 2009) and the Local Government

Operations Protocol (CCAR 2008). Generally, GHG impact analyses follow the same quantification methodologies as air quality studies for criteria pollutants.

Table 4-6.1. Existing Conditions: 2009 Annual Highway Traffic GHG Emissions

	CO_2	CH_4	N_2O	Total[2]
Vehicle miles traveled (VMT)	N/A	N/A	N/A	304,212,400
Emission Factor (grams per mile)	365.210	0.028	0.173	N/A
Emissions (metric tons per year)	40,552,000	3,100	19,200	N/A
GWP	1	21	310	N/A
CO_2e Emissions[1] (metric tons per year)	40,552,000	65,100	5,952,000	46,569,100

Key:
CO_2 = carbon dioxide
CO_2e = carbon dioxide equivalent
CH_4 = methane
GWP = Global Warming Potential
N/A = not applicable
N_2O = nitrous oxide
Note:
[1]CO_2e emissions are weighted by the global warming potential (GWP) for each non-CO_2 pollutant (i.e., CO_2e equals emissions of non-CO_2 pollutant x GWP)
[2]Totals may vary due to rounding

Greenhouse gas emissions were calculated for direct and indirect sources of GHG, including engine exhaust and purchased electricity. Emissions were estimated for three GHG pollutants regulated under the Kyoto Protocol: CO_2, CH_4, and N_2O. Although the Kyoto Protocol also regulated three other GHG pollutants (hydrofluorocarbons [HFCs], perfluorocarbons [PFCs], and sulfur hexafluoride [SF_6]), these pollutants are not emitted as products of engine exhaust or purchased electricity and are not analyzed further herein . Emissions were converted to CO_2e using the GWPs in the IPCC's Second Assessment Report and documented in the Inventory of U.S. Greenhouse Gas Emissions and Sinks (USEPA 2009b).

Global warming potentials are defined by CARB as the radiative forcing impact (degree of warming to the atmosphere) of one mass-based unit of a given GHG relative to an equivalent unit of CO_2. For example, one ton of CH_4 is equivalent to approximately 21 tons of CO_2 in the atmosphere. Although the IPCC has released several updates to the Second Assessment Report (SAR) since its release in 1996, the international standard is to use the original SAR to maintain consistency with GHG emission inventories already compiled.

The construction analysis followed the SCAQMD's recommendation that construction emissions be amortized over 30 years (defined as life of a project) and added to the operational emissions.

Potential emissions of CO_2, CH_4, and N_2O from construction equipment (e.g., bulldozers, scrapers, graders, off-highway trucks, etc.) were calculated using the OFFROAD model, developed by CARB, for off-road engine exhaust emissions. Potential emissions of CO_2 and CH_4 were calculated using the EMFAC[3] model for on-road vehicles, and includes construction worker trips to the construction site, on-road haulage trucks, material delivery trucks, and equipment maintenance vehicles. Although N_2O emissions would also occur from the operation of on-road vehicles, the EMFAC model does not currently generate these emissions. Additionally, appropriate sources of GHG emissions were reviewed as part of this analysis to supplement the EMFAC model, as necessary.

The operational emissions analysis took into account engine exhaust emissions, which were calculated to quantify predicted reductions in VMT in the region; emissions resulting from the remote generation of electricity to run the light rail vehicles and to power the facilities at the new stations; and emissions generated by bus operations.

4.6.3.1 No Build Alternative

The No Build Alternative would not involve any new transit infrastructure as part of the Regional Connector project. No construction emissions would occur, and operational emissions would not increase as part of the project. All of the increase in GHG emissions beyond the existing year 2009 conditions shown in Table 4-6.1 would be due to the projected growth in regional traffic between 2009 and 2035. Table 4-6.2 summarizes the year 2035 No Build Alternative highway traffic GHG emissions. More detailed data is available in the Appendix R, Climate Change Technical Memorandum and Section 4.5, Air Quality.

4.6.3.1.1 NEPA Finding

The No Build Alternative describes a future condition where none of the build alternatives are implemented. As such, there would be no adverse climate change impact associated with the No Build Alternative. However, the No Build Alternative lacks the beneficial greenhouse gas reductions that the build alternatives would provide.

4.6.3.1.2 CEQA Determination

There would be no climate change impact associated with the No Build Alternative. However, the No Build Alternative lacks the beneficial greenhouse gas reductions that the build alternatives would provide.

4.6.3.2 TSM Alternative

The TSM Alternative includes all of the provisions of the No Build Alternative, plus two new shuttle bus lines linking 7th Street/Metro Center Station and Union Station. Only minimal construction activities would be needed, such as the installation of bus stops, and no construction-related emissions are anticipated. The TSM Alternative would result in a slight increase in CH_4 due to the increase in CNG bus operations. However, this is more than offset by the reduction in CO_2 emissions caused by the resulting decrease in regional traffic. The operational emissions benefits associated with the TSM Alternative are summarized in Table 4-6.3.

[3] The EMission FACtors (EMFAC) model is used to calculate emission rates from on-road motor vehicles in California. It is similar to the USEPA's MOVES2010 model but uses a fleet mix and assumptions specific to California.

Table 4.6-2. No Build Alternative 2035 Annual Highway Traffic GHG Emissions

	CO_2	CH_4	N_2O	Total[2]
Vehicle Miles Traveled (VMT)	n/a	n/a	n/a	504,632,600
Emission Factor (grams per mile)	578.319	0.015	0.173	N/A
Emissions (metric tons per year)	106,521,100	2,800	31,800	N/A
GWP	1	21	310	N/A
CO2e Emissions1 (metric tons per year)	106,521,100	58,800	9,858,000	116,437,900
Increment (compared to Existing Conditions [2009]) (metric tons per year)	65,969,100	(6,300)	3,906,000	69,868,800

Key:
CO_2 = carbon dioxide
CO_2e = carbon dioxide equivalent
CH_4 = methane
GWP = Global Warming Potential
N/A = not applicable
N_2O = nitrous oxide
Note:
[1]CO_2e emissions are weighted by the global warming potential (GWP) for each non-CO_2 pollutant (i.e., CO_2e equals emissions of non-CO_2 pollutant x GWP)
[2]Totals may vary due to rounding

4.6.3.2.1 NEPA Finding

The TSM Alternative would result in a regional decrease in GHG emissions compared to the No Build Alternative, though not to the extent that the build alternatives would. This would be a beneficial impact. The TSM Alternative would not have an adverse effect on climate change.

4.6.3.2.2 CEQA Determination

The TSM Alternative would result in a regional decrease in GHG emissions compared to the No Build Alternative, though not to the extent that the build alternatives would. This would be a beneficial impact. The TSM Alternative would not have a significant adverse effect on climate change.

4.6.3.3 Build Alternatives

The build alternatives would involve construction and operation of a new light rail link between 7th Street/Metro Center Station and the Little Tokyo/Arts District area. This would entail new emissions associated with train operation, powering station facilities, and powering train and system control systems. For each alternative, the regional reduction in GHG emissions due to traffic congestion relief outweighs the new emissions associated with construction activities and operation of the LRT trains and new facilities. All of the build alternatives result in an overall reduction in GHG emissions. Table 4-6.3 shows the construction, operations, and amortized total emissions for each alternative. More detailed data is available in the Appendix R, Climate Change Technical Memorandum and the Air Quality Section (Section 4.5).

4.6.3.3.1 NEPA Finding

The At-Grade Emphasis LRT Alternative, Underground Emphasis LRT Alternative, and Fully Underground LRT Alternative would result in a regional decrease in GHG emissions compared to the No Build Alternative. This would be a beneficial impact. No adverse climate change impacts would occur as a result of implementation of any of these alternatives.

4.6.3.3.2 CEQA Determination

The At-Grade Emphasis LRT Alternative, Underground Emphasis LRT Alternative, and Fully Underground LRT Alternative would result in a regional decrease in GHG emissions compared to the No Build Alternative. This would be a beneficial impact. No significant adverse climate change impacts would occur as a result of any of these alternatives.

Table 4-6.3. Summary of Incremental GHG Emissions (Operational and Construction) Compared to the No Build Alternative (2035)

Alternative	Annual CO2e Emissions (metric tons per year)		
	Construction[1]	Operations[2]	Amortized Total[3]
TSM Alternative	NA	(59,600)	(59,600)
At-Grade Emphasis LRT Alternative	2,500	(68,400)	(65,900)
Underground Emphasis LRT Alternative4	3,300-3,400	(70,800)	(67,500)
Fully Underground LRT Alternative4	3,800-3,900	(73,000)	(69,000-69,100)

Key:
NA = not applicable
Notes:
[1]Construction emissions include total emissions that would occur over the life of the construction phase (2014-2017) amortized over 30 years.
[2]Incremental project-related operational emissions (i.e., increment between future build alternative and No Build Alternative).
[3]Amortized construction emissions added to incremental operational emissions. Totals may vary slightly due to rounding.
[4]A range of amortized construction emissions for the Underground Emphasis LRT Alternative and Fully Underground LRT Alternative is shown to account for slight variations due to multiple station location and construction method options.

4.6.4 Mitigation Measures

None of the proposed build alternatives would have adverse climate change impacts. No mitigation measures are required.

4.7 Noise and Vibration

This section summarizes the methodology and assumptions used to analyze potential effects from noise and vibration generated during construction and operation of the proposed build alternatives. Potential noise and vibration impacts of the proposed alternatives are evaluated in this section. Information in this section is based primarily on the Noise and Vibration Technical Memorandum prepared for the project and contained in Appendix S, Noise and Vibration of this DEIS/DEIR.

4.7.1 Regulatory Framework

4.7.1.1 Federal Transit Administration

Noise Standards

The noise impact analysis for this project is based on criteria defined in the *FTA Transit Noise and Vibration Impact Assessment* (USDOT 2006). The standards are based on community reaction to noise and evaluate potential changes to existing noise using a sliding scale. If existing noise is already high, a potential project is more limited in the amount of noise it can create.

Table 4.7-1 and Figure 4.7-1 show the FTA noise criteria used to determine "moderate" and "severe" levels of impact. Under NEPA, a "severe" level of impact is considered an adverse impact. In Table 4.7-1, the first column shows existing noise exposure, and the remaining columns show additional noise exposure caused by a potential transit project which is used to determine the level of impact. The future noise exposure would be the combination of existing noise exposure and the additional noise exposure caused by the Regional Connector Transit Corridor project. As the existing noise exposure increases in a particular location, the amount of the allowable increase in the overall noise exposure caused by the project decreases.

In an urban setting, a change of 1 dBA or less is generally not detectable by the human ear while a change of 3 dBA will be noticeable to most people. A change of 5 dBA is readily perceived. A change of 10 dBA, up or down, is typically perceived as a doubling or halving of an urban noise level, respectively.

Some land use types are more sensitive to noise than others. For example, parks, churches, and residences are typically more noise-sensitive than industrial and commercial areas. The FTA noise impact criteria classify sensitive land uses into three categories:

- Category 1: Buildings or parks where low noise is an essential element of their purpose (e.g., amphitheaters and concert pavilions)
- Category 2: Buildings where people normally sleep, including residences, hospitals, and hotels where nighttime sensitivity is assumed to be of utmost importance
- Category 3: Institutional land uses with primarily daytime uses that depend on low noise as an important part of operations (e.g., schools, libraries, churches, theaters, and places of study)

Vibration Standards

FTA has developed impact criteria for ground-borne vibration (GBV), which is expressed as a velocity level in units of VdB, and ground-borne noise (GBN) due to transit project construction and operation of transit vehicles (USDOT 2006). Ground-borne noise is created when a vibration source such as a train pass-by causes vibration of floors and walls in nearby buildings resulting in a low frequency rumble sound within the building. Impacts of ground-borne noise are particularly important for underground transit operations. At-grade and above ground transit operations create airborne noise in greater amounts through other processes, so ground-borne noise is typically less of a specific concern for these type of operations.

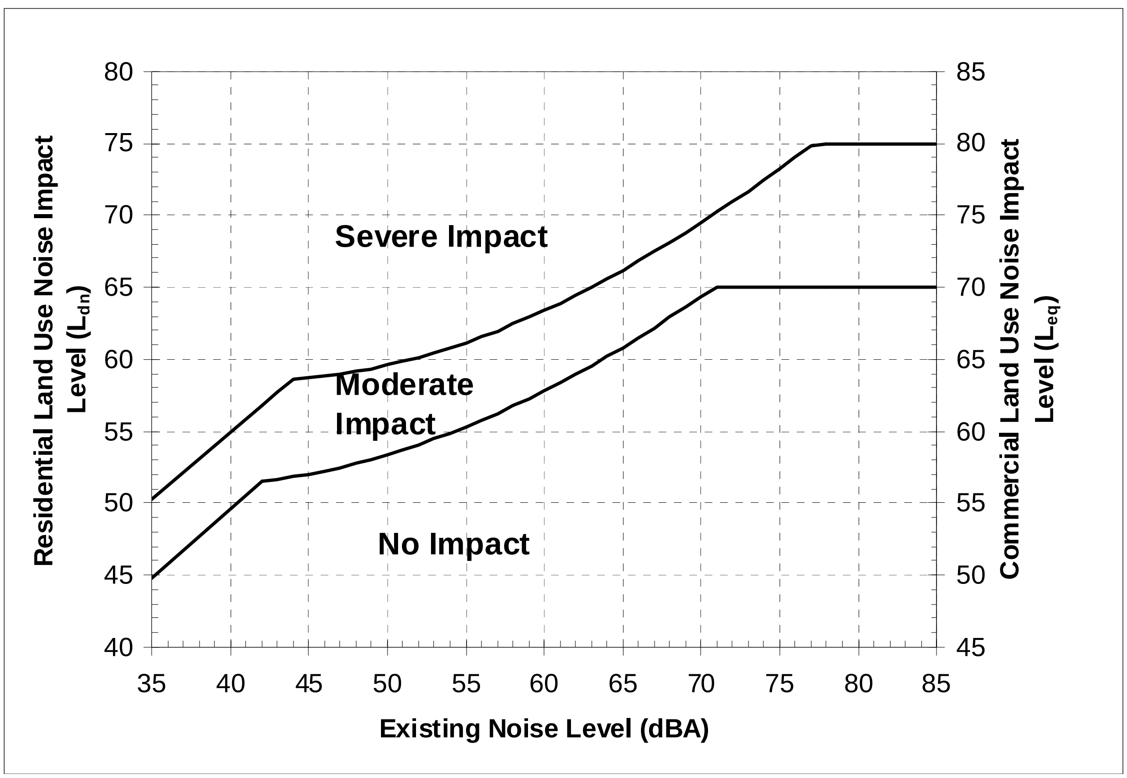
Table 4.7-1. Noise Impact Criteria

Existing Noise Exposure Leq or Ldn1	Project Noise Exposure Impact Thresholds: Ldn or Leq1 (all noise levels in dBA)			
	Category 1 or 2 Sites		Category 3 Sites	
	Moderate Impact	Severe Impact	Moderate Impact	Severe Impact
<43	Amb.+10	Amb.+15	Amb.+15	Amb.+20
43-44	52	58	57	63
45	52	58	57	63
46-47	53	59	58	64
48	53	59	58	64
49-50	54	59	59	64
51	54	60	59	65
52-53	55	60	60	65
54	55	61	60	66
55	56	61	61	66
56	56	62	61	67
57-58	57	62	62	67
59-60	58	63	63	68
61-62	59	64	64	69
63	60	65	65	70
64	61	65	66	70
65	61	66	66	71
66	62	67	67	72
67	63	67	68	72
68	63	68	68	73
69	64	69	69	74
70	65	69	70	74
71	66	70	71	75

Table 4.7-1. Noise Impact Criteria (continued)

Existing Noise Exposure Leq or Ldn1	Project Noise Exposure Impact Thresholds: Ldn or Leq1 (all noise levels in dBA)			
	Category 1 or 2 Sites		Category 3 Sites	
	Moderate Impact	Severe Impact	Moderate Impact	Severe Impact
72-73	66	71	71	76
74	66	72	71	77
75	66	73	71	78
76-77	66	74	71	79
>77	66	75	71	80

Source: Transit Noise and Vibration Impact Assessment, FTA, May 2006



Notes: [1]Ldn is used for land uses where nighttime sensitivity is a factor; Daytime Leq is used for land uses involving only daytime activities.

Figure 4.7-1. Noise Impact Criteria for Transit Projects

There appears to be a relationship between the number of perceived vibration events and the degree of annoyance caused by the vibration. It is intuitive to expect that more frequent vibration events, or events that last longer, will be more annoying to building occupants. FTA guidelines address vibration frequency by applying different levels of annoyance criteria based on number of transit vibration events per day.

A different analysis is used for vibration from construction activities that could cause damage to sensitive buildings. When assessing the potential for building damage, GBV is usually expressed in terms of the peak particle velocity (PPV) in units of inches per second. As defined in Section 7.1.2 of the *FTA Transit Noise and Vibration Impact Assessment*, "The peak particle velocity (PPV) is defined as the maximum instantaneous positive or negative peak of the vibration signal. PPV is often used in monitoring of blasting vibration since it is related to the stresses that are experienced by buildings."

PPV is used for evaluating the potential for building damage, because it shows the peak of the vibration signal, which is what could cause stress to the structure of a building. Vibration sensitivity of a land use is described by using the root mean square (RMS) or the "smoothed" vibration amplitude. This is typically "the square root of the squared amplitude of the average of the squared amplitude of the signal. The average is typically calculated over a one-second period" (FTA May 2006).

In short RMS, shown with the abbreviation "VdB," is used to evaluate human response to the vibration signals, and PPV is used to evaluate the potential for building damage.

The threshold of vibration perception for most humans is around 65 to 70 VdB. Levels in the 70 to 75 VdB range are often noticeable but acceptable. Levels greater than 80 VdB are often considered unacceptable.

Table 4.7-2 summarizes the FTA impact criteria for GBV and GBN. Some buildings, such as concert halls, television and recording studios, and theaters, can be very sensitive to vibration but are not included in the three listed categories. These types of buildings, noted in Table 4.7-3, usually warrant special attention during the environmental review and engineering/pre-construction phases of a project. Table 4.7-2 and Table 4.7-3 list impact criteria for transit operations. Following FTA guidance, some criteria in Table 4.7-2 may also be used to assess human annoyance caused by vibration from construction activities.

In addition to human annoyance from transit operations, FTA guidelines also address the potential for construction-activity-induced vibration to damage buildings. The potential for GBV to cause damage to a building varies by the type of materials and structural techniques used to construct each building. FTA vibration damage criteria for various structural categories are listed in Table 4.7-4.

FTA guidelines suggest minimum safe distances between construction equipment and buildings based on the types of construction equipment and the category of a building (see Table 4.7-4). Minimum safe distances between construction and nearby buildings are presented in Table 4.7-5. For example, minimum safe distance between the most invasive method of construction (impact pile driving) and a Category IV building (the most vibration sensitive type of building) would be at least 136 feet. Conversely, a small bulldozer could safely operate less than five feet from a Category I building (the least vibration-sensitive type of building).

Ground-borne noise (GBN) from at-grade or open excavation construction activities is rarely a concern because the airborne noise from the activity would likely dominate the noise environment. While not generally likely, some GBN from underground construction activity such as tunneling could occasionally be audible. However, this GBN would be temporary and of short duration as the construction activity moves along the project alignment.

This project would not involve impact or sonic pile driving or large vibratory rollers. As a result, the minimum safe distance between construction activities and buildings would never exceed 37 feet for this project. Distances in Table 4.7-5 are approximations based on typical equipment and construction activities and the general classification of structures.

Table 4.7-2. FTA Ground Borne Vibration (GBV) and Ground-Borne Noise (GBN) Impact Criteria for General Assessment

Land Use Category	GBV Impact Levels (VdB re: 1 Micro-inch/sec)			GBN Impact Levels (dB re: 20 micro-Pascals)		
	Frequent Events[1]	Occasional Events[2]	Infrequent Events[3]	Frequent Events[1]	Occasional Events[2]	Infrequent Events[3]
Category 1: Buildings where vibration would interfere with interior operations	65 VdB4	65 VdB4	65 VdB4	N/A4	N/A[4]	N/A[4]
Category 2: Residences and buildings where people normally sleep	72 VdB	75 VdB	80 VdB	35 dBA	38 dBA	43 dBA
Category 3: Institutional land uses with primarily daytime use	75 VdB	78 VdB	83 VdB	40 dBA[5]	43 dBA[5]	48 dBA[5]

Source: Transit Noise and Vibration Impact Assessment (USDOT 2006)
Notes:
1 *"Frequent Events" are defined as more than 70 vibration events of the same source per day. Most rapid transit projects fall into this category.*
2 *"Occasional Events" are defined as between 30 and 70 vibration events of the same source per day. Most commuter rail lines produce at least this many events.*
3 *"Infrequent Events" are defined as fewer 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. Buildings used for vibration-sensitive manufacturing or research will require detailed evaluation to define acceptable vibration levels. Ensuring lower vibration levels in a building often requires special design of the HVAC systems and stiffened floors.*
5 *Vibration –sensitive equipment is generally not sensitive to ground-borne noise.*

Table 4.7-3. FTA Ground Borne Vibration (GBV) and Ground-Borne Noise (GBN) Impact Criteria for Special Buildings

Type of Building or Room	GBV Impact Levels (VdB re: 1 micro inch/sec)		GBN Impact Levels (dB re: 20 micro Pascals)	
	Frequent Events[1]	Occasional or Infrequent Events[2]	Frequent Events[1]	Occasional or Infrequent Events[2]
Concert Halls	65 VdB	65 VdB	25 dBA	25 dBA
Television Studios	65 VdB	65 VdB	25 dBA	25 dBA
Recording Studios	65 VdB	65 VdB	25 dBA	25 dBA
Auditoriums	72 VdB	80 VdB	30 dBA	38 dBA
Theaters	72 VdB	80 VdB	35 dBA	43 dBA

Source: Transit Noise and Vibration Impact Assessment (USDOT 2006)
Notes:
[1] "Frequent Events" are defined as more than 70 vibration events of the same source per day. Most rapid transit projects fall into this category.
[2] "Occasional Events" are defined as between 30 and 70 vibration events of the same source per day. Most commuter rail lines have this many events.

Table 4.7-4. FTA Construction Vibration Damage Criteria

Building Category and Description	PPV (in/sec)
I. Reinforced-concrete, steel, or timber (no plaster)	0.5
II. Engineered concrete and masonry (no plaster)	0.3
III. Non-engineered timber and masonry buildings	0.2
IV. Buildings extremely susceptible to vibration damage	0.12

Source: Federal Transit Administration's Transit Noise and Vibration Impact Assessment Manual, May 2006. FTA-VA-90-1003-06. Table 12-3.

4.7.1.2 California Environmental Quality Act (CEQA)

Neither CEQA nor the City of Los Angeles provides quantitative thresholds for a substantial noise impact or a significant adverse vibration impact. This analysis applies FTA criteria to determine the threshold for significance. More information regarding these regulations and criteria is available in Appendix S.

Table 4.7-5. Calculated "Minimum Safe Distances" from Construction Equipment to Reduce Potential for GBV Damage (ft)

Equipment		Building Categories and (FTA Guideline Damage Thresholds)			
		Cat I (0.5 PPV) Inch/sec	Cat II (0.3 PPV) Inch/sec	Cat III (0.2 PPV) Inch/sec	Cat IV (0.12 PPV) Inch/sec
Pile Driver (Impact)	Upper Range	53	74	97	136
	Typical	30	42	55	77
Pile Driver (Sonic)	Upper Range	33	46	60	84
	Typical	13	18	23	32
Large Vibratory Roller		15	20	26	37
Hoe Ram		8	12	15	21
Large Bulldozer		8	12	15	21
Caisson drilling		8	12	15	21

4.7.2 Affected Environment

An assessment of existing noise conditions along the Regional Connector Transit Corridor alternatives alignments was conducted to establish a baseline by which alternatives could be evaluated. Figure 4.7-2 shows noise monitoring locations and FTA land use categories within the project area. Table 4.7-6 lists noise sensitive uses within the screening distance for the build alternatives.

Noise levels were measured at nine locations to establish the existing noise environment. The measurements included seven 24-hour and three short-term, 10-minute measurements. Existing noise levels are typical of an urban environment. The average day-night noise level (Ldn) ranges from 69 to 74 dBA. Most of the noise came directly from nearby or distant sources where there was no intervening terrain or buildings, some noise came from sources not in direct view that were partially shielded by a building, and some measured noise was reflected off one or more structures.

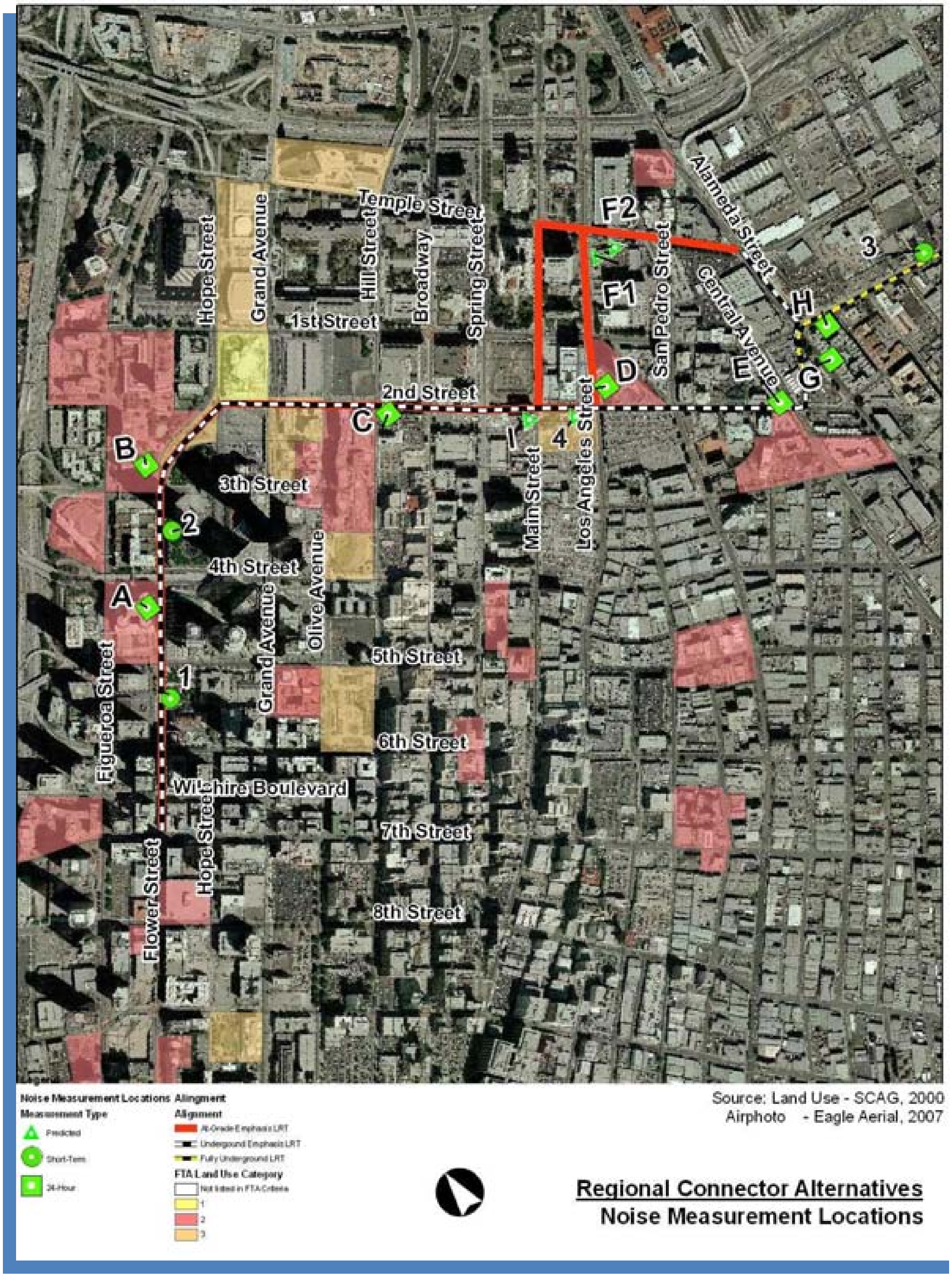


Figure 4.7-2. Noise Measurement Locations (Site #) and Sensitive Land Uses

Table 4.7-6. Noise Sensitive Land Use within Screen Distance

Name	Location	Build Alternative within Screen Distance	Land Use Category
Park at Central Library	200 N Main Street	ALRT, ULRT, FULRT	3
Bonaventure Hotel	404 South Figueroa Street	ALRT, ULRT, FULRT	2
World Trade Center Tennis Courts	333 South Figueroa Street	ALRT, ULRT, FULRT	3
Open Space Bank of America Building Plaza	333 Hope Street	ALRT, ULRT, FULRT	3
Bunker Hill Towers	234 South Figueroa Street	ALRT, ULRT, FULRT	2
Kawada Hotel	200 South Hill Street	ALRT, ULRT, FULRT	2
Higgins Building	108 South West 2nd Street	ALRT, ULRT, FULRT	2
Saint Vibiana	206 South Main Street	ALRT, ULRT, FULRT	3
Los Angeles Library Little Tokyo Branch	203 South Los Angeles Street	ALRT, ULRT, FULRT	3
New Otani Hotel	120 South Los Angeles Street	ALRT, ULRT, FULRT	2
Temple Street Jail	150 North Los Angeles Street	ALRT	2
Hikari Lofts	375 East 2nd Street	ALRT	2
JANM	369 East 1st Street	ULRT, FULRT	3
Savoy – Alameda Street	100 South Alameda Street	ULRT, FULRT	2
Los Angeles Hompa Hongwanji Temple	815 E 1st Street	FULRT	3
Los Angeles Metropolitan Detention Center	535 North Alameda Street	FULRT	2

ALRT = At-Grade Emphasis LRT Alternative; ULRT = Underground Emphasis LRT Alternative; FULRT = Fully Underground LRT Alternative.
** The Disney Concert Hall was analyzed for vibration effects only because all of the alternatives are below grade in the vicinity of the concert hall (site DH), which would attenuate noise resulting in no potential for airborne noise impact.*

Noise levels were measured at four locations along Flower Street, Sites 1, 2, A, and B shown on Figure 4.7-2.

- Site 1: A short-term (10-minute) measurement was conducted at the park area outside of the Los Angeles Library on Flower Street. A one-hour Leq of 67 was measured at 2:00 p.m. and a peak-hour Leq of 68 dBA was estimated at this location based on the 24-hour measurement obtained at the Westin Bonaventure. Noise levels at this location are dominated by traffic noise from Flower and 5th Streets.

- Site 2: A short-term measurement was conducted in the Bank of America Building Plaza. The plaza is located five floors above Flower Street at the same level as the tennis courts of the World Trade Center located on the north side of Flower Street. A one-hour Leq of 61 was measured at 1:15 p.m. and a peak-hour Leq at Site B is estimated at 63 dBA. Noise levels at this location are dominated by traffic noise from Flower Street.

- Site A: A 24-hour measurement was conducted on the pool deck of the fourth floor of the Westin Bonaventure. An Ldn of 71 dBA and a peak-hour Leq of 68 dBA was measured at 6:00 a.m.

- Site B: A 24-hour measurement was obtained outside the ground-floor condominiums of the Bunker Hill Towers at Flower and 3rd Streets. An Ldn of 74 dBA and a peak-hour Leq of 72 dBA were measured at 8:00 a.m. Noise levels at this location are dominated by traffic noise from Flower and 3rd Streets.

Noise measurements were obtained at two locations along 2nd Street, Sites C and E and existing conditions were estimated at Site I, as shown on Figure 4.7-2.

- Ambient noise exterior to the Disney Concert Hall (DH) was not measured because the alternatives are underground near the DH and the use is indoors with substantial sound attenuation furnished by the building's exterior façade. The DH was included in the modeling of potential vibration impacts.

- Site C: A 24-hour measurement was conducted on the roof of the Kawada Hotel at the intersection of 2nd and Hill Streets. An Ldn of 70 dBA and a peak hour Leq of 70 dBA were measured at 4:00 p.m. Noise levels at this location are dominated by traffic noise from 2nd and Hill Streets.

- Site E: A 24-hour measurement was conducted on the roof of the Hikari Loft Apartments at the intersection of 2nd Street and Central Avenue. A 24-hour Ldn of 69 dBA and a peak hour Leq of 71 dBA were measured at 7:00 p.m. Noise levels at this location are dominated by traffic noise from 2nd Alameda Streets and Central Avenue.

- Site I: Noise levels for Site I, the Higgins Building at the northwest corner of 2nd and Main Streets, were estimated based on the measurements at Sites C and D. Existing noise levels could not be accurately measured due to construction at Saint Vibiana and on Main Street.

- Site 4: This site, which lies on 2nd Street between Main and Los Angeles Streets, includes Saint Vibiana and the Los Angeles Library, Little Tokyo Branch. Existing noise levels could not be accurately measured due to construction at Saint Vibiana and on Main Street. Peak hour noise levels were estimated based on the measurements at Site D on the southeast corner of 2nd and Los Angeles Streets.

- No Category 1, 2 or 3 land uses are located on Main Street; thus, measurements were not recorded there.
- Site D: A 24-hour measurement was conducted at the ground level of the New Otani Hotel midway between 2nd and 1st Streets. This location most approximated noise levels in the tower that houses guest rooms. An Ldn of 73 dBA and a peak hour Leq of 73 dBA were measured at 7:00 a.m. and 6:00 p.m., respectively. Noise levels are dominated by traffic noise from Los Angeles Street.
- Sites F and F1: On Temple Street, sensitive land uses exist where the Metropolitan Detention Center is located. Due to construction on Temple Street, and actives at the jail, representative existing noise levels could not be measured. Noise levels for Sites F and F1 were estimated based on measurements at Sites D and H.
- Site G: A 24-hour measurement was conducted at ground level to approximate noise in certain units of the Savoy Condominium where traffic noise levels are dominated by street traffic on Alameda Street. An Ldn of 73 dBA and a peak hour Leq of 75 dBA were measured at 7:00 p.m.
- Site H: A 24-hour measurement was conducted at ground level to approximate noise in certain condo units in the Savoy Condominium building where noise levels are dominated by the traffic on 1st Street and train noise from Metro Gold Line operations. An Ldn of 72 dBA a peak hour Leq of 72 dBA were measured at 7:00 p.m.
- Site 3: A short-term measurement was conducted at ground level on East 1st Street, between Garey and Vignes Streets. This location approximates existing noise effects on the meeting room and meditation area of the Los Angeles Hompa Hongwanji Temple. Ambient noise levels at Site 3 are dominated by traffic on 1st Street and train noise from the Metro Gold Line operations. A one-hour (non-peak) Leq of 66 was measured at 2:00 p.m. At the time of this measurement, lane closures were in effect along 1st Street. This resulted in a lower ambient Leq than would have been expected if all lanes were open. Based on the long-term measurement at site H, the peak hour Leq at Site 3 was calculated at 70 dBA.

For more information regarding existing noise levels within the project area, please refer to Appendix S.

4.7.3 Environmental Impacts/Environmental Consequences

The following sections summarize the evaluation of potential noise and vibration impacts for each alternative. Table 4.7-7 summarizes the results of the analysis.

Table 4.7-7. Summary of Potential Noise and Vibration Impacts

Alternative	Construction Impacts		Operational Impacts		Mitigation Required
	Noise	Vibration	Noise	Vibration	
No Build	None	None	None	None	None
TSM	None	None	None	None	None
At-Grade Emphasis LRT	None	Adverse effect (mitigated)	Adverse Ground-borne (mitigated)	None	Mitigation proposed
Underground Emphasis LRT	None	Adverse effect (mitigated)	None	None	Mitigation proposed
Fully Underground LRT	None	Adverse effect (mitigated)	None	None	Mitigation proposed

Potential noise and vibration impacts from transit operations and construction are analyzed and compared to the existing conditions as described in Section 4.7.2.

The analysis of construction effects is based on Chapter 3 of the Construction Staging Plan from the Traffic Handling and Construction Staging Report (CDM 2009). Each of the build alternatives would utilize different construction methods, so each alternative would potentially generate different levels of construction noise and vibration. The Traffic Handling and Construction Staging Report estimates a four- to five-year construction period with surface street disruption of approximately 24 to 48 months for all build alternatives (CDM 2009). This analysis considered both daytime and nighttime construction activities using the procedures presented in Chapter 12 of the FTA guidance manual (U.S. Department of Transportation 2006).

Analysis of potential project-related noise levels for the build alternatives was based on FTA reference sound levels (U.S. Department of Transportation 2006) and sound level data from current Metro Blue and Gold Line operations. This analysis used the project assumptions about how the project would be operated (speed, headways, and schedule) in estimating ridership, fare revenue, and other impacts. Operation noise and vibration sources could include the movement of vehicles along each alignment (pass-by), noise from warning signals, locations of special trackwork, ventilation related noise, and operation of traction power substations (TPSS).

Vibration impacts from light rail transit operations are generated by motions and actions at the wheel/rail interface. Vibration from passing trains has a small potential to traverse geologic strata and negatively impact near-by sensitive buildings. However, the principal concern with light rail transit vibration is potential annoyance to building occupants. It is extremely unlikely that GBV from transit operations would cause any damage to buildings.

The potential for vibration and ground-borne noise impacts resulting from the build alternatives was determined using the vibration assessment information and procedures contained in Chapters 7, 8, and 10 of the FTA's guidance manual for a general vibration assessment (U.S.

Department of Transportation 2006). Ground attenuation of vibration was based on FTA reference data (U.S. Department of Transportation 2006). The conversion from vibration level to ground-borne noise level was based on the conversion factors in the FTA manual and measurements taken from the transit vehicles operating on the Metro Gold Line that the Regional Connector will join. To provide a very conservative analysis, the "typical" conversion factor of -35 dB was used to calculate the GBN level. A train traveling 50 (MPH) per-hour was used to estimate vibration levels whereas the Regional Connector trains would be travelling at 35 MPH maximum and would generate lower vibration levels.

All estimates of GBV from the potential project alignments were projected to the foundations of the nearest building. The vibration estimates do not include adjustments for calculations of a building's specific reaction to ground-borne vibration. Predicted GBV and GBN levels were compared to FTA criteria to determine potential impacts.

4.7.3.1 No Build Alternative

Automobile traffic would be the only likely source of increased noise levels under the No Build Alternative. However, traffic in the project area is already at or above road capacity, so increases in automobile traffic volumes are not expected to change existing 24-hour (Ldn) noise levels. New sources of vibration would not be proposed by this alternative and major construction activities would not occur under the No Build Alternative. Therefore, significant noise or vibration impacts are not anticipated under the No Build Alternative.

4.7.3.1.1 NEPA Finding and CEQA Determination

The No Build Alternative would have no effect on existing noise and vibration levels.

4.7.3.2 TSM Alternative

Major construction activities would not occur under the TSM Alternative; therefore, construction noise or vibration impacts would not occur under the TSM Alternative. This alternative would add bus routes along Alameda, Temple, 2nd, 3rd, 5th, 7th, Flower, Figueroa, and Olive Streets and Grand Avenue. Existing noise levels along proposed bus routes are substantially higher and would mask the noise of additional buses. Operation of additional buses along the proposed route would not result in a noticeable increase in vibration levels. Under FTA criteria, the potential increase in noise and vibration from this alternative would not result in a significant noise impact.

4.7.3.2.1 NEPA Finding and CEQA Determination

The TSM Alternative would not have adverse or significant noise and vibration impacts associated with either construction or operation.

4.7.3.3 At-Grade Emphasis LRT Alternative

4.7.3.3.1 Construction Noise and Vibration

Under the At-Grade Emphasis LRT Alternative, the following construction activities would have the most potential for noise and vibration impacts: cut and cover construction of a tunnel on Flower Street; cut and cover construction of the proposed Flower/6th/5th Street station; cut and cover construction of the proposed 2nd/Hope Street station; and re-grading of Alameda Street near the junction at Alameda and Temple Streets. These four activities have the most potential for noise impacts because of their duration and their proximity to noise-sensitive land uses.

Construction activities, relevant construction equipment, and related noise levels for this alternative are shown in Table 4.7-8.

Table 4.7-8. Construction Activity and Equipment Typical Noise Levels in dBA at 50 feet from Source for the At-Grade Emphasis LRT Alternative

Activity	Duration (months)	Construction Equipment				
		Concrete Truck	Dozer	Excavator	Crane	Drill Rig
Pre-Construction	4-6	NA	NA	NA	NA	90
Site Preparation	6-12	77	85	82	NA	NA
Flower Street Cut and Cover Tunnel	24-48	77	85	82	81	90
Flower/6th/5th Cut and Cover Station	24-48	77	85	82	81	90
Portal on Flower South of 3rd	12-18	77	85	82	81	90
Portal northeast of Flower and 3rd	TBD	77	85	82	81	90
2nd/Hope Street Cut and Cover Station	24-28	77	85	82	81	90
New Portal into 2nd Street Tunnel	TBD	77	85	82	81	90
Surface Trackwork	12-18	77	85	82	81	NA
Main and Los Angeles At-Grade Stations	12-18	77	85	82	81	90
Temple and Alameda Junction	24-36	77	85	82	81	90
Operating Systems Installation	TBD	TBD	TBD	TBD	TBD	TBD

Construction would comply with Section 41.40(a) of the Los Angeles Municipal Code. The contractor would also be responsible for complying with the applicable local ordinance as it applies to all equipment on the job or related to the job, including but not limited to trucks, transit mixers or transient equipment that may or may not be owned by the contractor. The Los Angeles Municipal Code section 41.40(a) does not set acceptable noise level limits for either daytime or nighttime construction activities. If a noise variance is required, the noise variance will set the acceptable noise level limits.

Typical types of mitigation measures and Best Management Practices (BMPs) the contractor can use to meet the acceptable limits include, but are not limited to, the following:

- Placement of temporary noise barriers around the construction site;
- Placement of localized barriers around specific items of equipment or smaller areas;
- Use of alternative back-up alarms/warning procedures;
- Higher performance mufflers on equipment used during nighttime hours; and
- Portable noise sheds for smaller, noisy, equipment, such as air compressors, dewatering pumps, and generators.

Compliance with applicable local ordinances and implementation of BMPs would ensure that noise and vibration levels associated with construction of the At-Grade Emphasis LRT Alternative would not result in a significant adverse impact.

However, sensitive and historic buildings in the vicinity of construction activities may be susceptible to vibration (GBV) damage. Construction of the project would not involve impact or sonic pile driving (pre-auguring would be used for installation of the soldier piles instead) or large vibratory rollers. Therefore, equipment such as large bulldozers and drill rigs would be the main construction vibration sources. Based on the minimum safe distances identified for Category IV buildings of 0.12 inch/sec Peak Particle Velocity (PPV) in Table 4.7-5, the minimum safe distance between construction activities (involving large bulldozers and drill rigs) and buildings would be 21 feet according to FTA guidelines for minimum safe distances (Table 4.7-5). Therefore, sensitive and historic buildings within 21 feet of construction may be susceptible to vibration damage.

A survey of structures within 21 feet of the anticipated vibration-producing construction activity would be conducted to assess the building category and the potential for GBV to cause damage. During construction, use of building protection measures such as underpinning, soil grouting, or other forms of ground improvement, use of lower vibration equipment and/or construction techniques, combined with a geotechnical and vibration monitoring program would be used to protect identified historic and sensitive structures. With implementation of mitigation measures identified in Section 4.7.4, construction-related vibration impacts to historic and sensitive buildings, located within 21 feet of the anticipated vibration-producing construction activity, would be reduced to less than significant.

Large bulldozer and drill rigs, the main construction vibration sources, could exceed levels specified in FTA annoyance criteria for sensitive receptors (See Table 4.7-2). However, perceptible vibration from construction equipment would be short-term and intermittent and, therefore, considered an "infrequent event" (occurring less than 30 times a day) as defined by FTA. Sensitive receptors located along the alignment are considered Category 2 and Category 3 land uses under the FTA annoyance criteria. Taking into account a 10 dBA reduction in vibration for coupling to building foundation loss (Table 10-1, FTA, 2006), occupants would not be subject to vibration annoyance impacts. It should be noted that large bulldozers and drill rigs would operate intermittently and would not be used every day of construction. In addition, construction of the alignment would not dwell in one location for the entire duration of construction. Therefore, vibration impacts (including ground-borne noise) associated with large bulldozer and drill rigs would be less than significant.

4.7.3.3.2 Transit Operation Noise

Operation of the At-Grade Emphasis LRT Alternative could generate six potential sources of noise impacts: pass-by from LRT vehicles, warning signals for at-grade crossings, areas of special trackwork, grade separation, ventilation shafts, and traction power substations (TPSS).

Pass-by Impacts:

Noise modeling for the At-Grade Emphasis LRT Alternative assumes a three-car train with 2.5-minute headways during peak hours (6:00 a.m. to 9:00 a.m. and 3:00 p.m. to 7:00 p.m.) and 5-minute headways during off peak hours (5:00 a.m. to 6:00 a.m., 9:00 a.m. to 3:00 p.m., and 7:00 p.m. to 1:00 a.m.). There would be no regularly planned service between 1:00 a.m. and 5:00 a.m. However, Metro may run trains later during special events like New Years Eve. The model assumes trains will travel at 35 MPH along Flower and Temple Streets and 25 MPH along 2nd, Main, and Los Angeles Streets.

As shown in Table 4.7-9, the analysis predicts three potential "moderate" level noise impacts from LRT vehicle pass-bys under this alternative. Two impacts would occur on 2nd Street on the ground floor of the Kawada Hotel and the Higgins Building. One impact would occur on Los Angeles Street on the ground floor of the New Otani Hotel. These noise impacts are below "severe" level of change and, therefore, are not considered adverse impacts.

Warning Signals:

Warning signals near at-grade rail crossings that include bells and train horns could generate noise impacts and increase potential impacts caused by LRT pass-bys. The At-Grade Emphasis LRT Alternative would make LRT trains run with existing traffic signals. Warning signals would not be regularly used by LRT trains. No noise impacts from at-grade warning signals are expected to result under this alternative.

Special Trackwork:

The At-Grade Emphasis LRT Alternative would require special trackwork for turnouts, which allow trains to move from one track to another, and crossovers, which allow trains to move between parallel tracks. Noise from switches or crossovers comes from a small gap in the central part of the switch, which could increase noise levels up to 6 dBA locally.

The At-Grade Emphasis LRT Alternative would have two areas of special trackwork: an at-grade crossover on 2nd Street near Broadway and an at-grade junction near Temple Street and Alameda to connect to the Metro Gold Line tracks. Noise-sensitive land uses do not exist near areas of special trackwork. Noise impacts from special trackwork are not predicted.

Grade Separation:

Under this alternative, a vehicular underpass would be constructed at Alameda and 1st Streets to provide a grade separation between trains and vehicles. Traffic on Alameda, Temple and 1st

Streets would not increase and, therefore, traffic noise levels along Alameda Street from 2nd to 1st Streets are not expected to increase as a result of this alternative.

Ventilation Shafts and TPSS:

Ventilation shafts and TPSSs would be designed in accordance with Metro system-wide design criteria noise guideline of 50 dBA at 50 feet or the nearest residential building, whichever is closer. Under this alternative, noise levels associated with ventilation and TPSSs would be far lower than current ambient noise levels and would not exceed FTA noise impact criteria. No significant, adverse noise impact would occur.

4.7.3.3.3 Transit Operation Vibration

The At-Grade Emphasis LRT Alternative would have two potential sources of vibration impacts during operations: transit vehicle pass-bys and special trackwork.

Vibration modeling for the At-Grade Emphasis LRT Alternative uses the same assumptions about train traffic as the noise impact analysis. Based on FTA's generalized ground surface vibration curves, adverse vibration impacts are not predicted from LRT vehicle pass-bys under this alternative (USDOT 2006). However, ground-borne noise impacts at Site C and Site D are predicted to occur from LRT vehicle pass-bys under this alternative, as presented in Table 4.7-10. These predicted levels do not reflect any adjustment of the vibration levels to account for expected attenuation from the building's foundation coupling loss. With implementation of mitigation, ground-borne noise impacts would be reduced to less than significant.

As indicated above, the areas of special trackwork are not located near any vibration-sensitive land uses. Thus, adverse vibration impacts from special trackwork are not predicted under this alternative.

4.7.3.3.4 NEPA Finding and CEQA Determination

Construction of the At-Grade Emphasis Alternative would not have adverse impacts from vibration. Implementation of proposed mitigation measures would result in a less than significant impact to sensitive or historic buildings within 21 feet of the construction. All other potential noise and vibration impacts associated with construction would be less than significant. Mitigation measures would reduce potential noise and vibration impacts from construction to less than significant levels.

Noise impacts in the entire project area associated with LRT vehicle pass-by would be below "severe" impact levels. Thus, the At-Grade Emphasis Alternative would not have adverse noise impacts related to LRT vehicle pass-by. "Moderate" noise impacts from LRT vehicle pass-bys would not result in a substantial permanent increase in ambient noise levels and potential impacts would not be significant. Ground-borne noise impacts associated with LRT vehicle pass-bys project operation would occur at Sites C and D but would be reduced below the significance threshold by mitigation. All other noise and vibration impacts from operations would not be adverse or significant.

Table 4.7-9. At-Grade Emphasis LRT Predicted Noise Levels and Impacts

Site #	Receptor Description	At-Grade LRT Segment	FTA Land Use[1]	Existing Ldn[2] (dBA)/ Peak Hour Leq (dBA)	Predicted Project Ldn[2] (dBA)/Peak Hour Leq (dBA)	Noise Impact Criteria for Predicted Project Noise Moderate/Severe[3]	Predicted Existing + Project Ldn[2] (dBA)/ Peak Hour Leq (dBA)	Number of Noise Impacts: Moderate SF[4]/MF[4]/Non-Residential	Number of Noise Impacts: Severe SF/MF/Non-Residential
1	Park at Central Library	Flower Street – Wilshire to 5th	3	68	Proposed Underground	68/73	68	0/0/0	0/0/0
A	Bonaventure Hotel	Flower Street – 5th to 3rd	2	71	63	66/71	72	0/0/0	0/0/0
2	Park Area 4th floor deck of Bank of America Building	Flower Street – 5th to 3rd	3	63	54	65/70	64	0/0/0	0/0/0
B	Bunker Hill Towers	Flower Street – 3rd to 2nd Street	2	74	60	66/72	74	0/0/0	0/0/0
B1	Bunker Hill Towers – Top Floor	Flower Street – 3rd to 2nd Street	2	71	54	66/70	71	0/0/0	0/0/0
C	Kawada Hotel	2nd Street – Hill to Los Angeles	2	75	69	66/73	76	0/1 MF/0	0/0/0
C1	Kawada Hotel – Top Floor	2nd Street – Hill to Los Angeles	2	70	61	65/69	70	0/0/0	0/0/0
I	Higgins Building	2nd Street – Hill to Los Angeles	2	75	69	66/73	76	0/1 MF/0	0/0/0

Table 4.7-9. At-Grade Emphasis LRT Predicted Noise Levels and Impacts (continued)

Site #	Receptor Description	At-Grade LRT Segment	FTA Land Use[1]	Existing Ldn[2] (dBA)/ Peak Hour Leq (dBA)	Predicted Project Ldn[2] (dBA)/Peak Hour Leq (dBA)	Noise Impact Criteria for Predicted Project Noise Moderate/Severe[3]	Predicted Existing + Project Ldn2 (dBA)/ Peak Hour Leq (dBA)	Number of Noise Impacts: Moderate SF[4]/MF[4]/Non-Residential	Number of Noise Impacts: Severe SF/MF/Non-Residential
4	Saint Vibiana Little Tokyo Library	2nd Street – Hill to Los Angeles	3	69	61	69/74	70	0/0/0	0/0/0
D	New Otani Hotel	Los Angeles Street – 2nd to 1st	2	73	67	66/71	74	0/1 MF/0	0/0/0
D1	New Otani Hotel 3rd Floor Garden	Los Angeles Street – 2nd to 1st	2	70	61	65/70	70	0/0/0	0/0/0
F1	Temple Street Jail	Los Angeles Street –1st to Temple	2	71	65	66/70	72	0/0/0	0/0/0
F2	Temple Street Jail	Temple Street – Los Angeles to Alameda	2	67	61	63/67	68	0/0/0	0/0/0

Source: Parsons Brinckerhoff, 2009

Notes: [1] Land use category descriptors are as follows: FTA Category 1 = buildings or parks where low noise levels are an essential element of their purpose; FTA Category 2 = residences and other buildings where people sleep, such as hotels, apartments and hospitals; and FTA Category 3 = institutional land uses with primarily daytime and evening use, including schools, libraries and churches.

[2] Ldn is used for land uses with nighttime sensitivity to noise and for residential areas where FTA rather than FHWA noise procedures are applicable. Peak-hour Leq is used for commercial, industrial, and other land uses that do not have nighttime noise sensitivity.

[3] Moderate and severe noise impact criteria are based on Table 4.7-1 and are the thresholds for noise generated by the project. The noise impact criteria correspond to the FTA land use category identified in Table 4.7-9.

[4] SF = Single family residential; MF = Multi-family residential

Table 4.7-10. At-Grade Emphasis LRT Predicted Ground Borne Noise and Vibration Levels and Impacts

Site #	FTA Land Use Category 1	FTA Vibration Level Criteria (VdB)	FTA GBN Level Criteria (dBA)2	Predicted Project Vibration Levels (VdB)	Predicted Project GBN Levels (dBA)3	Vibration and GBN Impact
1	3	75	40	67	32	No Impact
A	2	72	35	64	29	No Impact
2	3	75	40	64	29	No Impact
B	2	72	35	58	23	No Impact
C	2	72	35	70	35	GBN Impact
I	2	72	35	62	27	No Impact
4	3	75	40	60	25	No Impact
D	2	72	35	70	35	GBN Impact
F1	2	72	35	59	24	No Impact
F2	2	72	35	53	18	No Impact
DH	Special Buildings	65	25	57	22	No Impact

Source: Parsons Brinckerhoff, Inc., 2009
Notes: [1] Land use category descriptors: FTA Category 1 = buildings or parks where quiet is an essential element of their purpose; FTA Category 2 = residences and other buildings where people sleep, such as hotels, apartments and hospitals; FTA Category 3 = institutional land uses with primarily daytime and evening use, including schools, libraries and churches. [2] Impact criteria is for frequent events. [3] Based on more conservative "typical" vibration spectra.

4.7.3.4 Underground Emphasis LRT Alternative

4.7.3.4.1 Construction Noise and Vibration

For the Underground Emphasis LRT Alternative, the following construction activities would have the most potential for noise and vibration impacts: cut and cover construction of a tunnel on Flower Street; cut and cover construction of the proposed Flower/5th/4th Street station; cut and cover construction of the approach the proposed 2nd/Hope Street station and the station itself; construction of either of the proposed 2nd Street station alternatives (Los Angeles Street or Broadway Options); grade separation at the junction of 1st and Alameda Streets; and tunnel boring machine (TBM) tunneling beneath 2nd Street with a launch site near either 2nd Street and Central Avenue or the proposed 2nd/Hope Street station. These six activities have the most potential for noise and vibration impacts due to the duration and their proximity to sensitive land uses.

Construction activities, relevant construction equipment, and related noise levels for this alternative are shown in Table 4.7-11.

Potential noise from TBM operations at the launch site, where bored material would be hauled out, treated and removed, is listed in Table 4.7-11. Noise levels for the TBM are not listed for the segments of the alignment between the TBM launch and recovery sites. When it is operating underground, the TBM produces little to no noise that reaches surface land uses. Additionally, the TBM is slow moving and causes very little vibration to the surrounding area.

Construction would comply with Section 41.40(a) of the Los Angeles Municipal Code. The contractor would also be responsible for complying with the applicable local ordinance as it applies to all equipment on the job or related to the job, including but not limited to trucks, transit mixers, or transient equipment that may or may not be owned by the contractor. The Los Angeles Municipal Code section 41.40(a) does not set acceptable noise level limits for either daytime or nighttime construction activities. If a noise variance is required, the noise variance will set the acceptable noise level limits.

Compliance with applicable local ordinances and implementation of BMPs, listed above, would ensure that noise and vibration levels associated with construction of the Underground Emphasis LRT Alternative would not result in a significant adverse impact.

However, sensitive and historic buildings in the vicinity of construction may be susceptible to vibration (GBV) damage. The Underground Emphasis LRT Alternative would involve the same vibration producing construction equipment as the At-Grade Emphasis LRT Alternative. Therefore, the minimum safe distance of 21 feet between construction activities (involving large bulldozers and drill rigs) and buildings would also apply. Refer to FTA guidelines in Table 4.7-5 for minimum safe distances between large bulldozers and drill rigs and buildings under various scenarios. As a result, sensitive and historic buildings within 21 feet of construction may be susceptible to vibration damage.

TBM is slow moving and causes very little vibration to the surrounding area. According to one study, peak particle vibration velocities from tunnel construction (in soft ground) lie in the range from 0.0024 to 0.0394 inches per second PPV at a distance of 33 feet from the vibration source (Verspohl 1995). Another study measured vibration velocities in the range of 0.0157 to 0.0551 inches per second at the same 33 feet distance from the source (New 1990). These PPV vibrations may also be expressed as RMS vibration velocity levels ranging from 56 to 83 VdB. Given this range of potential vibration impacts, and the distance below grade that tunnel boring would occur, vibration produced by a TBM would be well below the FTA threshold for Category IV buildings of 0.12 inches per second PPV and no vibration damage associated with a TBM would occur.

Table 4.7-11. Construction Activity and Equipment Typical Noise Levels at 50 feet for the Underground Emphasis LRT Alternative

Activity	Duration (months)	Construction Equipment				
		Concrete Truck	Dozer	Excavator	Crane	Drill Rig
Pre-Construction	4-6	NA	NA	NA	NA	90
Site Preparation	12-18	77	85	82	NA	NA
Flower Street Cut and Cover Tunnel	24-48	77	85	82	81	90
Flower/5th/4th St Cut and Cover Station	24-48	77	85	82	81	90
Cut and Cover Approach to 2nd/Hope Street Station	24-48	77	85	82	81	90
2nd/Hope Street Station (SEM)	24-48	77	85	82	81	NA
2nd/Hope Street Station (Cut and Cover)	24-48	77	85	82	81	90
2nd Street TBM Tunnel	24-48	77	85	82	81	NA
2nd Street Cut and Cover Station (Broadway Option)	24-48	77	85	82	81	NA
2nd Street Cut and Cover Station (Los Angeles Street Option)	24-48	77	85	82	81	90
Portal	12-24	77	85	82	81	90
TBM Launch Site	2-4	77	85	82	81	90
1st and Alameda Junction	24-36	77	85	82	81	NA
Operating Systems Installation	TBD	TBD	TBD	TBD	TBD	TBD

A survey of structures within 21 feet of the anticipated vibration-producing construction activity would be conducted to assess the building category and the potential for GBV to cause damage. During construction, use of building protection measures such as underpinning, soil grouting, or other forms of ground improvement, use of lower vibration equipment and/or construction techniques, combined with a geotechnical and vibration monitoring program would be used to protect identified historic and sensitive structures. With implementation of mitigation measures identified in Section 4.7.4, construction-related vibration impacts to historic and sensitive buildings, located within 21 feet of the anticipated vibration-producing construction activity, would be reduced to a less than significant level.

The Underground Emphasis LRT Alternative would involve the same vibration producing construction equipment as the At-Grade Emphasis LRT Alternative, large bulldozer and drill rigs, and would, therefore, have similar vibration annoyance impacts on sensitive receptors (Table 4.7-2). Taking into account a 10 dBA reduction in vibration for coupling to building foundation loss (Table 10-1, FTA 2006), occupants would not be subject to vibration annoyance impacts. It should be noted, large bulldozers and drill rigs would operate intermittently and would not be used every day of construction. In addition, construction of the alignment would not dwell in one location for the entire duration of construction. Therefore, vibration impacts (including ground-borne noise) associated with large bulldozer and drill rigs would be less than significant.

4.7.3.4.2 Transit Operation Noise

The Underground Emphasis LRT Alternative would involve six potential sources of noise impacts during operations. These include pass-by noise from LRT vehicles, warning signals near at-grade crossings, special trackwork, grade separations, ventilation shafts, and TPSSs.

Pass-by Impacts:

Assumptions for the Underground Emphasis LRT Alternative noise modeling are the same as the At-Grade Emphasis LRT Alternative, except the analysis assumed a speed of 30 MPH for all segments instead of 35 MPH for the At-Grade Emphasis LRT Alternative. Given the underground design of this alternative, the only areas with potential noise impacts from LRT vehicle pass-by are the Hikari Lofts at the intersection of 2nd Street and Central Avenue and the Savoy Condominiums on Alameda Street, between 2nd and 1st streets. Given the existing ambient noise levels adjacent to the sensitive receptors (72 to 74 dBA Ldn), noise generated from LRT vehicle pass-by would not result in an increase in ambient noise levels (Table 4.7-12). Based on FTA criteria, no noise impacts are predicted from LRT vehicle pass-bys.

Warning Signals:

Under this alternative, LRT vehicles would run underground except crossing Alameda and 1st Streets. The LRT vehicles would run with existing traffic signals on 1st Street and would be separated from traffic on Alameda Street. Therefore, pending CPUC approval, the project would not include the use of warning signals or gates and would not create noise impacts from at-grade warning signals.

Special Trackwork:

This alternative would have one area of special trackwork that is above grade, the at-grade junction near Alameda and 1st Street to connect to the Gold Line tracks. Potential noise levels would increase up to 6 dBA in the vicinity of a switch. The junction near Alameda and 1st Streets are near the Savoy Condominiums and would be predicted to cause a “moderate” noise impact at the condominiums, as shown in Table 4.7-13.

Grade Separation:

Under this alternative, a vehicular underpass would be constructed at Alameda and 1st Streets to provide a grade separation between trains and vehicles. Traffic on Alameda, Temple and 1st Streets would not increase and, therefore, traffic noise levels along Alameda Street from 2nd to 1st Streets are not expected to increase as a result of this alternative.

Ventilation Shafts and TPSS:

Ventilation shafts and TPSSs would be designed in accordance with Metro system-wide design criteria noise guideline of 50 dBA at 50 feet or the nearest residential building, whichever is closer. Under this alternative, noise levels associated with ventilation and TPSSs would be far lower than current ambient noise levels and would not exceed FTA noise impact criteria. No significant, adverse noise impact would occur.

4.7.3.4.3 Transit Operation Vibration

The Underground Emphasis LRT Alternative has the same two potential sources of vibration impacts during operations as the At-Grade Emphasis LRT Alternative: pass-by vibration from LRT vehicles and areas of special trackwork.

Based on vibration modeling and FTA criteria, adverse vibration impacts are not predicted from LRT vehicle pass-bys, as presented in Table 4.7-14. The Underground Emphasis LRT Alternative would require one at-grade special trackwork on Alameda and 1st Streets, near the Savoy Condominiums and the JANM. Based on FTA's general vibration assessment guidelines, special trackwork for this alternative would add 10 db to the vibration level for LRT vehicle pass-by. As a result, special trackwork for this alternative would generate vibration levels of 68 VdB, which remains under the FTA threshold of 72 VdB. Thus, adverse vibration impacts are not predicted for the Underground Emphasis LRT Alternative.

As shown in Table 4.7-14, this alternative would generate GBN levels up to 33 dBA, which is below the FTA criterion of 35 dBA. Thus, no adverse vibration or ground-borne noise impacts from special trackwork are predicted for the Underground Emphasis LRT Alternative.

4.7.3.4.4 NEPA Finding and CEQA Determination

"Moderate" noise impacts from construction of this alternative would not result in a substantial permanent increase in ambient noise levels and potential impacts would not be adverse or significant. All other noise and vibration impacts from construction would be less than significant. Proposed mitigation measures would reduce potential noise and vibration impacts from construction to less than significant levels.

Noise impacts associated with operation of the Underground Emphasis LRT Alternative would be below "severe" impact levels and an adverse effect would not result under NEPA. Adverse noise or vibration impacts from operation of the Underground Emphasis LRT Alternative are not anticipated. Implementation of proposed mitigation measures would result in a less than significant impact to sensitive or historic buildings within 21 feet of the construction. All other noise and vibration impacts associated with operation would not be adverse or significant.

Table 4.7-12. Underground Emphasis LRT Predicted Noise Levels and Operational Impacts

Site #	Receptor Description	Underground LRT Segment	FTA Land Use[1]	Existing Ldn[2] (dBA)/Peak Hour Leq (dBA)	Predicted Project Ldn[2] (dBA)/Peak Hour Leq (dBA)	Predicted Existing + Project Ldn[2] (dBA)/Peak Hour Leq (dBA)	Number of Noise Impact					
							Moderate			Severe		
							SF[3]	MF[3]	Non-Residential	SF	MF	Non-Residential
E	Hikari Lofts	Portal to Little Tokyo Station	2	74	57	74	0	0	0	0	0	0
E1	Top Floor of Hikari Lofts	Portal to Little Tokyo Station	2	68	51	68	0	0	0	0	0	0
G	Savoy – Alameda Street	Portal to Little Tokyo Station	2	73	60	73	0	0	0	0	0	0
H	Savoy – 1st Street	Portal to Little Tokyo Station	2	72	60	72	0	0	0	0	0	0

Source: Parsons Brinckerhoff, 2009
Notes: [1] Land use category descriptors: FTA Category 1 = buildings or parks where low noise levels are an essential element of their purpose; FTA Category 2 = residences and other buildings where people sleep, such as hotels, apartments and hospitals; FTA Category 3 = institutional land uses with primarily daytime and evening use, including schools, libraries and churches.
[2] Ldn is used for land uses with nighttime sensitivity to noise and for residential areas where FTA rather than FHWA noise procedures are applicable. Peak-hour Leq is used for commercial, industrial, and other land uses that do not have nighttime noise sensitivity.
[3] SF = Single family residential; MF = Multi-family residential

Table 4.7-13. Underground Emphasis LRT Alternative Predicted Noise Levels with Special Trackwork

Site #	Receptor Description	FTA Land Use Category 1	Existing Ldn2 (dBA)/Peak Hour Leq (dBA)	Predicted Project Ldn2 (dBA)/Peak Hour Leq (dBA)	Noise Impact	Predicted Project+ 6 dBA for Special Trackwork Ldn2 (dBA)/Peak Hour Leq (dBA)	Predicted Existing + Project and Special Trackwork L_{dn}2 (dBA)/Peak Hour L_{eq} (dBA)	Noise Impact
E	Hikari Lofts	2	74	57	No Impact	63	74	No Impact
E1	Top Floor of Hikari Lofts	2	68	51	No Impact	57	68	No Impact
G	Savoy – Alameda Street	2	73	60	No Impact	66	74	Moderate Impact
H	Savoy – 1st Street	2	72	60	No Impact	66	73	Moderate Impact

Source: Parsons Brinckerhoff, Inc., 2009
Notes: [1] Land use category descriptors: FTA Category 1 = buildings or parks where low noise levels are an essential element of their purpose; FTA Category 2 = residences and other buildings where people sleep, such as hotels, apartments and hospitals; FTA Category 3 = institutional land uses with primarily daytime and evening use, including schools, libraries and churches.
[2] Ldn is used for land uses with nighttime sensitivity to noise and for residential areas where FTA rather than FHWA noise procedures are applicable. Peak-hour Leq is used for commercial, industrial, and other land uses that do not have nighttime noise sensitivity.

Table 4.7-14. Underground Emphasis LRT Alternative
Predicted Vibration Levels and Impacts

Site #	FTA Land Use Category [1]	FTA Vibration Level Criteria (VdB)	FTA GBN Level Criteria (dBA)[2]	Predicted Project Vibration Levels (VdB)	Predicted Project GBN Levels (dBA)[3]	Vibration and GBN Impact
1	3	75	40	65	30	No Impact
A	2	72	35	64	29	No Impact
2	3	75	40	61	26	No Impact
B	2	72	35	58	23	No Impact
C	2	72	35	63	28	No Impact
I	2	72	35	67	32	No Impact
4	3	75	40	67	32	No Impact
D	2	72	35	67	32	No Impact
E	2	72	35	62	27	No Impact
G	2	72	35	58	23	No Impact
H	2	72	35	58/68	23/33	No Impact
DH	Special Buildings	65	25	53	18	No Impact

Source: Parsons Brinckerhoff, Inc., 2009
Notes: [1] Land use category descriptors: FTA Category 1 = buildings or parks where quiet is an essential element of their purpose; FTA Category 2 = residences and other buildings where people sleep, such as hotels, apartments and hospitals; FTA Category 3 = institutional land uses with primarily daytime and evening use, including schools, libraries and churches. [2] Impact criteria is for frequent events. [3] Based on more conservative "typical" vibration spectra.

4.7.3.5 Fully Underground LRT Alternative

4.7.3.5.1 Construction Noise and Vibration

For the Fully Underground LRT Alternative, the following construction activities would have the most potential for construction-related noise and vibration impacts: cut and cover construction of a tunnel at Flower Street; cut and cover construction of the proposed Flower/5th/4th Street station; cut and cover construction of the approach to the proposed 2nd/Hope Street station and the station itself; construction of the proposed 2nd Street /Broadway station; construction of the proposed 2nd Street/Central Avenue station; and TBM tunneling beneath 2nd Street and the launch site near either 1st and Alameda Streets or the proposed 2nd/Hope Street station. These six activities have the most potential for noise and vibration impacts due to their duration and their proximity to noise sensitive land uses.

Table 4.7-15 lists the construction activities, and the construction equipment expected to be used during each construction activity, and the related noise levels anticipated for the Fully Underground LRT Alternative.

Potential noise from TBM operations at the launch site, where bored material would be hauled out, treated and removed, is listed in Table 4.7-15. Noise levels for the TBM are not listed for the segments of the alignment between the TBM launch and recovery sites because it would be operating underground. Additionally, the TBM is slow moving and causes very little vibration to the surrounding area.

Construction would comply with Section 41.40(a) of the Los Angeles Municipal Code. The contractor would also be responsible for complying with the applicable local ordinance as it applies to all equipment on the job or related to the job, including but not limited to trucks, transit mixers or transient equipment that may or may not be owned by the contractor. The Los Angeles Municipal Code section 41.40(a) does not set acceptable noise level limits for either daytime or nighttime construction activities. If a noise variance is required, the noise variance will set the acceptable noise level limits.

Compliance with applicable local ordinances and implementation of BMPs, listed above, would ensure that noise and vibration levels associated with construction of the Fully Underground LRT Alternative would not result in a significant adverse impact.

However, sensitive and historic buildings in the vicinity of construction may be susceptible to vibration (GBV) damage. The Fully Underground LRT Alternative would involve the same vibration producing construction equipment as the Underground Emphasis LRT Alternative. Therefore, the minimum safe distance of 21 feet between construction activities (involving large bulldozers and drill rigs) and buildings would also apply. Refer to FTA guidelines in Table 4.7-5 for minimum safe distances between large bulldozers and drill rigs and buildings under various scenarios. As a result, sensitive and historic buildings within 21 feet of construction may be susceptible to vibration damage.

A survey of structures within 21 feet of the anticipated vibration-producing construction activity would be conducted to assess the building category and the potential for GBV to cause damage. During construction, use of building protection measures such as underpinning, soil grouting, or other forms of ground improvement, use of lower vibration equipment and/or construction techniques, combined with a geotechnical and vibration monitoring program would be used to protect identified historic and sensitive structures. With implementation of mitigation measures identified in Section 4.7.4, construction-related vibration impacts to historic and sensitive buildings, located within 21 feet of the anticipated vibration-producing construction activity, would be reduced to a less than significant level.

Table 4.7-15. Fully Underground LRT Alternative
Construction Activity and Equipment Typical Noise Levels at 50 feet

Activity	Duration (months)	Construction Equipment				
		Concrete Truck	Dozer	Excavator	Crane	Drill Rig
Pre-Construction	4-6	NA	NA	NA	NA	90
Site Preparation	12-18	77	85	82	NA	NA
Flower Street Cut and Cover Tunnel	24-48	77	85	82	81	90
Flower/5th/4th St Cut and Cover Station	24-48	77	85	82	81	90
Cut and Cover Approach to 2nd/Hope Street Station	24-48	77	85	82	81	90
2nd/Hope Street Station (SEM)	24-48	77	85	82	81	NA
2nd/Hope Street Station (Cut and Cover)	24-48	77	85	82	81	90
2nd Street TBM Tunnel	24-48	77	85	82	81	NA
2nd Street Cut and Cover Station (Broadway Option)	24-48	77	85	82	81	NA
2nd Street Cut and Cover Station (Los Angeles Street Option)	24-48	77	85	82	81	90
Portal	12-24	77	85	82	81	90
TBM Launch Site	2-4	77	85	82	81	90
1st and Alameda Junction	24-36	77	85	82	81	NA
Operating Systems Installation	TBD	TBD	TBD	TBD	TBD	TBD

The Fully Underground LRT Alternative would involve the same vibration producing construction equipment as the Underground Emphasis LRT Alternative (large bulldozer and drill rigs) and would therefore, have similar vibration annoyance impacts on sensitive receptors. Taking into account a 10 dBA reduction in vibration for coupling to building foundation loss (Table 10-1, FTA 2006), occupants would not be subject to vibration annoyance impacts.

4.7.3.5.3 Transit Operation Noise

The alternative would have five potential sources of noise impacts during operations. These include pass-by noise from LRT vehicles, warning signals near at-grade crossings, areas of special trackwork, ventilation shafts, and TPSSs.

Pass-by Impacts:

Assumptions for the Fully Underground LRT Alternative noise modeling are the same as the Underground Emphasis LRT Alternative. The only area under the alternative with potential pass-by noise impacts would be the Los Angeles Hompa Hongwanji Temple at the intersection of 1st and Vignes Streets. LRT vehicle pass-bys would not result in significant, adverse noise impacts under this alternative (Table 4.7-16).

Warning Signals:

This alternative would not add any additional warning signals and, therefore, would not create noise impacts from at-grade warning signals.

Special Trackwork:

The alternative would include an above-grade switch along 1st Street near the Los Angeles Hompa Hongwanji Temple. The switch would be located within 70 feet of the Los Angeles Hompa Hongwanji Temple. However, the noise analysis predicted that there would not be an adverse noise impact to the Temple (see Table 4.7-17).

Ventilation Shafts and TPSS:

Ventilation shafts and TPSSs would be designed in accordance with Metro system-wide design criteria noise guideline and would not exceed FTA noise impact criteria. Significant, adverse noise impact would not occur.

4.7.3.5.4 Transit Operation Vibration

The Fully Underground LRT Alternative has the same two potential sources of vibration impacts during operations as the Underground Emphasis LRT Alternative: pass-by vibration from LRT vehicles and areas of special trackwork.

Based on FTA criteria, vibration impacts (including ground-borne noise) are not predicted from LRT vehicle pass-bys under this alternative, as presented in Table 4.7-18. At the switch along 1st Street, the predicted vehicle pass-by vibration level at Sites H and 3 would be 68 VdB, which is still below the FTA criterion of 72 VdB. As shown in Table 4.7-18, the greatest GBN levels would be 33 dBA, which is below the FTA criterion of 35 VdB. Thus, adverse vibration or ground-borne noise impacts from special trackwork are not predicted for this alternative.

4.7.3.5.5 NEPA Finding and CEQA Determination

Potential noise and vibration impacts from construction of the Fully Underground LRT Alternative would not be adverse or significant. Proposed mitigation measures would reduce potential noise and vibration impacts from construction to less than significant levels.

Table 4.7-16. Fully Underground LRT Alternative Predicted Noise Levels and Impacts

Site #	Receptor Description	Underground LRT Segment	FTA Land Use[1]	Existing Ldn[2] (dBA)/Peak Hour Leq (dBA)	Predicted Project Ldn[2] (dBA)/Peak Hour Leq (dBA)	Predicted Existing + Project Ldn[2] (dBA)/Peak Hour Leq (dBA)	Number of Noise Impact					
							Moderate			Severe		
							SF	MF	Non-Residential	SF	MF	Non-Residential
3	Los Angeles Hompa Hongwanji Temple	Portal to Gold Line	3	70	60	**70**	0	0	0	0	0	0

Source: Parsons Brinckerhoff, 2009
Notes: [1] Land use category descriptors: FTA Category 1 = buildings or parks where low noise levels are an essential element of their purpose; FTA Category 2 = residences and other buildings where people sleep, such as hotels, apartments and hospitals; FTA Category 3 = institutional land uses with primarily daytime and evening use, including schools, libraries and churches.
[2] Ldn is used for land uses with nighttime sensitivity to noise and for residential areas where FTA rather than FHWA noise procedures are applicable. Peak-hour Leq is used for commercial, industrial, and other land uses that do not have nighttime noise sensitivity.

Table 4.7-17. Fully Underground LRT Alternative Predicted Noise Levels with Special Trackwork

Site #	FTA Land Use Category [1]	Existing Ldn2 (dBA)/Peak Hour Leq (dBA)	Predicted Project Ldn2 (dBA)/Peak Hour Leq (dBA)	Noise Impact	Predicted Project+ 6 dBA for Special Trackwork Ldn2 (dBA)/Peak Hour Leq (dBA)	Predicted Existing + Project and Special Trackwork Ldn2 (dBA)/Peak Hour Leq (dBA)	Noise Impact
3	3	70	60	No Impact	66	**71**	No Impact

Source: Parsons Brinckerhoff, Inc., 2009
Notes: [1] Land use category descriptors: FTA Category 1 = buildings or parks where low noise levels are an essential element of their purpose; FTA Category 2 = residences and other buildings where people sleep, such as hotels, apartments and hospitals; FTA Category 3 = institutional land uses with primarily daytime and evening use, including schools, libraries and churches.

Operation of the Fully Underground LRT Alternative would not result in adverse or significant noise or vibration impacts. Implementation of proposed mitigation measures would result in a less than significant impact to sensitive or historic buildings within 21 feet of the construction. All other noise and vibration impacts associated with construction would not be adverse or significant.

Table 4.7-18. Fully Underground LRT Alternative Predicted Vibration Levels (VdB) and Ground-Borne Noise Levels (dBA) Impacts

Site #	FTA Land Use Category [1]	FTA Vibration Level Criteria (VdB)	FTA GBN Level Criteria (dBA)[2]	Predicted Project Vibration Levels (VdB)	Predicted Project GBN Levels (dBA)[3]	Vibration and GBN Impact
1	3	75	40	65	30	No Impact
A	2	72	35	64	29	No Impact
2	3	75	40	61	26	No Impact
B	2	72	35	58	23	No Impact
C	2	72	35	63	28	No Impact
I	2	72	35	67	32	No Impact
4	3	75	40	67	32	No Impact
D	2	72	35	67	32	No Impact
E	2	72	35	62	27	No Impact
G	2	72	35	58	23	No Impact
H	2	72	35	58/68	23/33	No Impact
3	3	75	40	58/68	23/33	No Impact
DH	Special Building	65	25	53	18	No Impact

Source: Parsons Brinckerhoff, Inc., 2009
Notes: [1] Land use category descriptors: FTA Category 1 = buildings or parks where quiet is an essential element of their purpose; FTA Category 2 = residences and other buildings where people sleep, such as hotels, apartments and hospitals; FTA Category 3 = institutional land uses with primarily daytime and evening use, including schools, libraries and churches.
[2] Impact criteria is for frequent events.
[3] Based on more conservative "typical" vibration spectra, [4] with special track work.

4.7.4 Mitigation Measures

Given that the No Build Alternative and the TSM Alternative would not result in any noise or vibration impacts, implementation of mitigation is not required for these alternatives. The following mitigation measures would apply to all of the build alternatives.

4.7.4.1 Construction Mitigation Measures

If a noise variance from Section 41.40(a) of the Los Angeles Municipal Code is required, the variance will specify acceptable noise level limits. The contractor could use the following measures to meet relevant construction-related noise limits:

- Place temporary noise barriers around the construction site
- Place localized barriers around specific items of equipment or smaller areas
- Use alternative back-up alarms/warning procedures
- Use higher performance mufflers on equipment used during nighttime hours
- Provide portable noise sheds for smaller, noisy, equipment, such as air compressors, dewatering pumps, and generators

During the construction phase of any of the three build alternatives, sensitive or historic buildings within 21 feet of construction may be susceptible to vibration damage. A survey of structures within 21 feet of anticipated vibration-producing construction activity would be conducted. The survey would classify buildings by category of sensitivity and note the potential for GBV to cause damage to buildings.

The survey would be used to establish baseline, pre-construction conditions for historic or other sensitive buildings. If the survey of relevant structures finds buildings susceptible to vibration damage, a monitoring plan would be developed. This plan would ensure that construction-induced vibration would not damage historic buildings.

Mitigation measures would further reduce annoyance to sensitive receptors caused by GBV. All or a combination of the following measures may be used to mitigate adverse noise and vibration impacts:

- When feasible, maintain distances greater than those provided in Table 4.7-5 to avoid potential construction-related vibration damage.
- When feasible, use construction equipment or less vibration intensive techniques near vibration sensitive locations.
- When feasible, route heavily laden vehicles away from vibration-sensitive locations.
- Operate earthmoving equipment as far as possible from vibration-sensitive locations by site layout considerations.

- Sequence construction activities that produce vibration such as demolition, excavation, earthmoving, and ground impacting so that the vibration sources do not operate simultaneously.

- When feasible, avoid nighttime construction activities that produce noticeable vibration.

- Use as small an impact device as possible to accomplish necessary tasks.

- When feasible, select non-impact demolition and construction methods such as saw or torch cutting and removal for off-site demolition, and use chemical splitting, or hydraulic jack splitting, instead of high impact methods.

- Use building protection measures such as underpinning, soil grouting, or other forms of ground improvement.

- Avoid using pavement breakers and vibratory rollers and packers near sensitive uses when feasible.

4.7.4.2 Operation Mitigation Measures

To reduce moderate noise impacts due to LRT vehicle pass-bys associated with operation of the At-Grade Emphasis LRT Alternative the following mitigation measure is proposed.

- Wheel skirts could be included on LRT vehicles to reduce wayside noise levels by at least 2 dBA

To reduce a moderate noise impact due to track switches near the intersection of 1st and Alameda Streets as part of the Underground Emphasis LRT Alternative the following mitigation measure is proposed.

- A spring-rail or movable frog switch could be used at this location to reduce potential noise by covering the gap in the central part of the switch.

To reduce ground-borne noise impacts at sites C and D due to LRT vehicle pass-bys associated with the At-Grade Emphasis LRT Alternative, the following mitigation measure is proposed.

- Use of High-Resilience rail fasteners in the two areas (sites C and D) would reduce the ground-borne noise levels to below the 35 dBA criterion.

4.8 Ecosystems/Biological Resources

This section summarizes the existing biological resources located in the project study area and the potential impacts of the proposed alternatives on these resources. Information in this section is based on the Ecosystem and Biological Resources Technical Memorandum prepared for the project and contained in Appendix T, Ecosystems and Biological Resources of this DEIS/DEIR.

4.8.1 Regulatory Framework

Biological resources within the project area are protected by several federal, state, and local laws and policies, such as the Endangered Species Act, The Migratory Bird Treaty Act (MBTA), the California Endangered Species Act, the California Fish and Game Code, and the City of Los Angeles Native Tree Protection Ordinance.

The City of Los Angeles Native Tree Protection Ordinance (Ordinance No. 177,404) protects native oak tree species, California Sycamore, California Bay, and California Black Walnut. It was passed to slow the decline of native tree habitat. The ordinance applies to trees greater than 4 inches in diameter on both public and private lots and requires replacement of removed trees.

Thresholds for biological resources are identified in Section C of the Los Angeles CEQA Thresholds Guide. The measures below state that a project would normally have a significant impact on biological resources if it could:

- Result in the loss of individuals, or the reduction of existing habitat, of a state- or federally-listed endangered, threatened, rare, protected, or candidate species, or a Species of Special Concern, or federally-listed critical habitat
- Result in the loss of individuals, the reduction of existing habitat of a locally designated species, or a reduction in a locally designated natural habitat or plant community
- Interfere with habitat such that normal species behaviors are disturbed (e.g., from introducing noise, light) to a degree that may diminish the chances for long-term survival of a sensitive species.

More information regarding these laws and policies is available in Appendix T, Ecosystems and Biological Resources of this DEIS/DEIR.

4.8.2 Affected Environment

Due to its densely developed and urbanized nature, the project area provides little opportunity for wildlife species or other biological resources to exist. There are no Habitat Conservation Plans for this area, and no Significant Ecological Areas located within 0.25 mile of either side of the proposed alignments (City of Los Angeles 2001). There are no wildlife corridors within this area to support movement of wildlife species. There are no wetlands, oak woodlands, or coastal sage scrub habitat within the project area. The Los Angeles River, which is contained within a concrete channel through the downtown area, is located more than 0.25 miles away from the project area.

A review of the California Natural Diversity Database (CNDDB) was conducted to identify sensitive plants and animals potentially occurring in the project area. CNDDB results are reported for the United States Geological Survey (USGS) Los Angeles 7.5-minute quadrangle which is an approximately 60-square mile area. The results for this large area may not be accurate for the project area which is only about 1.6-square miles. Therefore, a field survey of the project area was also conducted on May 17, 2009. The field survey included parks and other public open spaces within 0.25 miles of either side of the proposed alignments, and included visual observation and photographic documentation of all parks, open space areas, and mature trees within the project area. Based on the field survey, there is no habitat within the project area that could support the sensitive species and vegetation community identified by the CNDDB as potentially occurring within the Los Angeles quadrangle.

However, mature trees were observed along the proposed alignments and within roadway medians. Due to their mobility, some migratory bird species may utilize these mature trees during migration. While unlikely, there is potential for migratory birds, including raptors, to utilize these mature trees for breeding.

California Sycamore, a native tree species protected under the City of Los Angeles Native Tree Protection Ordinance, is found in several locations within the project area.

Table 4.8-1 shows trees that were identified in the project area.

Table 4.8-1. Trees Potentially Affected by the Build Alternatives

Location	At-Grade Emphasis LRT		Underground Alternatives[9]	
	Native (CA sycamores)	Palms and other mature non-native trees	Native (CA sycamores)	Palms and other mature non-native trees
Los Angeles Library (at Flower and 5th Streets) [1]	10	25	10	15
Flower Street to 2nd Street	0	15	0	0
Flower Street where alignment turns [2]	5	25	5	25
Along 2nd Street to Los Angeles Street[3]	20	35	0	0
Underground station at 2nd Street - Broadway [4]	0	0	10	15
Underground Emphasis LRT station at 2nd Street - Los Angeles Street Option [5]	0	0	10	25
Main Street (At-Grade Emphasis LRT only) [6]	20	40	0	0
Los Angeles Street (At-Grade Emphasis LRT only) [7]	5	35	0	0
Temple Street (At-Grade Emphasis LRT only) [8]	0	15	0	0

Table 4.8-1. Trees Potentially Affected by the Build Alternatives (continued)

Location	At-Grade Emphasis LRT		Underground Alternatives[9]	
	Native (CA sycamores)	Palms and other mature non-native trees	Native (CA sycamores)	Palms and other mature non-native trees
2nd Street east of Los Angeles Street (Underground Emphasis LRT only)	0	0	5	35
At-grade tracks along Alameda and underpass (Underground Emphasis LRT only)	0	0	0	15
Fully Underground LRT station at 2nd Street and Central Avenue				7[10]
Fully Underground LRT portal east of Alameda Street	0	0	0	0[11]
Totals				
At-Grade Emphasis LRT Alternative	60	190	N/A	N/A
Underground Emphasis LRT Alternative	N/A	N/A	40	130
Fully Underground LRT Alternatives	N/A	N/A	25	62

[1] The station at this location is underground for the build alternatives, but the potential impact is calculated based on the at-grade construction footprint.
[2] The station footprints are identical for the build alternatives since alignments are located underground.
[3] Alignments are along 2nd Street but impacts are different depending on whether proposed LRT is at-grade or underground.
[4] No station proposed at this location for the At-Grade Emphasis LRT Alternative.
[5] No station proposed at this location for the At-Grade Emphasis LRT Alternative or the Fully Underground LRT Alternatives.
[6] Table lists existing sycamores and mature non-native trees along Main Street.
[7] Large pines located in the center median, other trees located along Los Angeles Street.
[8] Inventory includes large ficus, etc. along Temple Street.
[9] Underground alternatives include the Underground Emphasis LRT Alternative and the Fully Underground LRT Alternative.
[10] Includes trees on the west side of Alameda between 1st and 2nd Streets that may be affected and one mature cherry tree on Central Avenue that could be impacted if the building containing the Weyland's Brewery is removed.
[11] There are several small trees along 1st Street that are much less than 4 inches dbh.

4.8.3 Environmental Impacts/Environmental Consequence

4.8.3.1 No Build Alternative

The No Build Alternative would have no direct or indirect effects on ecosystems or biological resources in the project area since there would be no construction activities. Since the No Build Alternative would not result in direct or indirect impacts to ecosystems or biological resources, there would be no cumulative impacts.

4.8.3.2 TSM Alternative

The two new express shuttle bus lines created under the TSM Alternative would not require construction that would directly or indirectly impact ecosystems or biological resources in the project area. The TSM Alternative would have no direct or indirect effects on ecosystems or biological resources in the project area. Since the TSM Alternative would not result in direct or indirect impacts to ecosystems or biological resources, there would be no cumulative impacts.

4.8.3.3 At-Grade Emphasis LRT Alternative

During construction of the At-Grade Emphasis LRT Alternative, some mature trees located along the proposed alignment could be removed or disturbed. However, it is unknown at this time exactly how many trees could be affected by construction of this alternative. Table 4.8-1 shows the maximum number of trees that could be affected. There are currently 250 mature trees in the area that could potentially be affected by construction, and a subset of these trees could be removed or disturbed during construction of the At-Grade Emphasis LRT Alternative. Of this total, 60 trees are protected native California sycamore trees. As project design progresses and construction plans are finalized, it may be possible to minimize the number of trees affected by avoidance or fencing. Potential mitigation measures are described in Section 4.8.4 and include compliance with the Native Tree Protection Ordinance. Compliance with the Native Tree Protection Ordinance would reduce this potential impact to a less than significant level. Additionally, station landscaping and urban design along the entire alignment would include planting new trees. Therefore, after mitigation, the At-Grade LRT Alternative could result in a net increase in total tree inventory.

Removal or disturbance of mature trees could increase competition for food and nesting habitat for migratory bird species, which could result in a potential indirect impact. This adverse impact would not be significant, since the project area provides only low quality habitat for a small number of migratory birds, if any. Further, mitigation taken to comply with the MBTA and the California Fish and Game Code would reduce potential indirect impacts to a less than significant level.

Construction activities associated with future projects have the potential to affect migratory birds if nesting habitat is disturbed during the breeding season. Other ongoing and future construction projects would be required to implement mitigation measures for any potential impacts to biological resources, particularly migratory birds, as required under either the MBTA or the California Fish and Game Code. Therefore, there would be no cumulative impacts from the At-Grade Emphasis LRT Alternative with respect to biological resources.

Since the project area is already highly urbanized and the LRT project would be consistent with the urban character of the project area, there would be no operational impacts on ecosystems or biological resources.

4.8.3.3.1 NEPA Finding and CEQA Determination

The At-Grade Emphasis LRT Alternative would not have an adverse impact on ecosystems or biological resources in the project area. With implementation of proposed mitigation measures, the At-Grade Emphasis LRT Alternative would not result in significant impacts to ecosystems and biological resources.

4.8.3.4 Underground Emphasis LRT Alternative

Construction of the Underground Emphasis LRT Alternative could require less removal or disturbance of mature trees located along the proposed alignment than under the At-Grade Emphasis LRT Alternative. There are currently 170 mature trees in the area that could potentially be affected by construction, and a subset of these trees could be removed or disturbed during construction of the Underground Emphasis LRT Alternative. However, it is unknown at this time exactly how many trees could be affected by construction of this alternative. Table 4.8-1 shows the maximum number of trees that could be affected. An estimated 40 protected native California sycamore trees occur in the potential area of impact and could be affected by this alternative. As project design progresses and construction plans are finalized, it may be possible to minimize the number of trees affected by avoidance or fencing. Potential mitigation measures are described in Section 4.8.4 and include compliance with the Native Tree Protection Ordinance. Compliance with the Native Tree Protection Ordinance would reduce this potential impact to a less than significant level. Additionally, station landscaping and urban design along the entire alignment would include planting new trees. Therefore, after mitigation, the Underground Emphasis LRT Alternative could result in a net increase in total tree inventory.

Removal or disturbance of mature trees could increase competition for food and nesting habitat for migratory bird species, which could result in a potential indirect impact. This impact would not be significant because the project area provides only low quality habitat for a small number of migratory birds and only a small number of birds (if any) could be displaced. Mitigation taken to comply with the MBTA and the California Fish and Game Code would reduce these potential indirect impacts to a less than significant level.

Construction activities associated with future projects within the study area have the potential to affect migratory birds if nesting habitat is disturbed during the breeding season. Other ongoing and future construction projects would be required to implement mitigation measures to address any potential impacts to migratory birds under either the MBTA or the California Fish and Game Code. Therefore, there would be no cumulative impacts from the Underground Emphasis LRT Alternative with respect to biological resources.

Since the project area is already highly urbanized and the LRT project would be consistent with the urban character of the project area, there would be no operational impacts on ecosystems or biological resources.

4.8.3.4.1 NEPA Finding and CEQA Determination

The Underground Emphasis LRT Alternative would not have an adverse impact on ecosystems or biological resources in the project area. With implementation of proposed mitigation measures, the Underground Emphasis LRT Alternative would not have a significant impact on ecosystems and biological resources.

4.8.3.5 Fully Underground LRT Alternative

The Fully Underground LRT Alternative has the potential to affect fewer trees compared to the Underground Emphasis LRT Alternative. The vehicle underpass along Alameda Street between Temple and 2nd Streets proposed for the Underground Emphasis LRT Alternative would affect more trees than the Fully Underground LRT Alternative alignment which is underground at this location. Table 4.8-1 shows the maximum number of trees that could be affected. As no mature trees or other biological resources were observed in the area north and east of 1st and Alameda Streets, there would be no additional direct impacts related to the Fully Underground LRT Alternative. The same mitigation measures described in Section 4.8.4 would be required to reduce potential impacts associated with tree removal or disturbance during construction to a less than significant level.

If the entire block bounded by 1st, 2nd, and Alameda Streets and Central Avenue is required for construction and additional buildings must be removed, then there is the potential that one additional cherry tree that is slightly larger than 4 inches diameter breast height (dbh) in the sidewalk on Central Avenue might be removed. This effect would be less than significant.

As with the other build alternatives, indirect impacts to migratory birds from the Fully Underground LRT Alternative would not be significant because the project area provides only low quality habitat for a small number of migratory birds and only a small number of birds (if any) could be displaced. Mitigation would reduce these potential indirect impacts to a less than significant level.

Other ongoing and future construction projects would be required to implement mitigation measures to address any potential impacts to migratory birds either under the MBTA or the California Fish and Game Code. Therefore, there would be no cumulative impacts from the Fully Underground LRT Alternative with respect to biological resources.

Since the project area is already highly urbanized and the LRT project would be consistent with the urban character of the project area, there would be no operational impacts on ecosystems or biological resources.

4.8.3.5.1 NEPA Finding and CEQA Determination

The Fully Underground LRT Alternative would not have an adverse impact on ecosystems and biological resources in the project area. With implementation of proposed mitigation measures, the Fully Underground LRT Alternative would not have a significant impact on ecosystems and biological resources.

4.8.4 Mitigation Measures

In order to reduce the number of trees potentially removed or disturbed during construction of any of the build alternatives, the following mitigation measures are under consideration:

- The construction contractor would minimize disturbance to trees, where feasible, through avoidance or fencing.
- If disturbance is unavoidable, the construction contractor would trim individual trees instead of removing them completely to reduce the scale of disturbance.
- When feasible, the construction contractor would time necessary tree removal and trimming activities to seasons outside of the bird breeding season, which can extend from February 1 to August 31.

If it is not feasible to avoid tree removal and trimming related to construction during the breeding bird season from February 1 to August 31, breeding bird surveys would be conducted as recommended by the California Department of Fish and Game.

- Two biological surveys, conducted by a qualified biologist, would be conducted, one 15 days prior and a second 72 hours prior to construction activities that would remove or disturb suitable nesting habitat.
- Surveys would be performed by a qualified biologist with previous breeding bird survey experience. The biologist would prepare survey reports documenting the presence or absence of active nests of any protected native bird in the habitat to be removed and any other such habitat within 300 feet of the construction work area (within 500 feet for raptors).
- If an active nest is located, construction within 300 feet of the nest (500 feet for raptor nests) would be postponed until the nest is vacated, juveniles have fledged, and there is no evidence of a second attempt at nesting.

If construction of the project requires removal of any of the native trees located along the proposed alignment and stations for any of the build alternatives, the following mitigation measure would be applied:

- A removal permit would be required from the Los Angeles Board of Public Works in accordance with the City of Los Angeles Native Tree Protection Ordinance. The tree removal permit may require replanting of native trees within the project area or at another location within the City of Los Angeles to mitigate for the removal of these trees. The City's ordinance requires replacement of protected trees at a 2:1 ratio and other trees at a 1:1 ratio. If construction would require pruning of any protected native tree, the pruning would be performed in a manner that does not cause permanent damage or adversely affect the health of the trees.

The type of trees included as part of the street restoration plans would be determined in consultation with the City, the community, and designers. If landscaping and/or street trees planted as part of another Metro transit project are disturbed by this project, they would be replaced to the extent feasible.

4.9 Geotechnical/Subsurface/Seismic/Hazardous Materials

This section summarizes the existing geologic conditions in the project area, including the general topography, geologic materials, faults, seismicity, and potential hazardous materials. The information in this section is based on the Geotechnical/ Subsurface/ Seismic/ Hazardous Materials Technical Memorandum, which is incorporated into this DEIS/DEIR as Appendix U.

4.9.1 Regulatory Framework

NEPA requires an evaluation of potential impacts related to hazardous materials, including:

- The potential to encounter existing hazardous materials during project activities, and

- The potential for the proposed project to generate new hazardous materials that could affect the surrounding human and natural environments.

CEQA requires study of potential impacts related to geology, soils, and seismicity. The Los Angeles CEQA Thresholds Guide specifies additional thresholds of significance pertaining to creation or acceleration of geologic hazards, acceleration of erosion and sedimentation processes, alteration of distinct and prominent geologic and topographic land features, creation of hazards to the public by release or transport of hazardous materials, and interference with an adopted emergency response or evacuation plan. These thresholds are evaluated by determining whether the project would expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:

- Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault
- Strong seismic ground shaking
- Seismic-related ground failure, including liquefaction
- Landslides
- Result in substantial soil erosion or the loss of topsoil
- Be located on a geologic unit or soil that is unstable or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse
- Location on expansive soil, creating substantial risks to life or property
- Release or transport of hazardous materials, or
- Interference with an adopted emergency response or evacuation plan.

These thresholds have been incorporated into the analysis documented in this section.

Relevant regulations and programs also include:

- Federal:
  - Resource Conservation and Recovery Act
  - Superfund Amendments and Reauthorization Act
  - Comprehensive Environmental Response, Compensation, and Liability Act
  - Toxic Substances Control Act

  - Federal Occupational Safety and Health Act
- State:
  - Alquist-Priolo Act
  - Seismic Hazards Mapping Act of 1990
  - Surface Mining and Reclamation Act
  - California Hazardous Waste Control Law
  - Carpenter-Presley-Tanner Hazardous Substances Account Act
  - State of California Occupational Safety and Health Act
  - Unified Hazardous Waste and Hazardous Materials Management Regulatory Program
  - Waters Bill of 1985
  - La Follette Bill of 1986
  - South Coast Air Quality Management District Rule 1403
- Local:
  - City of Los Angeles General Plan – Safety Element and Seismic Safety Element
  - Uniform Fire Code
  - Los Angeles Municipal Code – Methane and Methane Buffer Zones

4.9.2 Affected Environment

4.9.2.1 Regional Geology

The proposed project alignments would traverse the southeastern end of the Elysian Park Hills and the ancient floodplain of the Los Angeles River. The geomorphology ranges from gently sloping alluvial floodplain surfaces to hillside slopes of moderate relief and grade. The steepest slopes along the alignment surface are between 3rd Street at Flower Street and Olive Street at 2nd Street. The Los Angeles River floodplain covers the broad, gently sloping, alluvial terrain east of the Bunker Hill area. Artificial fill of variable thickness underlies the proposed alignment near the surface. Fill materials consist of mixtures of sand, silt, clay, with variable amounts of construction debris. Deep areas of fill to depths of approximately 25 feet below ground surface are present at abandoned tunnels and storm drain excavations that have been backfilled. The regional geology and soils in the site vicinity is shown on Figure 4.9-1, Regional Geologic Map. The historical high groundwater in the vicinity of the alignment ranged between 30 to 70 feet below the existing grade. Additional groundwater information is found in the Water Resources Technical Memorandum (Appendix V).

4.9.2.2 Faulting and Seismicity

No known Holocene Active or Latest Pleistocene Active faults trend through the project area. The project area is not located within a currently established Alquist-Priolo earthquake fault zone for surface fault rupture. Holocene Active faults within ten miles of the planned alignment include the Hollywood fault (4.3 miles northwest of the proposed alignment), the Raymond fault (4.9 miles northeast of proposed alignment), the Newport-Inglewood fault zone (7.0 miles west-northwest of proposed alignment), Verdugo fault (7.1 miles north-northeast of the proposed alignment), and the Santa Monica fault (9.2 miles west of the proposed alignment). Although the Hollywood fault is considered active by the State Geologist, an Alquist-Priolo Earthquake Fault Zone has not yet been established for the Hollywood fault due to its poorly defined location along its length. Other potentially active faults not definitively proven to exist may be located as close as one-half mile from the project area. A detailed inventory of regional fault zones is available in Appendix U. Seismic hazards that could affect the project alignment include ground shaking from an earthquake along one of the active faults in the region. Liquefaction-induced ground failure has historically been another major cause of earthquake damage in Southern California. Potential liquefaction zones in the project area are depicted in Figure 4.9-2.

Seismically induced settlement includes compression of dry soils above groundwater and liquefaction-induced settlement of liquefiable soils below groundwater. Seismically induced settlement occurs primarily within loose to moderately dense sandy soils due to volume reduction during or shortly after an earthquake event. The composition of most of the artificial fill along the proposed project alignment is expected to be undocumented and could include these loose soils. In addition, a portion of the alluvial soils along the alignment are anticipated to be loose to medium dense. Accordingly, both the portions of the proposed alignment mapped within the liquefiable zone and those underlain by undocumented fill have the potential to experience seismically induced settlement.

The proposed project alignment is not located within an earthquake-induced landslide zone according to the State of California Seismic Hazard Zones for the Hollywood and Los Angeles Quadrangles. However, the northwest portion of the project area in the vicinity of the proposed 2nd/Hope Street station (the area east of the US 101/SR 110 interchange) is within the Hillside Ordinance area according to the City of Los Angeles Seismic Safety Element (1996). Figure 4.9-2 shows potential landslide hazards in the project area.

Earthquake-induced flooding can be caused by failure of dams or other water-retaining structures due to an earthquake. Due to the absence of such structures in the vicinity of the alignment, the potential for such hazards to affect the project is considered low. The proposed alignments are located in an urbanized area composed mainly of impervious surfaces that include well-developed drainage infrastructure, so the project would not substantially increase the risk of flooding.

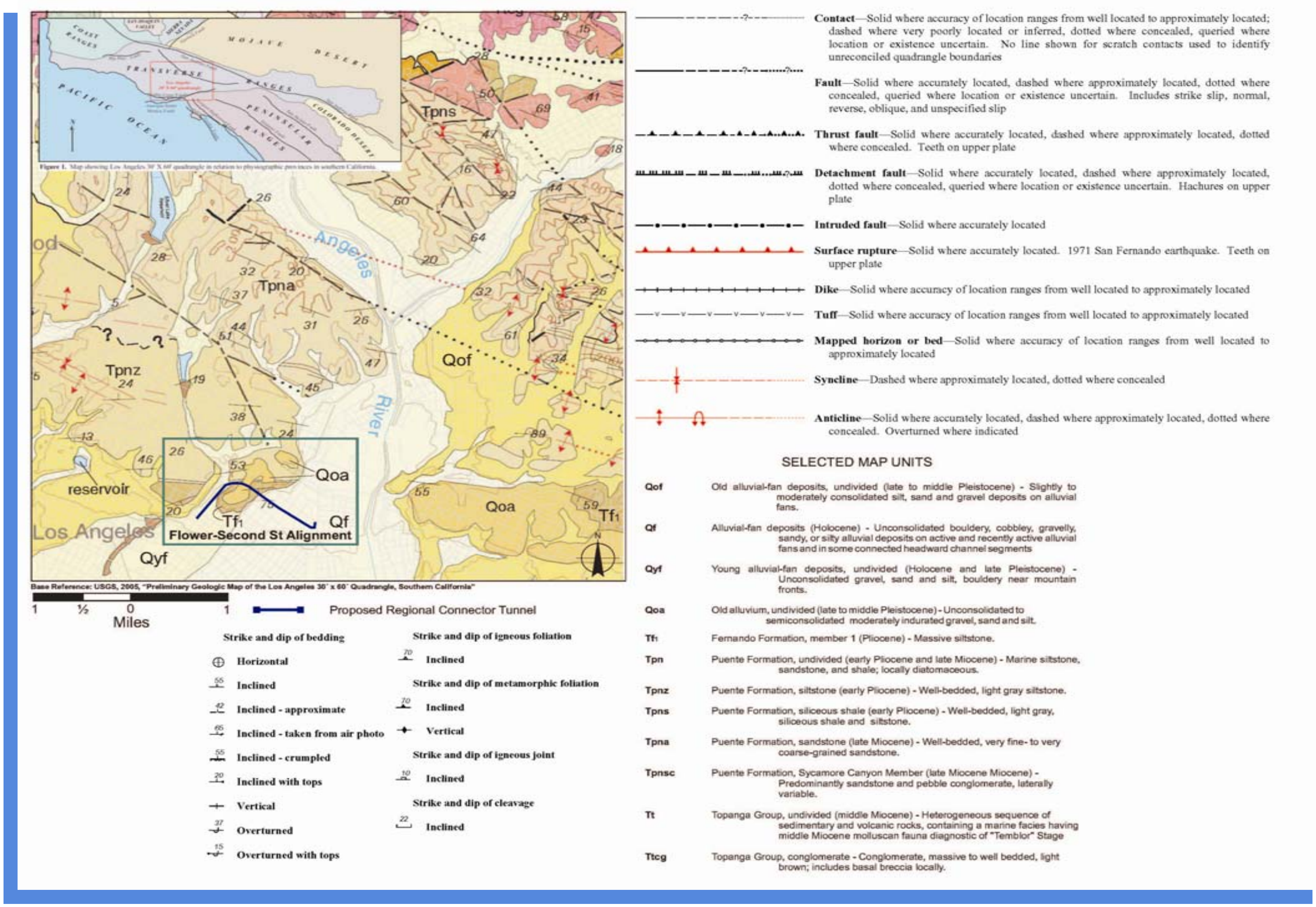


Figure 4.9-1. Regional Geologic Map

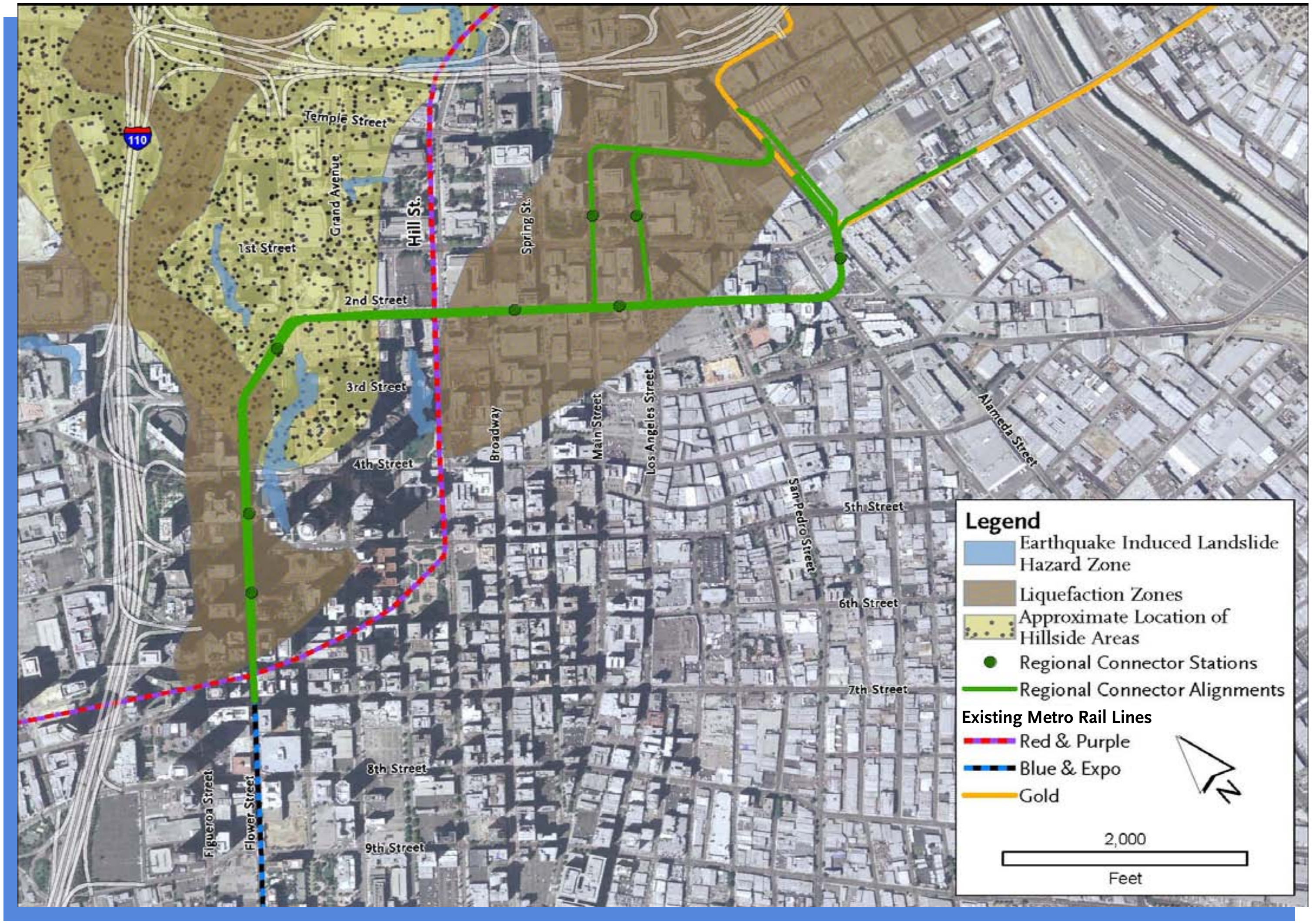


Figure 4.9-2. Liquefaction and Landslide Hazards

4.9.2.3 Seiches and Tsunamis

Seiches are large waves generated in enclosed bodies of water in response to ground shaking. Tsunamis are tidal waves generated in large bodies of water by fault displacement or major ground movement such as submarine landslides.

According to the City of Los Angeles Seismic Safety Element (1996) and the County of Los Angeles Seismic Safety Element (1990), the project area is more than 10 miles from the ocean and is not located within areas potentially impacted by either tsunamis or seiches.

4.9.2.4 Mineral Resources

Regarding the loss of mineral resources, the project area traverses areas underlain by geologic materials such as sand and gravel that may be considered mineral resources and could be used as construction aggregates. However, these materials have not been previously mined along the project alignment. Furthermore, mining of these materials in an urbanized environment is not considered economical. However, there is a potential for re-use of excavated material as fill.

4.9.2.5 Hazardous Materials

A search of regulatory databases, including federal, state, and local environmental records, as well as historical mapping, was conducted for the project. The database search results include facilities that handle hazardous materials but have not necessarily had a release to the environment as well as sites that are documented as closed cases where past satisfactory remediation has occurred. These listings do not represent a potential concern for the proposed project and were eliminated from further evaluation.

In some instances, more information was requested from regulatory agencies to determine the current status of a site. In addition, Sanborn fire insurance maps, maps of the Union Station Methane Buffer Zone and Methane Zone and the Los Angeles City Methane Buffer Zone, and oil well construction and abandonment records provided additional information used to determine which sites pose a potential concern with respect to hazardous materials.

The *Hazardous Materials Investigation and Analysis* (CDM 2009) classifies properties of concern as High, Moderate, or Low based on the following criteria:

- High - sites with known/probable soil, groundwater, or soil gas contamination that have not been remediated, or where remediation is incomplete or undocumented. Other considerations include the type and mobility of any contamination, distance to a project, groundwater impacts, and the location with respect to the inferred or known direction of groundwater flow.

- Moderate – sites with known/potential soil, groundwater, or soil gas contamination and where remediation is in progress, contaminants do not appear to pose a concern for a project, or where construction would occur within mapped Methane Buffer Zones. Sites may also be considered a Moderate level of concern based on the type and intensity of former land use (e.g., chemical manufacturers, machine shops, gas stations, etc.), even though they did not otherwise have an environmental database listing.

- Low – sites that are not likely or are less likely to impact soil and/or groundwater that would be encountered during construction of a project. These may include sites having permitted air toxic emissions or some sites with spills or leaks to the environment that were subsequently remediated and have received case closure.

Figure 4.9-3 shows the properties of High or Moderate concern.

The City of Los Angeles, Department of Public Works, Bureau of Engineering, has mapped Potential Methane Zones and "buffer zones". The City's Municipal Code, Chapter IX, Building Regulations, Article 1, Division 71, Methane Seepage Regulations, requires construction projects located within the Methane Zone or Methane Buffer Zone to comply with the City's Methane Mitigation Standards to control methane intrusion emanating from geologic formations.

In addition to hazardous materials that are known or suspected to exist at the properties listed in Appendix U, other hazardous materials may be present (CDM 2009). Transformers located above and below grade along the alignments may contain PCBs. Lead may also be present in surface soil from historic emissions of leaded fuel from vehicles on adjacent roadways. Since most soil along the proposed alignment is covered by asphalt or concrete, exposure to these hazardous materials is unlikely. However, buildings along the proposed alignments that were constructed prior to 1979 may contain asbestos and buildings constructed prior to 1978 may contain lead-based paint that could be released during demolition. These hazardous materials would present a concern for the proposed project, as exposure to these materials at certain levels may cause adverse health effects to workers and the general public.

4.9.3 Environmental Impacts/Environmental Consequences

The following sections summarize the evaluation of potential geotechnical, subsurface, seismic, and hazardous materials impacts for each alternative. Table 4.9-1 summarizes the results of the analysis.

4.9.3.1 No Build Alternative

As the No Build Alternative does not involve construction of any new transit infrastructure beyond projects already identified in Metro's 2009 LRTP, it would not result in any geotechnical, subsurface, seismic, or hazardous materials impacts.

4.9.3.1.1 NEPA Finding

The No Build Alternative would not have adverse geotechnical, subsurface, seismic, or hazardous materials impacts.

4.9.3.1.2 CEQA Determination

The No Build Alternative would not have significant adverse geotechnical, subsurface, seismic, or hazardous materials impacts.

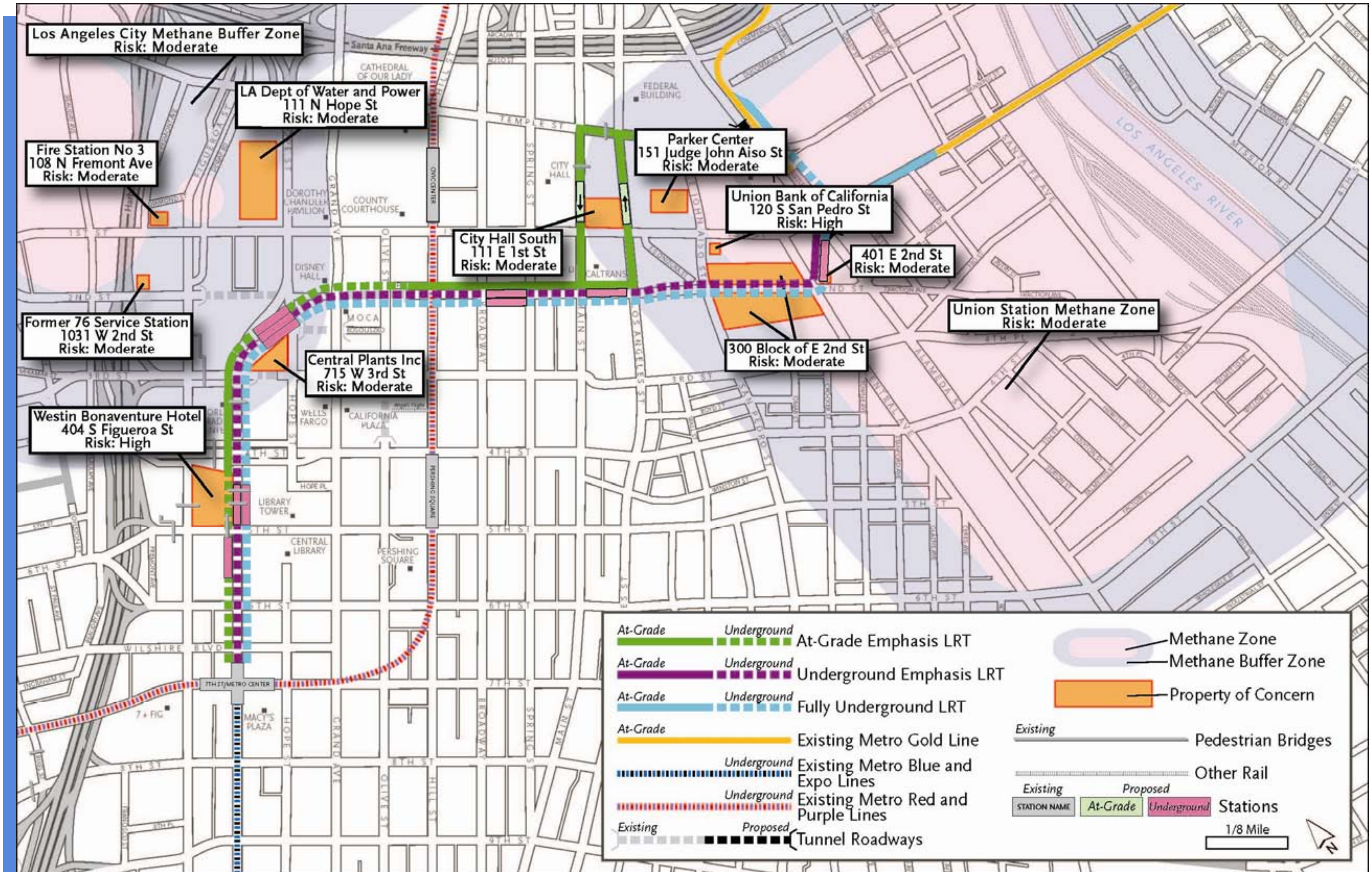


Figure 4.9-3. Known or Suspected Hazardous Materials in Soil and/or Groundwater within 0.25 Miles of Proposed Alignments

Table 4.9-1. Summary of Potential Impacts to Geotechnical/Subsurface/Seismic/Hazardous Materials

Alternative	Geotechnical Impacts[1]	Seismic Impacts[2]	Hazardous Materials[3]	Mitigation Required
No Build	None	None	None	None
TSM	None	None	None	None
At-Grade LRT	None	Adverse effects not significant after mitigation	Adverse effects not significant after mitigation	Mitigation proposed
Underground LRT	Adverse effects not significant after mitigation	Adverse effects not significant after mitigation	Adverse effects not significant after mitigation	Mitigation proposed
Fully Underground LRT	Adverse effects not significant after mitigation	Adverse effects not significant after mitigation	Adverse effects not significant after mitigation	Mitigation proposed

[1] Geotechnical impacts might include risk of landslides, soil erosion, or ground settlement due to unstable soils
[2] Seismic impacts could include known faults, liquefaction risks, seismic-related flooding
[3] Hazardous material risks include methane zone and methane zone buffer areas, contaminated soil and groundwater, and hazardous building materials

4.9.3.2 TSM Alternative

The TSM Alternative includes all of the provisions of the No Build Alternative, plus two new shuttle bus routes through downtown Los Angeles. The implementation of these shuttle bus routes would not introduce any additional geotechnical, subsurface, seismic, or hazardous materials impacts compared to the No Build Alternative.

4.9.3.2.1 NEPA Finding

The TSM Alternative would not result in adverse geotechnical, subsurface, seismic, or hazardous materials impacts.

4.9.3.2.2 CEQA Determination

The TSM Alternative would not result in significant adverse geotechnical, subsurface, seismic, or hazardous materials impacts.

4.9.3.3 At-Grade Emphasis LRT Alternative

4.9.3.3.1 Geotechnical, Subsurface, and Seismic Hazards

The At-Grade Emphasis LRT Alternative does not cross any known fault. However, the At-Grade Emphasis LRT Alternative would be potentially susceptible to liquefaction in portions of the proposed alignment along Flower Street between Wilshire Boulevard and 2nd Street, and along 2nd Street between Hill and San Pedro Streets. The portions of the alignment within the mapped liquefiable zone or underlain by undocumented fill may be susceptible to seismically induced settlement.

Therefore, there is limited potential for adverse effects related to liquefaction and seismically induced settlement for portions of the At-Grade Emphasis LRT Alternative, but there would not be a potential for adverse impacts related to active or potentially active faults, landslides, flooding, seiches, or tsunamis.

The proposed construction would have the potential for adverse impacts related to ground settlement and differential settlement on adjacent structures including historical buildings. Further evaluation and survey would be performed during design to establish building types and existing conditions, and to develop criteria to limit potential movement to acceptable threshold values.

4.9.3.3.2 Hazardous Materials

During construction of the At-Grade Emphasis LRT Alternative, there is the potential to encounter hazardous materials along the proposed alignment (Figure 4.9-3). Construction of the at-grade portions of the alignment would entail clearing and grading of shallow soil, during which shallow groundwater could also be encountered. The underground portions of the At-Grade Emphasis LRT Alternative along Flower Street (approximately 45 percent) would require trenching or tunneling, and as a result would encounter deeper soils and groundwater. Known and/or suspected soil and/or groundwater contamination exists at properties directly within and near to the proposed alignment, as shown in Figure 4.9-3. Additional site-specific soil, groundwater, and/or soil gas investigation activities may be necessary at these properties to further delineate potential areas of contamination and guide construction activities. Groundwater encountered during construction dewatering would require testing and either on-site treatment and discharge in accordance with applicable standards or transport to a treatment and/or disposal facility.

Lead may be present in surface soils along the proposed alignment from historical vehicle emissions, and PCBs may exist in surface or subsurface soils from leaking transformers located above or below grade. During construction, release of these hazardous materials in contaminated soil and/or groundwater could result in exposure to workers, the public, and sensitive receptors, such as schools within 0.25 miles. This could occur through the release of dust or vapors from exposed soil and/or groundwater. Until further study is conducted, the actual levels of hazardous materials that could be encountered in soil and/or groundwater during construction are unknown. Compliance with the federal, state, and local laws and regulations regarding hazardous materials listed in Section 4.9.1 would be required during construction of the At-Grade Emphasis LRT Alternative. In addition, mitigation would be required to reduce potential impacts to construction workers from encountering contamination during construction.

There is potential for hazardous materials, such as fuels and hydraulic oil used for construction equipment, paints, lubricating fluids, and solvents for maintenance to be accidentally released during construction. Direct impacts could result from an accidental release. The implementation of the BMPs in Section 4.9.4.1 would ensure that potential direct impacts from an accidental release would be less than significant. Compliance with existing laws and regulations would reduce the potential for significant impacts from an accidental release of hazardous materials during operation as well.

The proposed alignment would cross methane zones and methane buffer zones associated with oil deposits in the project area, as shown in Figure 4.9-3. The At-Grade Emphasis LRT Alternative alignment would cross into the Union Station Oil Field along Los Angeles and Temple Streets based on maps published by the California Division of Oil, Gas, and Geothermal Resources (CDOGG, 2003). The Union Station Oil field has been delineated as a Methane Zone by the City of Los Angeles Department of Public Works, Bureau of Engineering. The proposed alignment would also cross a City of Los Angeles Methane Buffer Zone north of 3rd Street and west of Grand Avenue. Petroliferous odors have been reported in several borings drilled north of 3rd Street between Flower Street and Grand Avenue.

Excavation within these zones may encounter naturally occurring hydrocarbon gases, including hydrogen sulfide and methane. Methane and hydrogen sulfide are considered hazardous because of their explosive properties. Additionally, hydrogen sulfide is highly toxic when inhaled. These gases can seep into tunnels and other excavations through soil and also through discontinuities (fractures, faults, etc.) in bedrock.

Mitigation requirements are determined according to the actual methane levels and pressures detected on a site. Mitigation measures could include both active and passive ventilation systems to ensure exchange of air, gas barriers (membranes around basements and foundations), and sensors in interior spaces to monitor the presence of gas and its pressure.

If construction of the At-Grade Emphasis LRT Alternative requires building demolition, release of hazardous materials including asbestos fibers and lead-based paint particles could occur, which could result in a potential impact. Mitigation, as described in Section 4.9.4, would reduce this potential direct impact to less than significant.

During long-term operation of the At-Grade Emphasis LRT Alternative, there is the potential for the below-grade portions of the alignment to act as a preferential pathway for existing groundwater contamination to move to areas distant from the project.

Indirect impacts could occur from the accidental release of hazardous materials during the transport of soil or other media contaminated with hazardous materials to a disposal facility located away from the project area during construction.

There is the potential for cumulative impacts associated with hazards and hazardous materials from the At-Grade Emphasis LRT Alternative. A number of related construction projects have been identified and some of those projects could involve ground-disturbing construction where there is potential to encounter hazardous materials in soil and/or groundwater. In addition, other construction activities in the project area may entail building demolition, with the potential for release of asbestos fibers from asbestos containing materials and lead particles from lead-based paint. The additive effect of on-going and future activities could result in cumulative impacts to human health or the environment through release of hazardous materials.

4.9.3.3.3 NEPA Finding

There is the potential for adverse impacts with respect to liquefaction, seismically induced settlement, and hazardous materials for portions of the At-Grade Emphasis LRT Alternative. Mitigation would be required to reduce the severity of these potential impacts to a less than significant level.

4.9.3.3.4 CEQA Determination

Potential impacts associated with liquefaction, seismically induced settlement, landslides, flooding, and hazardous materials could occur during construction and operation of the At-Grade Emphasis LRT Alternative. Compliance with federal, state, and local laws and regulations regarding hazardous materials would reduce many of these impacts to a less than significant level. In addition, implementation of mitigation measures would be required to address specific issues (e.g., liquefaction, settlement, potential presence of subsurface gases, asbestos containing materials and lead based paint) to a less than significant level.

4.9.3.4 Underground Emphasis LRT Alternative

4.9.3.4.1 Geotechnical, Subsurface, and Seismic Hazards

The geotechnical, subsurface, and seismic hazards associated with the Underground Emphasis LRT Alternative would be similar to those of the At-Grade Emphasis LRT Alternative except that a greater proportion of the alignment is underground and would be potentially susceptible to adverse impacts related to ground settlement and differential settlement on adjacent structures. Ground improvement would be required in advance of tunneling to provide adequate support and to minimize settlement. In addition, a preconstruction survey of adjacent structures and all historical buildings in the vicinity would be conducted to establish a baseline against which to measure potential construction-induced damage. Construction monitoring would be required during construction to ascertain the criteria are met.

In addition, a limited portion of the eastern edge of the Underground Emphasis LRT Alternative alignment near the intersection of Alameda and 1st Streets would be within the mapped Inundation Hazard Area (Figure 4.10-1). The majority of the Underground Emphasis LRT Alternative is not located in an area mapped with the potential to be susceptible to flooding. The alignment is located in an urbanized area covered with impervious surfaces and includes a well-developed drainage infrastructure. The proposed project would not increase the risk of flooding.

With implementation of mitigation, potential effects related to geologic, subsurface, or seismic hazards would be reduced to a less than significant level. Figure 4.9-4 illustrates a typical alignment profile for the Underground Emphasis LRT Alternative, which shows the area of greatest ground cover over the tunnel (i.e., greatest depth from ground surface to tunnel grade) and the locations of borings associated with field explorations conducted for the project. Figure 4.9-5 provides the legend for Figure 4.9-4.

4.9.3.4.2 Hazardous Materials

The potential hazardous materials impacts associated with the Underground Emphasis LRT Alternative would be similar to those of the At-Grade Emphasis LRT Alternative. However, since a greater portion of the alignment would be underground, more of the project area would be susceptible to the potential spread of contaminated groundwater and release of subsurface oilfield gases. As with the At-Grade Emphasis LRT Alternative, the proposed alignment would cross methane zones and methane buffer zones associated with oil deposits in the vicinity, as shown in Figure 4.9-3. Excavation within these zones may encounter naturally occurring hydrocarbon gases, including hydrogen sulfide and methane. Therefore, construction of this alternative would require compliance with the City's Methane Mitigation Standards. Also, the Underground Emphasis LRT Alternative would require more property acquisition and demolition of existing structures, which could heighten the risk of potential release of asbestos fibers and lead-based paint particles.

4.9.3.4.3 NEPA Finding

The Underground Emphasis LRT Alternative would have the potential for adverse impacts with respect to liquefaction, seismically induced settlement, ground loss due to tunneling, and hazardous materials. Mitigation would be required to reduce the severity of these impacts to a less than significant level.

4.9.3.4.4 CEQA Determination

Potential impacts associated with liquefaction, seismically-induced settlement, ground loss due to tunneling, and hazardous materials could occur during construction and operation of the Underground Emphasis LRT Alternative. Many of these impacts would be addressed with adherence to federal, state, and local laws and regulations regarding hazardous materials. However, mitigation would be required to address specific issues, including potential ground loss due to tunnel construction, liquefaction hazard, presence of subsurface gases, asbestos containing materials, and lead based paint. With mitigation, potential impacts would be less than significant.

4.9.3.5 Fully Underground LRT Alternative

4.9.3.5.1 Geotechnical, Subsurface, and Seismic Hazards

The geotechnical, subsurface, and seismic hazards for the Fully Underground LRT Alternative would be similar to those of the Underground Emphasis LRT Alternative. More of the alignment would be located within the mapped Inundation Hazard Area, but this would still be a limited portion of the overall alignment.

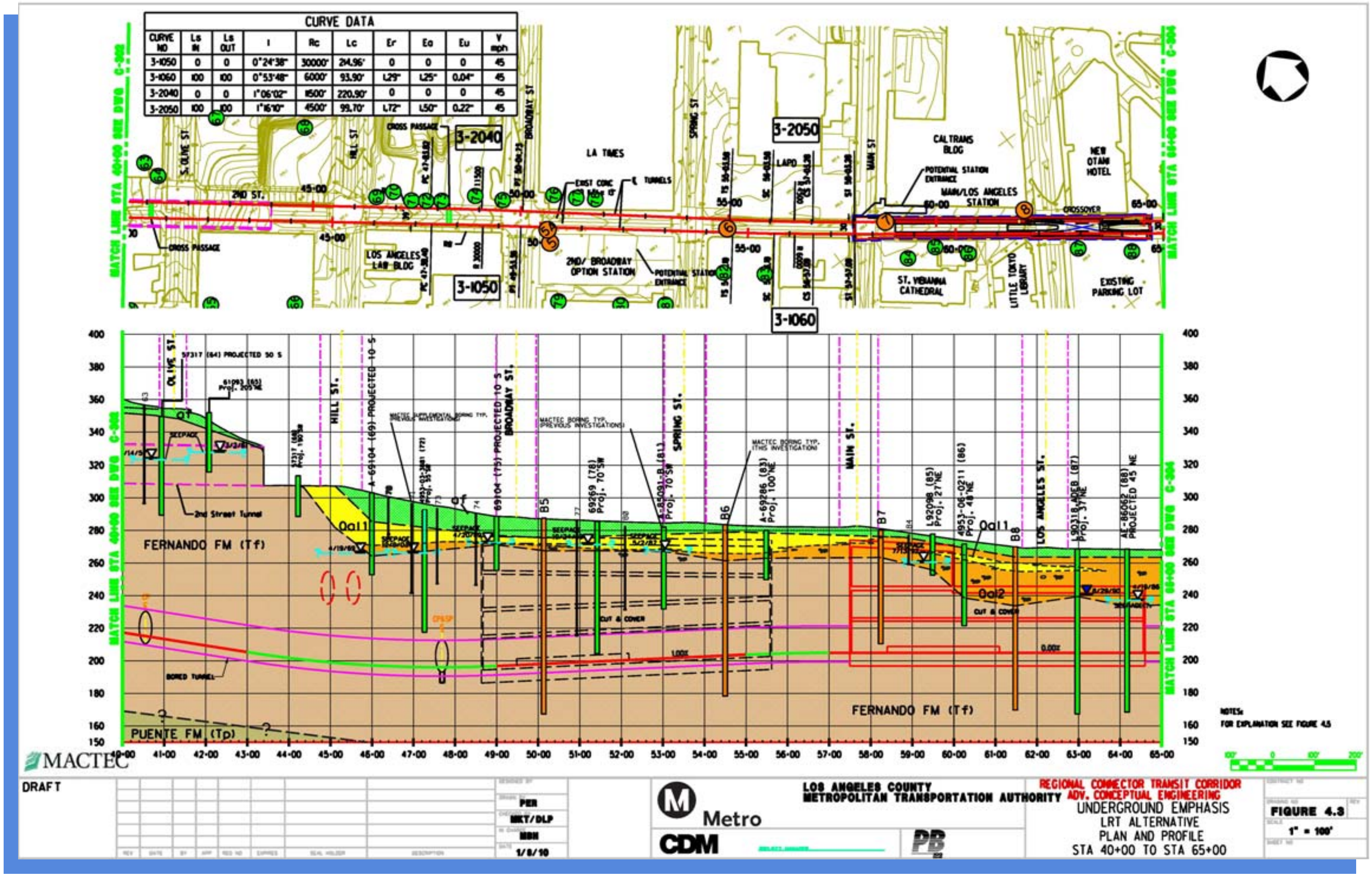


Figure 4.9-4. Underground Emphasis LRT Alternative Typical Underground Conditions

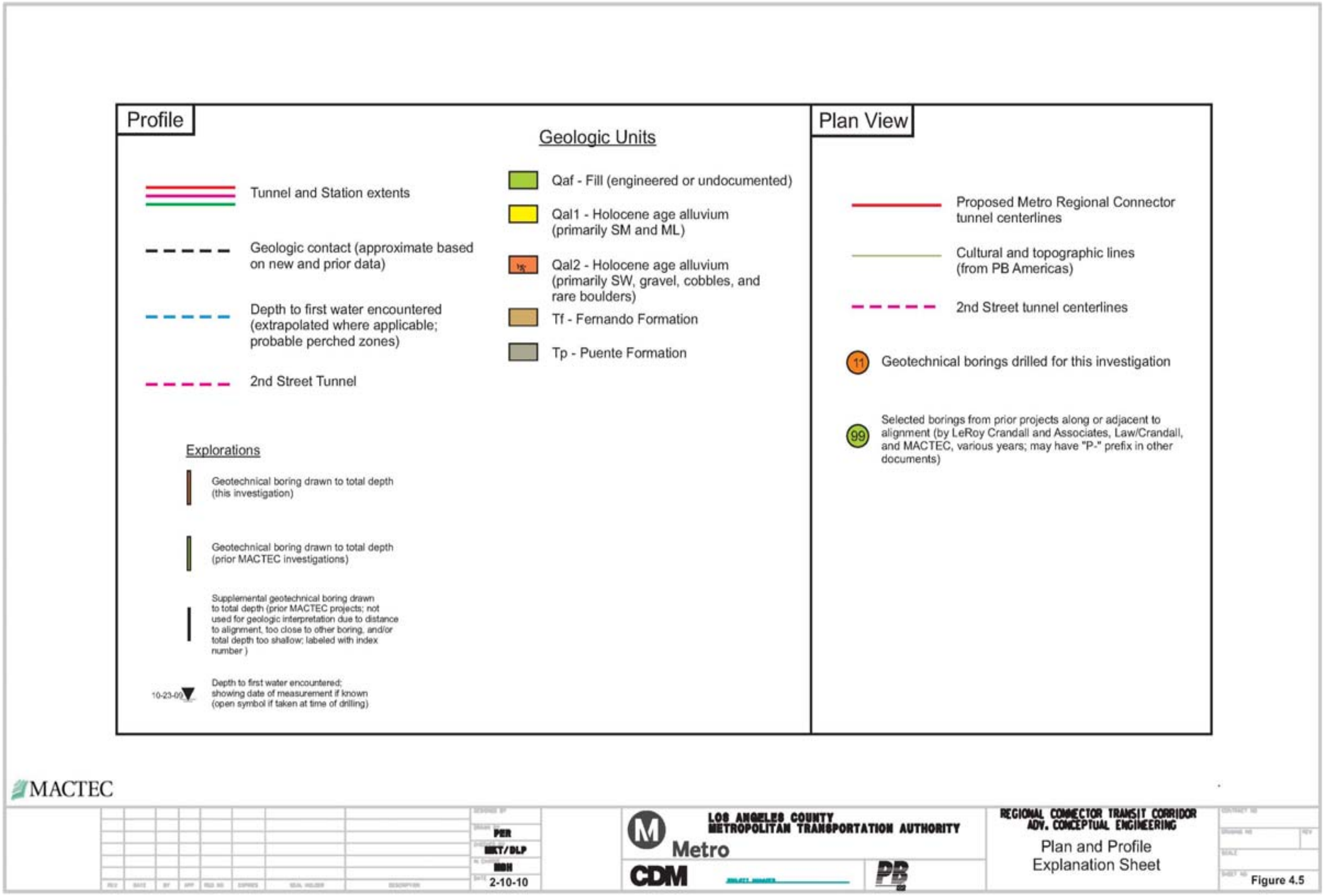


Figure 4.9-5. Geologic and Subsurface Formations Legend for Figure 4.9-4

4.9.3.5.2 Hazardous Materials

The hazardous materials impacts associated with the Fully Underground LRT Alternative would be similar to those of the Underground Emphasis LRT Alternative. However, since a greater portion of the alignment would be underground, more of the project area would be susceptible to the potential spread of contaminated groundwater and release of subsurface oilfield gases. Also, the Fully Underground LRT Alternative would require more property acquisition and demolition of existing structures, which could heighten the risk of potential release of asbestos fibers and lead-based paint particles.

4.9.3.5.3 NEPA Finding

The Fully Underground LRT Alternative would have the potential for adverse impacts with respect to liquefaction, seismically induced settlement, ground loss due to tunneling, and hazardous materials. Mitigation would be required to reduce the severity of these impacts to a less than significant level.

4.9.3.5.4 CEQA Determination

The Fully Underground LRT Alternative would have potential impacts associated with liquefaction, seismically induced settlement, ground loss due to tunneling, and hazardous materials during construction and operation. With mitigation, potential impacts would be less than significant.

4.9.4 Mitigation Measures

4.9.4.1 Construction Mitigation Measures

A geotechnical investigation would be performed during final design for the proposed at-grade and below-grade structures and improvements. The investigation would provide additional site specific data to facilitate final design for maintaining the integrity of existing structures under static and seismic loading and operational demands. Although portions of the alignment would be constructed in potential liquefaction zones, none are expected to result in or exacerbate geologic hazards. The proposed subway tunnels and underground stations for the build alternatives would be located at depths below soils prone to liquefaction, and be subject to standard design specifications. Higher design earth pressures would be applied to below grade structures within liquefaction zones during the construction process to keep potential risks of damage from liquefaction and seismically induced settlement to an acceptable level.

For the any of the build alternatives, the potential for ground movement associated with cut and cover construction and potential ground loss due to tunneling could be mitigated by the following mitigation measures:

- Design criteria would be established during final design that require the construction contractor to limit movement to less than an acceptable threshold value as a performance standard. This acceptable threshold standard would be a function of several factors including but not limited to the type of structure and its existing condition. Additional data and survey information would be gathered during preliminary engineering for each building to enable assessment of the tolerance of potentially affected structures. In addition, standard threshold criteria and guidelines published by agencies and for similar type of structures would be reviewed. Additional geotechnical studies would be performed to define the nature of the soils and to refine the means of achieving each performance specification.

- Require ground improvement such as grouting or other methods to fill voids where appropriate and offset potential settlement when excess material has been removed during excavation. The criteria for requiring grouting or ground improvement would be based on the additional data collection and reviews as noted above and acceptable threshold values.

- Grout tunnel alignment in advance to provide adequate soil support and minimize settlement as geotechnical conditions require.

- Monitor settlement along project alignment using a series of measuring devices above the route of the alignment. Leveling surveys would be conducted prior to tunneling, to monitor for possible ground movements.

- Conduct a preconstruction survey of buildings to establish a baseline to measure potential construction-induced damage against.

- Describe and define tunnel construction monitoring requirements. In addition, provisions could be included to use the Earth Pressure Balance or Slurry TBM for tunnel construction to minimize ground loss. During tunnel construction, the soils encountered would be monitored relative to anticipated soil conditions as described in a Geotechnical Baseline Report.

A Contaminated Soil/Groundwater Management Plan would be implemented during construction to establish procedures to follow if contamination is encountered. The plan would be prepared during the final design phase of the project, and the construction contractor would be held to the level of performance specified in the plan. The plan would include the following:

- Notification procedures and contact information for appropriate regulatory agencies

- Procedures for sampling and analysis of soil and/or groundwater known or suspected to be impacted by hazardous materials

- Procedures for the proper handling, storage, transport, and disposal of contaminated soil and/or groundwater, in consultation with regulatory agencies

- Dust control measures (e.g., soil wetting, wind screens, etc.) for contaminated soil

- Groundwater collection, treatment, and discharge procedures and applicable standards

In addition, a Worker Health and Safety Plan would be implemented prior to the start of construction activities. All workers would be required to review, receive training if necessary, and sign the plan prior to starting work. The plan would, at a minimum, identify the following:

- Properties of concern and the nature and extent of contaminants that could be encountered during excavation activities
- All appropriate worker, public health, and environmental protection equipment and procedures
- Emergency response procedures, including most direct route to a hospital
- Site Safety Officer

During construction of the underground portions of the build alternatives, mitigation would be required to address the potential for the creation of a preferential pathway and resulting spread of existing groundwater contamination. This could entail the use of impermeable grout where necessary to fill gaps between the tunnel and the surrounding earth along underground portions of the alignment where groundwater contamination exists.

To reduce potential impacts from subsurface gases associated with oilfields in the vicinity of the project area, mitigation measures would be implemented during construction of the underground portions of the build alternatives to address both exposure to toxic gases and the risk of explosion. This would be particularly important in methane zones and methane buffer zones, but testing would be required in all underground segments, as oilfield gases could occur outside of mapped zones. Construction of the project would comply with the City of Los Angeles' Methane Mitigation Standards to control methane intrusion emanating from geologic formations. Mitigation requirements are determined according to the actual methane levels and pressures detected on a site. Specific precautions to protect workers and the public from exposure to toxic gases would be required, and specialized excavation methods would be needed to prevent explosion.

Prior to building demolition, surveys of asbestos containing materials and lead-based paint would be conducted. If necessary, destructive sampling would be used. All asbestos containing materials and lead-based paint would be removed or otherwise abated prior to demolition. Removal and abatement activities would comply with all applicable laws, regulations, and rules.

To reduce potential impacts from accidental release of construction-related hazardous materials, the construction contractor would be required to implement BMPs for handling hazardous materials in compliance with existing regulations. These BMPs would include the following:

- Requirements for proper use, storage, and disposal of chemical products and hazardous materials used in construction
- Spill control and countermeasures, including employee spill prevention/response training
- Vehicle fueling procedures to avoid overtopping construction equipment fuel tanks
- Procedures for routine maintenance of construction equipment, including the proper containment and removal of grease and oils

- Procedures for the proper disposal of discarded containers of fuels and other chemicals

4.9.4.2 Operational Mitigation Measures

Mitigation would be required to address the potential for intrusion of subsurface gases in the underground portions of any of the build alternatives. Compliance with the Los Angeles City Municipal Code would be necessary for all structures within methane zones or methane buffer zones. The code requires gas concentration/pressure testing on a specified frequency and, based on the results, appropriate mitigation measures or controls to be included in the design. These mitigation measures may include the use of gas-impermeable liners and venting to reduce or eliminate gas intrusion into stations and along the length of the underground segments. The design, construction, and use of this technology have been successfully employed by Metro for various Red Line segments.

Although potential impacts related to very weak EMFs that would be created by the build alternatives would not be anticipated, additional evaluation of sensitive receptors, including residences, schools, hospitals, day care facilities, and convalescent homes within 100 feet of the proposed alignments, would be warranted. Projected EMF levels produced by the LRT would be compared with International Radiation Protection Association guidelines. If these guidelines are exceeded, mitigation would be implemented to ground or block EMFs or modify the LRT power requirements.

4.10 Water Resources

This section summarizes the existing water resources in the project area and the potential impacts of the proposed alternatives on these resources. The information in this section is based on the Water Resources Technical Memorandum, which is incorporated into this DEIS/DEIR as Appendix V.

4.10.1 Regulatory Framework

The NEPA guidance issued by Federal Transportation Administration (FTA) recognizes the potential for wastewater generation and increased runoff to diminish water quality as possible impacts of transit projects.

CEQA guidelines provide a framework for evaluating potential effects. A significant impact to hydrology and water quality would occur if an alternative would:

- Violate any applicable water quality standards or waste discharge requirements, including those defined in Section 13050 of the Clean Water Act
- Affect the rate or change the direction of movement of existing groundwater contaminants, or expand the area affected by contaminants
- 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

- Substantially alter the existing drainage pattern of the site or area, including the alteration of the course of a stream or river, in a manner that would result in substantial erosion or siltation on- or off-site
- Create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff
- Otherwise substantially degrade water quality
- Place within a 100-year flood hazard area structures that would impede or redirect flood flows
- Expose people to a significant risk of loss, injury, or death involving flooding

The City of Los Angeles also specifies that a significant impact would occur if a project would increase the risk of harmful flooding during a 50-year storm.

Other applicable laws and guidance include:

- Federal:
  - Clean Water Act
  - National Flood Insurance Program regulations
- State:
  - Porter-Cologne Water Quality Control Act
  - State Antidegradation Policy
  - National Pollutant Discharge Elimination System
- Regional/Local:
  - Los Angeles Regional Water Quality Control Board requirements
  - County of Los Angeles General Plan
  - Los Angeles County Code
  - City of Los Angeles General Plan
  - City of Los Angeles Specific Plan for the Management of Flood Hazards
  - Los Angeles Department of Water and Power – Urban Water Management Plan

More information about these regulations and plans are provided in Appendix V.

4.10.2 Affected Environment

The proposed alternatives are located in the Los Angeles River Watershed Management Area. The Los Angeles River Watershed covers an area of over 834 square miles from the eastern portions of the Santa Monica Mountains, Simi Hills, and the Santa Susana Mountains in the west to the San Gabriel Mountains in the east.

The Los Angeles Department of Water and Power (LADWP) is responsible for supplying, treating, and distributing water for domestic and industrial uses in the project area. The City of Los Angeles obtains its water supply from local wells in the Los Angeles groundwater basin, the Los Angeles aqueducts, and by purchasing water from the Metropolitan Water District (MWD) (City of Los Angeles Planning Department 1995).

Groundwater is a major component of the water supply in the Los Angeles metropolitan area. Local groundwater resources provide about 15 percent of the total water supply. In drought years, this number can be as large as 30 percent (City of Los Angeles 2005a).

The proposed project alignment encompasses an area of approximately 1,200 acres in the central downtown area of Los Angeles. Surface water bodies are not directly located in the project area. The closest surface water feature is the Los Angeles River which runs approximately 0.5 miles east of Alameda Street and is near the project area's eastern boundary. Land use along this part of the river includes industrial, residential, and commercial uses, including major refineries and petroleum products storage facilities, major freeways, and rail lines (LARWQCB 2007). Surface water runoff and peak runoff rates have increased due to the impervious surfaces related to development in the project area. Another reason for the increase in peak runoff rates in the coastal plain areas stems from the elimination of natural ponding areas and improved hydraulic efficiency of water carriers such as streets and storm drain systems.

The project area is outside of the 100-year and 500-year flood zones and thus would not be susceptible to these storm events as defined by FEMA (100-year and 500-year storms are defined as having a one percent and 0.2 percent chance, respectively, of occurring in any given year). The closest 100-year floodplain area is along the Los Angeles River between Broadway and Mission Road approximately 0.5 to 0.7 miles from the project area (City of Los Angeles 1996).

The Los Angeles Coastal Plain Groundwater Basins underlie the project area. These groundwater basins are incorporated into the Coastal Plain Hydrographic Subunit. The Coastal Plain Hydrographic Subunit contains the Central, West Coast, Santa Monica, and Hollywood Basins. The Central Sub-basin, one of the most important basins in the hydrographic subunit, directly underlies the project area (City of Los Angeles Planning Department 1995).

Exploratory borings in the vicinity of the proposed alternatives have discovered groundwater along Flower Street between 7th and 2nd Streets at depths ranging from approximately 15 to 35 feet below ground surface. Other borings made adjacent to Flower Street between 2nd and 5th Streets discovered groundwater at depths between approximately 18 to 27 feet below the ground surface. In the area of Hill and Alameda Streets, borings reported groundwater seepage at depths between approximately 14 to 36 feet (Metro 2008). From these preliminary borings, it appears that groundwater is perched on the underlying San Fernando formation bedrock. Perched groundwater is groundwater that is separated from the water table and is often formed in response to water that collects during rain events or is in the process of being recharged by percolation from nearby surface water or other perched water zones.

The Inundation Hazard Zone is defined as areas that could flood should earthquake-induced failure of up-gradient dams, flood control facilities, or other water retaining structures occur. Multiple flood control facilities are located in the San Fernando Valley portion of the Los Angeles River watershed. Failure of these flood control mechanisms would potentially cause inundation in the vicinity of the proposed alternatives. A limited portion of the eastern section of the proposed build alternatives is at the edge of a potential inundation area (near the intersection of Alameda Street with both Temple and 1st Streets) (City of Los Angeles 1996). However, the majority of the length of the build alternatives is not located in an area mapped to have the potential to be susceptible to this type of flooding. Figure 4.10-1 shows the locations of the proposed build alternatives relative to the inundation zone.

4.10.3 Environmental Impacts/Environmental Consequences

The following sections summarize the evaluation of potential water resource impacts for each alternative. Table 4.10-1 summarizes the results of the analysis.

Table 4.10-1. Summary of Potential Impacts to Water Resources

Alternative	Water Quality	Groundwater Contamination	Drainage Impacts	Mitigation Required
No Build	None (No beneficial effects either)	None	None	None
TSM	None	None	None	None
At-Grade LRT	Adverse effects not significant after mitigation	Adverse effects not significant after mitigation	None	Mitigation proposed
Underground LRT	Adverse effects not significant after mitigation	Adverse effects not significant after mitigation	Adverse effects avoided through design	Mitigation proposed
Fully Underground LRT	Adverse effects not significant after mitigation	Adverse effects not significant after mitigation	Adverse effects avoided through design	Mitigation proposed

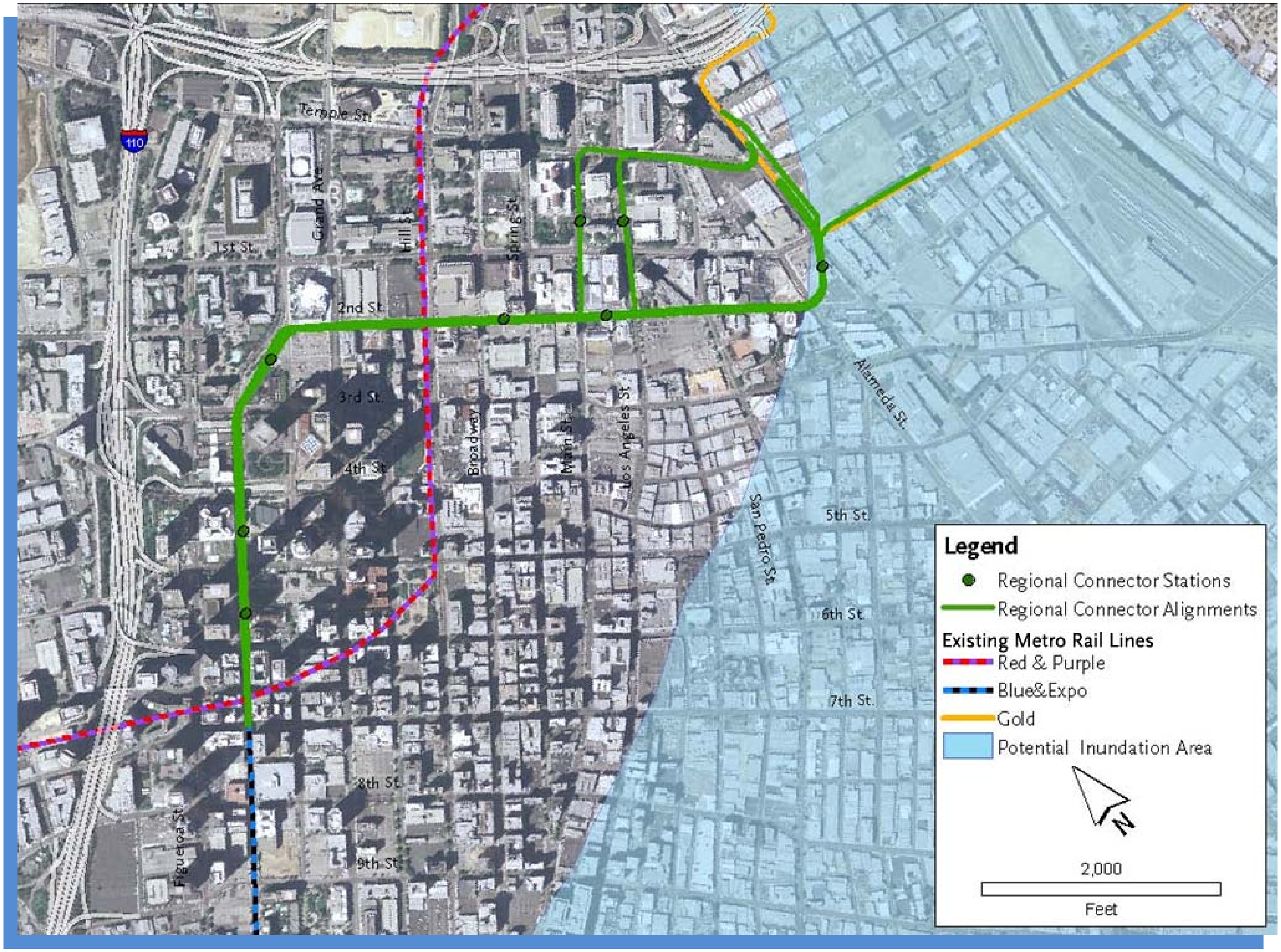


Figure 4.10-1. Potential Inundation Areas Relative to the Project Area

4.10.3.1 No Build Alternative

The No Build Alternative would not involve any new construction or operation of transit service. Changes to groundwater resources or recharge would not occur within the project area. The No Build Alternative would not allow the transit network to replace as many automobile trips as the build alternatives would, so some increases in roadway pollutants would occur as traffic worsens. Roadway pollutants can wash off of surface streets into surface waters during rain events.

4.10.3.1.1 NEPA Finding

The No Build Alternative would not have adverse impacts to water resources, although with fewer transit options, potential reductions in roadway pollutants would not occur.

4.10.3.1.2 CEQA Determination

The No Build Alternative would not have significant adverse impacts to water resources.

4.10.3.2 TSM Alternative

The TSM Alternative includes the same provisions as the No Build Alternative, plus the addition of two new shuttle bus routes linking 7th Street/Metro Center Station and Union Station. These additional shuttle bus lines would require minor rebuilding of existing drainage structures to accommodate new curb bus stops and the effects of this activity would not cause changes to water quality, hydrology, or drainage. Like the No Build Alternative, the TSM Alternative would not allow the transit network to replace as many automobile trips as the build alternatives would, so some increases in roadway pollutants would occur as traffic worsens.

4.10.3.2.1 NEPA Finding

The TSM Alternative would not have adverse impacts to water resources, although the limited increase in transit ridership would limit potential reductions in roadway pollutants.

4.10.3.2.2 CEQA Determination

The TSM Alternative would not have significant adverse impacts to water resources.

4.10.3.3 At-Grade Emphasis LRT Alternative

While approximately half of the At-Grade Emphasis LRT Alternative would be constructed at grade and would not require as much excavation as the other build alternatives, there would still be a potential need for dewatering if groundwater is encountered during construction activities. Stations and tunneling would occur as deep as 80 feet below the surface. Exploratory borings showed groundwater depths of 15 to 35 feet below ground on Flower Street in the vicinity of the proposed alignment. As such, it is likely that groundwater would be encountered during excavation activities. This groundwater is known to be contaminated with pollutants common to urban and commercial activities.

Given the likelihood of encountering contaminated groundwater, compliance with federal, state, and local laws and regulations (as described in Section 4.9) would be required during construction activities. A dewatering permit from the LARWQCB would be necessary and any contaminated groundwater would be properly treated prior to being discharged.

Uncontaminated groundwater may be treated and pumped back into the groundwater table, pumped to the sewer or storm drain system, or used on site for dust control purposes. Additional site specific groundwater investigation may be necessary to define the extent and location of groundwater contaminants for final design and to refine necessary mitigation measures.

Excavation activities also have the potential to create a preferential pathway for the spreading of contaminated groundwater in the groundwater basin. This impact could be mitigated by the use of impermeable concrete grouting materials which would reduce contaminant migration. Further mitigation measures to protect against potential environmental and social impacts from encountering contaminated groundwater are also described in Section 4.9.

Under the At-Grade Emphasis LRT Alternative, there is a potential for conflicts with the existing drainage system along 2nd Street between Grand Avenue and Olive Street where the alignment would be constructed through the 2nd Street Tunnel. Overall however, construction of the At-Grade Emphasis LRT Alternative would be expected to result in minimal impacts to and need for relocation of the current drainage system. In the case where construction activities would result in the need to relocate certain drainage infrastructure, temporary lines would be installed during the construction period. Construction of the At-Grade Emphasis LRT Alternative would have no significant impact on the overall drainage pattern in the project area.

The proposed alignment is outside of the 100-year flood hazard area; therefore, construction and operation of the At-Grade Emphasis LRT Alternative would not alter any existing flood zones.

In order to reduce any potential impacts related to stormwater runoff, a Stormwater Pollution Prevention Plan (SWPPP) would be prepared and implemented during construction. Additionally, a Standard Urban Stormwater Management Plan (SUSMP) would be prepared and implemented in accordance with the Los Angeles Municipal Code, to ensure that stormwater runoff is managed for water quality concerns through implementation of appropriate BMPs. Prior to issuance of any grading or building permits, the County and/or Stormwater Division of the Bureau of Sanitation must approve the SUSMP.

Due to the predominance of impervious surfaces throughout the project area, there is minimal percolation to the underlying groundwater basins. Therefore, any potential increases in contaminated surface water runoff would have no significant impact on groundwater quality.

Tunneling during construction could potentially create a preferential pathway for contaminated groundwater that could be encountered. This could cause the contamination to spread at higher rates than would normally occur without disruption by construction activity. This potential impact would be reduced to a less than significant level with implementation of mitigation measures described in Section 4.10.4.

Although unlikely during the operation phase of the At-Grade Emphasis LRT Alternative, groundwater dewatering and subsequent discharge may occur. The tunnel and underground stations would be constructed to preclude gas leakage or groundwater intrusion into the tunnel using a technique similar to that used for the Metro Gold Line tunnels in Boyle Heights. During operation, in the unlikely event that any water accumulates in the tunnel portions of the alignment, it would be pumped out by sump pumps and treated in accordance with applicable discharge permits before being discharged into the drainage system. Therefore, potential impacts to groundwater would be less than significant.

Operation of the At-Grade Emphasis LRT Alternative would likely decrease Vehicle Miles Traveled (VMT) of personal automobiles through the project area. An overall reduction in VMT could decrease the primary pollutants associated with all types of transportation operations such as heavy metals, solvents, and petroleum hydrocarbons. This would be a beneficial impact to surface water quality in the project area.

In regards to cumulative impacts, each of the reasonably foreseeable concurrent projects would be subject to applicable water quality regulations and each would be required to prepare a SWPPP for construction activities, incorporate BMPs to control pollutant discharges, and operate in compliance with Chapter 13.29, Stormwater and Urban Runoff Pollution Prevention Control and SUSMP. Also, it is not expected that any of the cumulative projects would result in a substantial change to the amount of impervious land cover in the project area, or a substantial alteration of the drainage systems. Overall, construction and operation of the At-Grade Emphasis LRT Alternative would not contribute to significant cumulative water quality, hydrology, and/or drainage impacts.

4.10.3.3.1 NEPA Finding

The At-Grade Emphasis LRT Alternative would have adverse effects with respect to water quality and groundwater contamination during construction. Operation of the alternative would have the potential beneficial effect of reducing automobile use and related roadway pollutants in stormwater runoff. Compliance with applicable regulations and implementation of the proposed mitigation measures in Section 4.10.4 would reduce potential adverse impacts to a less than significant level.

4.10.3.3.2 CEQA Determination

The At-Grade Emphasis LRT Alternative would not have significant impacts with respect to water quality and groundwater contamination after proposed mitigation measures are considered. Compliance with federal, state, and local laws in conjunction with implementation of mitigation measures proposed in Section 4.10.4 would reduce these potential impacts to a less than significant level.

4.10.3.4 Underground Emphasis LRT Alternative

The potential construction-related water quality and hydrology impacts of the Underground Emphasis LRT Alternative would be similar to those of the At-Grade Emphasis LRT Alternative. However, because the Underground Emphasis LRT Alternative involves more tunneling and generally greater intensity of construction activities, the potential for excavation to create a preferential pathway for the spreading of groundwater contamination in the groundwater basin would be greater. The use of impermeable concrete grouting materials would reduce potential contaminant migration, as described in Section 4.10.4, to a less than significant level. The Underground Emphasis LRT Alternative would also impact a storm drain backbone line along Flower and 2nd Streets, but design measures would address the potential conflicts and avoid changes to system capacity or the overall direction of storm flows through the drainage infrastructure in the project area.

The Underground Emphasis LRT Alternative would have similar operation-related water quality, hydrology, and drainage impacts as the At-Grade Emphasis LRT Alternative. As with the At-Grade Emphasis LRT Alternative, this alternative would have slightly beneficial water quality impacts associated with a reduction in annual VMT of automobiles through the project area, which would reduce buildup of pollutant loads associated with automobile use such as oil, grease, and metals.

4.10.3.4.1 NEPA Finding

The Underground Emphasis LRT Alternative would have adverse effects with respect to water quality and groundwater contamination during construction. Operation of the alternative would have the potential beneficial effect of reducing automobile use and related roadway pollutants in stormwater runoff. Compliance with applicable regulations and implementation of the proposed mitigation measures in Section 4.10.4 would reduce potential adverse impacts to a less than significant level.

4.10.3.4.2 CEQA Determination

The Underground Emphasis LRT Alternative would not have significant impacts with respect to water quality and groundwater contamination after proposed mitigation measures are considered. Compliance with federal, state, and local laws in conjunction with implementation of mitigation measures proposed in Section 4.10.4 would reduce these potential impacts to a less than significant level.

4.10.3.5 Fully Underground LRT Alternative

Potential construction-related water quality impacts of the Fully Underground LRT Alternative would be similar to those of the Underground Emphasis LRT Alternative. The primary difference between the two alternatives is that the Fully Underground LRT Alternative includes a new station at 2nd Street and Central Avenue and an underground rail junction beneath 1st and Alameda Streets. This would result in more intense excavation activities in the potential inundation area than the Underground Emphasis LRT Alternative; however, the area is already fully urbanized and highly impervious so there would not be significant increases in the potential severity of inundation impacts.

4.10.3.5.1 NEPA Finding

The Fully Underground LRT Alternative would have adverse effects with respect to water quality and groundwater contamination during construction. Operation of the alternative would have the potential beneficial effect of reducing automobile use and related roadway pollutants in stormwater runoff. Compliance with applicable regulations and implementation of the proposed mitigation measures in Section 4.10.4 would reduce potential adverse impacts to a less than significant level.

4.10.3.5.2 CEQA Determination

The Fully Underground LRT Alternative would not have significant impacts with respect to water quality and groundwater contamination after proposed mitigation measures are considered. Compliance with federal, state, and local laws in conjunction with implementation of mitigation measures proposed in Section 4.10.4 would reduce these potential impacts to a less than significant level.

4.10.4 Mitigation Measures

In the case that contaminated groundwater is encountered and it is determined that there is potential for the contamination to spread, this would be mitigated during the design and engineering process. For example, it could be specified that impermeable concrete-based grouting materials should be used to fill the gap between the tunnel and the surrounding earth. The permeability of grouting materials is lower than surrounding soil types and this would reduce the possibility that the tunnel could serve as a preferential pathway for contaminant migration. An additional potential construction mitigation measure that could be performed to lessen the impact of the build alternatives includes establishing an erosion control plan prior to the initiation of construction activities. The erosion control plan would include:

- Use of natural drainage, detention ponds, sediment ponds, or infiltration pits to allow runoff to collect and reduce or prevent erosion
- Use of barriers to direct and slow the rate of runoff and to filter out large-sized sediments
- Use of down-drains or chutes to carry runoff from the top of a slope to the bottom
- Control of the use of water for irrigation and dust control so as to avoid off-site runoff.

Potentially significant impacts to water quality stemming from both construction and operation of the Regional Connector project could be mitigated with the following measures as appropriate;

- Project design could include properly designed and maintained biological oil and grease removal systems in new storm drain systems to treat water before it leaves project sites.
- Proper storage of hazardous materials to prevent contact with precipitation and runoff
- Development and maintenance of an effective monitoring and cleanup program for spills and leaks of hazardous materials
- Placement of equipment to be repaired or maintained in covered areas on a pad of absorbent material to contain leaks, spills, or small discharges
- Periodic and consistent removal of landscape and construction debris
- The removal of any significant chemical residue on the project sites through appropriate methods

- The use of non-toxic alternatives for any necessary applications of herbicides or fertilizers
- Installation of detention basins to remove suspended solids by settlement
- Periodic monitoring of the water quality of runoff before discharge from the site and into the storm drainage system

4.11 Energy Resources

This section summarizes the energy resources in the project area, usage associated with construction and operation of the proposed Regional Connector Transit Corridor project alternatives, and the net energy demand associated with changes to the regional transportation network under each of the proposed alternatives. Information in this section is based on the Energy Resources Technical Memorandum prepared for the project and contained in Appendix W, Energy Resources of this DEIS/DEIR.

4.11.1 Regulatory Framework

Energy and energy use within the project area is governed by several federal, state, and local laws and policies, such as:

- The Energy Policy and Conservation Act of 1975
- The Alternative Fuels Act of 1988
- Safe, Accountable, Flexible, and Efficient Transportation Act: A Legacy for Users (SAFETEA-LU)
- Senate Bill 1389
- Executive Order S-3-05
- Metro's Energy and Sustainability Policy
- The Mineral and Energy Resources Section of the County's General Plan

Electricity and transportation are the major energy use sectors analyzed by the California Energy Commission (CEC). Federal and state policies and regulations are gradually transforming electricity generation to cleaner sources and away from reliance on petroleum sources (CEC 2007a). More information regarding these laws and policies is available in Appendix W.

The Council on Environmental Quality (CEQ) dictates requirements for reporting environmental consequences under NEPA. While there are no specific NEPA criteria for analyzing impacts to energy resources, 40 CFR § 1502.16(e) directs that environmental impact statements (EISs) include a discussion of the "energy requirements and conservation potential of various alternatives," "natural or depletable resource requirements and conservation potential of various alternatives," and potential mitigation measures.

The following significance criteria are based on Appendix G of the state CEQA Guidelines and the *City of Los Angeles CEQA Thresholds Guide* (2006). The proposed project alternatives would result in a significant impact to energy resources if they would:

- Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state
- Require new (off-site) energy supply facilities and distribution infrastructure or capacity enhancing alterations to existing facilities
- Conflict with adopted energy conservation plans
- Use non-renewable resources in a wasteful and inefficient manner
- Result in a need for new systems or substantial alterations to power or natural gas

4.11.2 Affected Environment

Transportation in Los Angeles County continues to be dominated by single-occupancy automobiles. In 2005, 74.7 percent of all people in the Southern California region drove alone to work (Los Angeles County 2008). High percentages of single-occupancy vehicles result in higher VMT throughout the state. In turn, high VMT translate into high energy use and increased air pollutants in the SCAG region. The CEC's Integrated Energy Policy Report concludes that the transportation sector is the largest contributor of greenhouse gases in the state (CEC 2007a).

Table 4.11-1 summarizes baseline (2009) annual transportation energy usage in the Los Angeles region. The most recent available data for Metro bus and light rail energy consumption in the project region are from 2007. In that year, light rail and buses consumed approximately 900 billion British Thermal Units (BTUs), the equivalent of approximately 160,000 barrels of oil. The most recent data for annual automobile energy consumption in the region comes from the transportation model. Automobiles in the region consumed approximately 700,000 billion BTUs in 2009, the equivalent of over 118 million barrels of oil.

Metro's electricity use is split between powering the rail system and transit facilities (LACMTA 2009b). For both rail and facility electricity requirements, Metro buys power from LADWP, Southern California Edison (SCE), and Pasadena Water and Power (LACMTA 2009b). In 2008, Metro rail consumed 175 million kilowatt hours (kWh) of electricity (approximately 597 billion BTUs) and Metro facilities consumed 69 million kWh (approximately 235 thousand BTUs) (LACMTA 2009b). Metro would purchase additional electricity from its current providers to facilitate the proposed project. Metro's 2009 Baseline Sustainability Report presents goals and recommendations for tracking and improving these performance measures.

Table 4.11-1. Regional Annual Transportation Energy Usage, Existing Conditions [a]

Vehicle Class	Consumption Factors[1,2] (BTU/mi)	Miles Traveled (Annual)	Total BTU Consumption (Billions)	Total Barrels of Oil
Light Rail[2]	77,327	3,925,583	304	52,400
Bus[2]	6,255	101,930,386	638	110,000
Automobiles[3]	6,213	111,037,526,000	689,876	118,944,100
Annual Total	N/A	111,143,381,969	690,818	119,106,600

Sources: [1]DOE, 2008;
[2]RY2007 (Database: http://www.ntdprogram.gov/ntdprogram/data.htm);
[3]CDM, 2009.
Notes: [a] Existing conditions are reported from data sources dated 2007 and 2009. The 2007 data are the most recent available data from the National Transportation Data Program for Metro-reported light rail and bus miles travelled annually.

4.11.3 Environmental Impacts/Environmental Consequence

The following sections summarize the evaluation of potential energy resource impacts for each alternative. Table 4.11-2 summarizes the results of the analysis.

Table 4.11-2. Summary of Potential Impacts to Energy Resources

Alternative	Energy Consumption - Construction	Energy Consumption - Operation	Mitigation Required
No Build	None	None (Increase associated with project growth)	None
TSM	None	None (some beneficial impacts)	None
At-Grade LRT	None (construction increase offset by long-term impacts)	Beneficial long-term impacts	None
Underground LRT	None (construction increase offset by long	Beneficial long-term impacts	None
Fully Underground LRT	None (construction increase offset by long	Beneficial long-term impacts	None

Analysis of potential energy resource impacts included consideration of the following elements:

- Construction-related energy
- Energy operating costs
- Direct energy consumption (measured in BTUs per vehicle mile for cars, trucks, buses, and light rail operating in the project area)
- Net project operating energy savings or costs

Construction-related impacts were estimated by applying a highway construction energy factor to the total estimated construction cost of the Regional Connector project. The California Department of Transportation (CALTRANS) derived energy consumption for different light rail transit facilities in Energy and Transportation Systems, and these factors are still widely used in the industry today (CALTRANS 1983).

Consumption factors are reported in BTUs per dollar of construction spending. Given the date of this data source, the energy consumption factors were adjusted to account for the change in construction costs. The California Construction Cost Index was used to adjust the factors to 2009 dollars.

Analysis of the operational energy impact of proposed stations for the build alternatives was determined following the same methodology used in the Climate Change analysis, following Chester and Horvath's electricity usage factors used for the San Francisco Municipal Railway (Muni) in San Francisco (Chester and Horvath 2008).

Table 4.11-3 summarizes annual changes in energy consumption associated with regional highway VMT for each of the action alternatives compared to the No Build Alternative. Calculations were based on data from the transportation model that projected changes in daily VMT throughout the region. As shown in Table 4.11-3, all of the alternatives would result in a net decrease in VMT throughout the region when compared to the No Build Alternative. This decrease in VMT would result in a net decrease in energy consumption, with the Fully Underground LRT Alternative having the greatest decrease. Table 4.11-4 summarizes total operational energy demands under all of the proposed alternatives. Table 4.11-4 compares BTUs and barrels of oil under each alternative as well as the percent change in BTUs between each build alternative and the No Build Alternative.

4.11.3.1 No Build Alternative

Since construction would not be performed under the No Build Alternative, this alternative would not result in construction-related impacts to energy use or resources. Under the No Build Alternative, energy consumption would not be associated with the operation of new light rail lines or stations. Increased energy consumption that would occur under the No Build Alternative (approximately 500,000 billion BTUs) is a result of projected growth in traffic that is expected to occur in the region without the project (Table 4.11-4). Direct impacts to energy resources would not occur as a result of this alternative.

Since construction would not occur with this alternative, and project-level impacts would not occur in energy consumption, this alternative would not contribute to cumulative impacts with respect to energy consumption.

Table 4.11-3. Estimated Regional Highway VMT and Energy Consumption Comparisons

Comparison	Annual Change in Automobile VMT	Annual Change in Energy Consumption (BTU in billions)	Annual Change in Barrels of Oil
TSM Alternative vs. No Build Alternative	(100,083,000)	(622)	(107,200)
At-Grade Emphasis LRT Alternative vs. No Build Alternative	(110,157,000)	(684)	(118,000)
Underground Emphasis LRT Alternative vs. No Build Alternative	(113,989,500)	(708)	(122,100)
Fully Underground LRT Alternative vs. No Build Alternative	(117,384,000)	(729)	(125,700)

Note: Parentheses indicate a reduction compared to the No Build Alternative.

4.11.3.1.1 NEPA Finding and CEQA Determination

The No Build Alternative would not have adverse or significant impacts with respect to energy resources in the region.

4.11.3.2 Transportation System Management (TSM) Alternative

The TSM Alternative would not have construction impacts on energy resources or energy use in the project area or region because construction would not occur outside of that previously approved in Metro's LRTP.

Operation of the TSM Alternative would reduce highway VMT in the project area by over 100 million vehicle miles per year. Correspondingly, automobile energy consumption would decrease and total net savings from operations of the TSM Alternative would be annually greater than 600 billion BTUs. Therefore, operation of the TSM Alternative would result in potential beneficial impacts. Cumulative impacts would not occur to energy resources since the TSM Alternative would not result in construction or operational-related impacts.

4.11.3.2.1 NEPA Finding and CEQA Determination

The TSM Alternative would not have adverse or significant impacts with respect to energy resources. The overall net energy effects would be beneficial.

Table 4.11-4. Estimated Annual Operational Energy Consumption for Each Alternative

VMT1 (billions)	BTU2 (billions)	Barrels of Oil	Total BTU (billions)	Percent Change in BTU from No Build	Total Barrels of Oil
Baseline (2009)					
Highway – 111.04	689,876	118,944,100	689,876	--	118,944,100
No Build (2035)					
Highway – 184.19	1,144,378	197,306,600	1,144,378	--	197,306,600
TSM					
Highway – 184.09	1,143,751	197,198,400	1,143,757	(0.054)	197,199,500
Bus – .000994	6.2	1,100			
At-Grade Emphasis LRT					
Highway – 184.08	1,143,698	197,189,300	1,143,731	(0.057)	197,195,000
Light Rail – .000383	29.7	5,100			
Stations – --	3.1	500			
Underground Emphasis LRT					
Highway – 184.08	1,143,698	197,189,300	1,143,731	(0.057)	197,195,000
Light Rail – .000380	29.4	5,000			
Stations – --	3.4	600			

Table 4.11-4. Estimated Annual Operational Energy Consumption for Each Alternative (continued)

VMT1 (billions)	BTU2 (billions)	Barrels of Oil	Total BTU (billions)	Percent Change in BTU from No Build	Total Barrels of Oil
Fully Underground LRT					
Highway – 184.07	1,143,626	197,176,900	1,143,659	(0.063)	197,182,500
Light Rail – .000362	28.0	4,800			
Stations – --	4.5	800			

Notes: [1] – Calculation of VMT describes changes in highway VMT within the project area projected by the transportation model for the 2035 horizon year under each alternative. Added bus VMT are included in the TSM Alternative and added light rail VMT are included in the three LRT build alternatives. Operations of buses and light rail outside of the proposed alternatives are assumed to remain unchanged.
[2] – Operational BTUs include the energy required to operate additional stations under the LRT build alternatives.
[3] – This percentage represents percent change in operational BTUs and does not include construction.

4.11.3.3 At-Grade Emphasis Light Rail Transit (LRT) Alternative

To determine construction-related energy consumption, capital cost data were used per the methodology described in Section 4.11.3. Construction energy impacts are summarized in Table 4.11-5.

Construction of the At-Grade Emphasis LRT Alternative would result in a temporary energy demand of 3,457 billion BTUs. This would be a temporary impact to energy sources. In addition, potential construction-related impacts would be less than significant, given the long-term, beneficial decreases in energy use from implementation of this alternative.

Table 4.11-5. Estimated Energy Consumption from Construction – At-Grade Emphasis LRT Alternative

Project Component	Base Year Dollars (thousands)	Energy Consumption Factor (BTU/2009 $)	Total BTU Consumption (billions)
Track Elements	105,506	6,012	634
Stations, Stops, Terminals	230,850	6,012	1,388
Maintenance Facilities	8,625	7,394	63
Site work	165,378	6,012	994
Systems	40,950	9,240	378
Total	**551,309**	**N/A**	**3,457**

Total annual BTU consumption associated with the At-Grade Emphasis LRT alternative would be approximately 1,143,731 billion BTUs. Total energy use is compared to the No Build Alternative (2035) to identify adverse impacts under NEPA. Total energy use of the alternative is compared to current total energy usage (2009) to determine significance under CEQA.

Total operational energy consumption at build out of the At-Grade Emphasis LRT Alternative would be greater than that of existing conditions. However, this increase results from increased regional traffic unrelated to this alternative. Compared to the No Build Alternative, this alternative would reduce VMT and result in an annual decrease in energy consumption (Table 4.11-3). Total annual net savings from operations under this alternative would be greater than 600 billion BTUs (113,000 barrels of oil). This potential impact to energy resources in the region would be beneficial.

The proposed project, in conjunction with other reasonably foreseeable renovation, new construction, and transportation projects in the vicinity of the proposed project, would comply with federal, state, and local regulations to conserve and reduce energy usage. This project alternative, and other potential projects in the area, would comply with applicable energy efficiency guidance set by the LADWP. Potential cumulative impacts related to construction would be less-than-significant.

LADWP predicts increases in electricity demand over the next decade. LADWP has increased its ability to serve the area by adding new facilities and increasing and diversifying its energy supplies. LADWP is committed to increasing electricity generation from renewable energy sources and ensuring a reliable flow of electricity to users in its service area. Potential cumulative impacts related to operation would be less than significant, given that operation of the At-Grade Emphasis LRT Alternative would result in a beneficial energy impact.

4.11.3.3.1 NEPA Finding and CEQA Determination

The At-Grade Emphasis LRT Alternative would not have adverse or significant impacts with respect to energy resources. The overall net energy effects would be beneficial.

4.11.3.4 Underground Emphasis LRT Alternative

Construction energy impacts are summarized in Table 4.11-6.

Table 4.11-6. Estimated Energy Consumption from Construction – Underground Emphasis LRT Alternative

Project Component	Base Year Dollars (thousands)	Energy Consumption Factor (BTU/2009$)	Total BTU Consumption (billions)
Track Elements	161,921	6,012	973
Stations, Stops, Terminals	388,140	6,012	2,333
Maintenance Facilities	8,625	7,394	63
Site work	201,937	6,012	1,214
Systems	40,285	9,240	372
Total	**800,908**	**N/A**	**4,955**

Construction of the Underground Emphasis LRT Alternative would consume a one-time energy amount of approximately 5,000 billion BTUs. This would be a temporary impact to energy resources. The one-time energy use required to construct this alternative would be offset by the project's long-term, beneficial operational impacts. Therefore, potential construction-related impacts would be less than significant, given the long-term, beneficial decreases in energy use from implementation of this alternative.

Annual operation of this alternative would require approximately 1,143,698 billion BTUs (Table 4.11-4). Total energy use is compared to the No Build Alternative (2035) to identify adverse impacts under NEPA. Total energy use of the alternative is compared to current total energy usage (2009) to determine significance under CEQA.

Total operational energy consumption at build out of the Underground Emphasis LRT Alternative would be greater than that of existing (2009) conditions. However, this increase results from increased regional traffic unrelated to this alternative. Compared to the No Build Alternative, this alternative would reduce VMT and result in an annual decrease in energy consumption (Table 4.11-3). Total annual net savings from operations under this alternative would be greater than 650 billion BTUs (equivalent to 115,000 barrels of oil). This potential impact to energy resources in the region would be beneficial.

Construction of the Underground Emphasis LRT Alternative would result in less than significant impacts to energy resources. The proposed project, in conjunction with reasonably foreseeable renovation, new construction, and transportation projects in the vicinity of the proposed project would comply with federal, state, and local regulations to conserve and reduce energy usage. This project alternative, and other potential projects in the area, would comply with applicable energy efficiency guidance set by the LADWP. Potential cumulative impacts related to construction would be less-than-significant.

LADWP predicts increases in electricity demand over the next decade. LADWP has increased its ability to serve the area by adding new facilities and increasing and diversifying its energy supplies. The LADWP is working to develop new renewable energy and energy efficient resources. Potential cumulative impacts related to operation would be less than significant, given that operation of the Underground Emphasis LRT Alternative would result in a beneficial energy impact.

4.11.3.4.1 NEPA Finding and CEQA Determination

The Underground Emphasis LRT Alternative would not have adverse or significant impacts with respect to energy resources. The overall net energy effects would be beneficial and greater than the At-Grade Emphasis LRT Alternative but less than the Fully Underground LRT Alternative.

4.11.3.5 Fully Underground LRT Alternative

Construction of the Fully Underground LRT Alternative would result in a temporary energy demand of approximately 6,000 billion BTUs, as presented in Table 4.11-7. This would be a temporary impact to energy sources, and the project would result in long-term, beneficial decreases in energy use in the region. Given the long-term, beneficial decreases in energy use from implementation of this alternative, potential construction-related impacts would be less than significant.

Total annual BTU consumption associated with the Fully Underground LRT Alternative would be approximately 1,143,659 billion BTUs. Total energy use is compared to the No Build Alternative (2035) to identify adverse impacts under NEPA. Total energy use of the alternative is compared to current total energy usage (2009) to determine significance under CEQA.

Total operational energy consumption at build out of the Fully Underground Emphasis LRT Alternative would be greater than that of existing (2009) conditions. However, this increase results from increased regional traffic unrelated to this alternative. Compared to the No Build Alternative, this alternative would reduce VMT and result in an annual decrease in energy consumption (Table 4.11-3). Total annual net savings from operations under this alternative would be greater than 700 billion BTUs (120,000 barrels of oil). This potential impact to energy resources in the region would be beneficial.

Table 4.11-7. Estimated Energy Consumption from Construction – Fully Underground LRT Alternative

Project Component	Base Year Dollars (thousands)	Energy Consumption Factor (BTU/2009$)	Total BTU Consumption (billions)
Track Elements	229,148	6,012	1,377
Stations, Stops, Terminals	457,640	6,012	2,759
Maintenance Facilities	8,825	7,394	65
Site work	188,060	6,012	1,130
Systems	49,124	9,240	453
Total	**932,797**	**N/A**	**5,784**

Cumulative impacts would be similar to those described for the Underground Emphasis LRT Alternative; thus, potential cumulative impacts from construction and operation of the Fully Underground LRT Alternative would be less than significant.

4.11.3.5.1 NEPA Finding and CEQA Determination

The Fully Underground LRT Alternative would not have adverse or significant impacts with respect to energy resources. The overall net energy effects would be beneficial and greater than any of the other build alternatives.

4.11.4 Mitigation Measures

Mitigation measures would not be required because potential impacts to energy resources under the TSM and build alternatives would be beneficial.

4.12 Historic Resources

The following sections summarize the evaluation of potential impacts on historic properties for each alternative. Table 4.12-1 summarizes the results of the analysis.

4.12.1 Built Environment

This section describes the Regional Connector Transit Corridor's potential impacts on historic built environment resources. The information in this section is based on the Cultural Resources – Built Environment Technical Memorandum, which is incorporated into this DEIS/DEIR as Appendix X.

Table 4.12-1. Summary of Potential Impacts to Historic Resources

Alternative	Built Environment	Archaeology	Paleontology	Mitigation Measures
No Build	None	None	None	None
TSM	None	Significant effect not significant after mitigation [1]	Potential adverse effect, not significant after mitigation	Mitigation measures proposed
At-Grade LRT	Adverse effect not significant after mitigation [2]	Significant effect not significant after mitigation [1]	Potential adverse effect, not significant after mitigation	Mitigation measures proposed
Underground LRT	Significant effect not significant after mitigation [1]	Significant effect not significant after mitigation [1]	Potential for adverse, significant and unavoidable impacts	Mitigation measures proposed
Fully Underground LRT	Significant effect not significant after mitigation [1]	Significant effect not significant after mitigation [1]	Potential for adverse, significant and unavoidable impacts	Mitigation measures proposed

[1] No adverse impact to historic properties under NEPA, but a potential significant impact under CEQA exists.
[2] The California State Historic Preservation Officer concurred with FTA's determination of adverse effect on June 1, 2010. Mitigation measures are proposed in Section 4.12.1.4.

4.12.1.1 Regulatory Framework

NEPA requires that effects on historic properties be evaluated during the EIS process, in coordination with procedures established by Section 106 of the National Historic Preservation Act (NHPA). Federal agencies must evaluate potential direct and indirect impacts on properties that are listed in or eligible for listing in the National Register of Historic Places (NRHP). An adverse effect would occur if the project would directly or indirectly diminish any of the characteristics that qualify a historic property for NRHP eligibility or listing.

The NRHP, created under the NHPA, is the federal list of historic, archaeological, and cultural resources worthy of preservation. Resources listed in the NRHP include districts, sites, buildings, structures, and objects that are significant in American history, prehistory, architecture, archaeology, engineering, and culture. The NRHP is maintained and expanded by the National Park Service on behalf of the Secretary of the Interior. The California Office of Historic Preservation (in Sacramento) administers the statewide NRHP program under the direction of the SHPO. To guide the selection of properties included in the NRHP, the National Park Service has developed the NRHP Criteria for Evaluation. The criteria are standards by which every property that is nominated to the NRHP is judged. Significance in American history, architecture, archaeology, and culture is possible in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, material, workmanship, feeling and association, and meet one of the following Criteria (36 CFR 60.4):

- Criterion A: A property is associated with events that have made a significant contribution to the broad patterns of our history; or

- Criterion B: A property is associated with the lives of a person or persons significant in our past; or
- Criterion C: A property embodies the distinctive characteristics of a type, period, or method of construction or that represent the work of a master, or that possesses high artistic values, or that represents a significant and distinguishable entity whose components may lack individual distinction; or
- Criterion D: A property has yielded, or may be likely to yield, information important in prehistory or history.

Buildings less than 50 years old do not meet the NRHP criteria unless they are of exceptional importance under Criteria Consideration G, as described in the NPS's Bulletin No. 22, "How to Evaluate and Nominate Potential National Register Properties That Have Achieved Significance Within the Last 50 Years." Other NRHP criteria considerations are used for religious properties, moved properties, birthplaces or graves, cemeteries, reconstructed properties, and commemorative properties.

Following the procedures required under Section 106, FTA conducted an analysis of the potential adverse effects of the proposed Regional Connector Transit Corridor alternatives to historic properties under NHPA and potential significant impacts to historic resources under CEQA. This analysis incorporates the findings of other applicable technical studies as needed. As part of the Section 106 process, FTA consulted with the California SHPO to establish the area of potential effects (APE) for the project. FTA also consulted with Indian tribes and other interested parties. This consultation process is described in more detail the Appendix X.

FTA evaluated all of the resources within the APE for their potential eligibility as historic properties under NHPA and historical resources under CEQA. FTA then assessed, in consultation with the SHPO, whether the project would cause adverse effects. This was accomplished by applying the "criteria of adverse effect" as stated in 36 CFR 800.5(a)(1). In accordance with 36 CFR 800.5(b), if a project's effects do not diminish the characteristics of a historic property, that make it eligible for the National Register, then a "no adverse effect" finding is appropriate.

If an adverse effect is expected to occur as a result of a proposed project, FTA is required to consult further to resolve the adverse effect, pursuant to 36 CFR Part 800.5(2) and develop and evaluate alternatives or modifications to the undertaking that could avoid, minimize, or mitigate adverse effects on historic properties (36 CFR Part 800.6). Proposed mitigation measures are described in Section 4.12.1.4. On June 1, 2010, the California SHPO concurred with FTA's determination of eligibility and effects from the project. Consultation is continuing to establish the mitigation measures for the adverse effects. In addition to the California SHPO, consulting parties for this project include LACMTA and the Advisory Council on Historic Preservation (ACHP). Consultation with the ACHP will continue until the agency states it has no further interests in the project. The FTA/LACMTA also contacted a number of tribes with interests in the project. Consultation with the Gabrielino/Tongva San Gabriel Band of Mission Indians and the Tongva Ancestral Territorial Tribal Nation is ongoing.

CEQA requires that resources listed in or eligible for listing in the California Register of Historic Resources (CRHR) shall be studied. In addition to historic properties listed in or eligible for the NRHP, the CRHR includes resources recently designated as California Historic Landmarks (CHL) and California Points of Historical Interest. California SHPO review of the study is required before project-related changes to historic properties can proceed. CEQA also requires that mitigation measures to reduce or avoid impacts to historical resources be evaluated, and a range of alternatives be considered that could substantially lessen significant impacts to historical resources.

At the local level, the City of Los Angeles designates local landmarks (Historic-Cultural Monuments) and historic districts. NEPA and CEQA guide lead agencies to incorporate local designations in the review and evaluation of project effects. City of Los Angeles Historic-Cultural Monuments and Historic Preservation Overlay Zones were considered in this built environment analysis. These resources have "presumptive significance" under CEQA, and mitigation measures are recommended to address any significant impacts to these resources.

4.12.1.2 Affected Environment

The project-specific APE was established through consultation between FTA, Metro, SHPO, and other consulting parties. The APE was drawn to ensure inclusion of historic properties and historical resources that may be directly or indirectly affected by the project. All properties in the APE that were constructed 50 or more years prior to the anticipated 2019 project construction date, along with other significant properties that were built more recently, were evaluated for historical significance and potential impacts. A map of the APE is shown in Figures 4.12-1 through 4.12-9.

A record search, a built environment survey, consultation with the SHPO, Native American tribes with interests in the project area, local government, local historic groups, and other interested parties regarding cultural resources was conducted for this project. A summary of these contacts is contained in Appendix X.

The records search and survey of the APE revealed that it contains 289 properties, 118 of which were constructed more than 50 years prior to the proposed project opening date of 2019. Twenty-nine of these properties were previously listed in the NRHP and/or the CRHR. More detailed studies of the other properties were undertaken to determine historical significance. Of the 55 resources, 48 are historic properties that are either listed in or determined eligible for listing the NRHP and the CRHR. The California SHPO has concurred with FTA's determination of eligibility for those properties eligible for listing in the NRHP (a copy of the SHPO concurrence letter is located in Appendix X).

Of the 55 resources mentioned above, seven are historical resources listed in, determined eligible for listing in, or recommended as eligible for listing in the CRHR. This included the Walt Disney Concert Hall which was deemed eligible for the CRHR under the criterion for properties that have achieved significance in less than 50 years. A complete list of evaluated properties and the details of their analysis are provided in Appendix X.

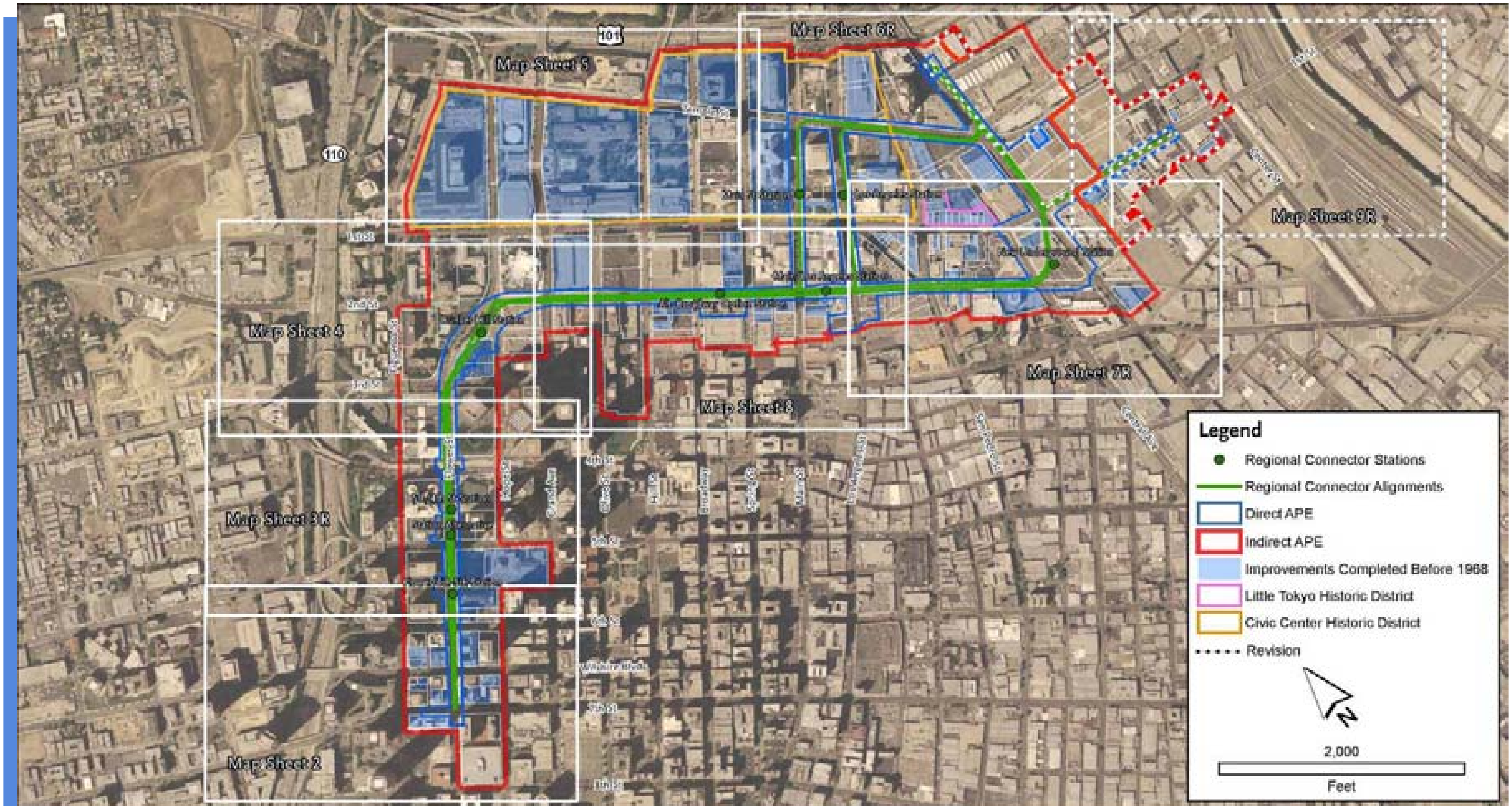


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Figure 4.12-1. Area of Potential Effects (APE) for Historic Resources – Sheet 1

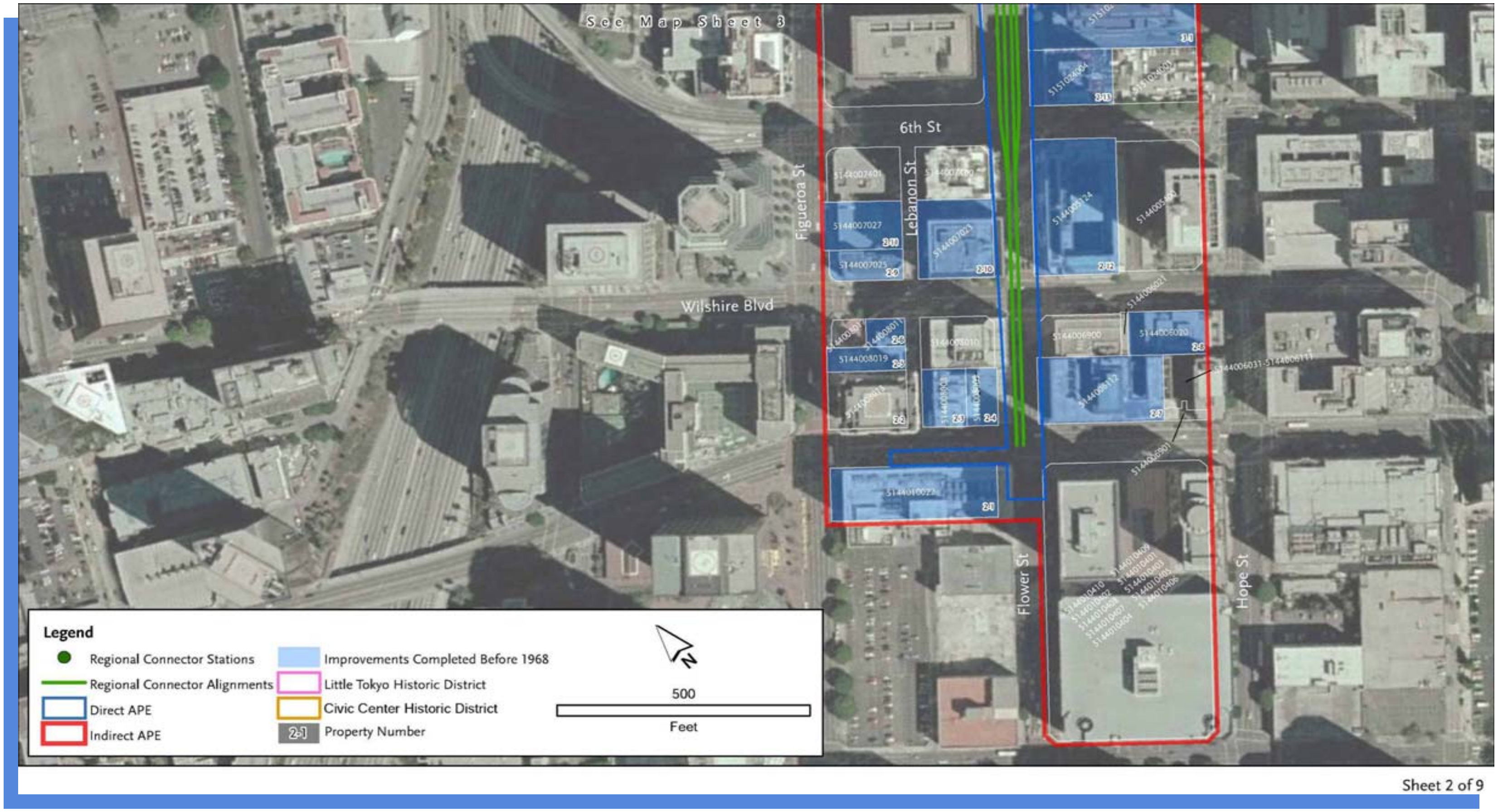


Figure 4.12-2. Historic Resources APE Sheet 2

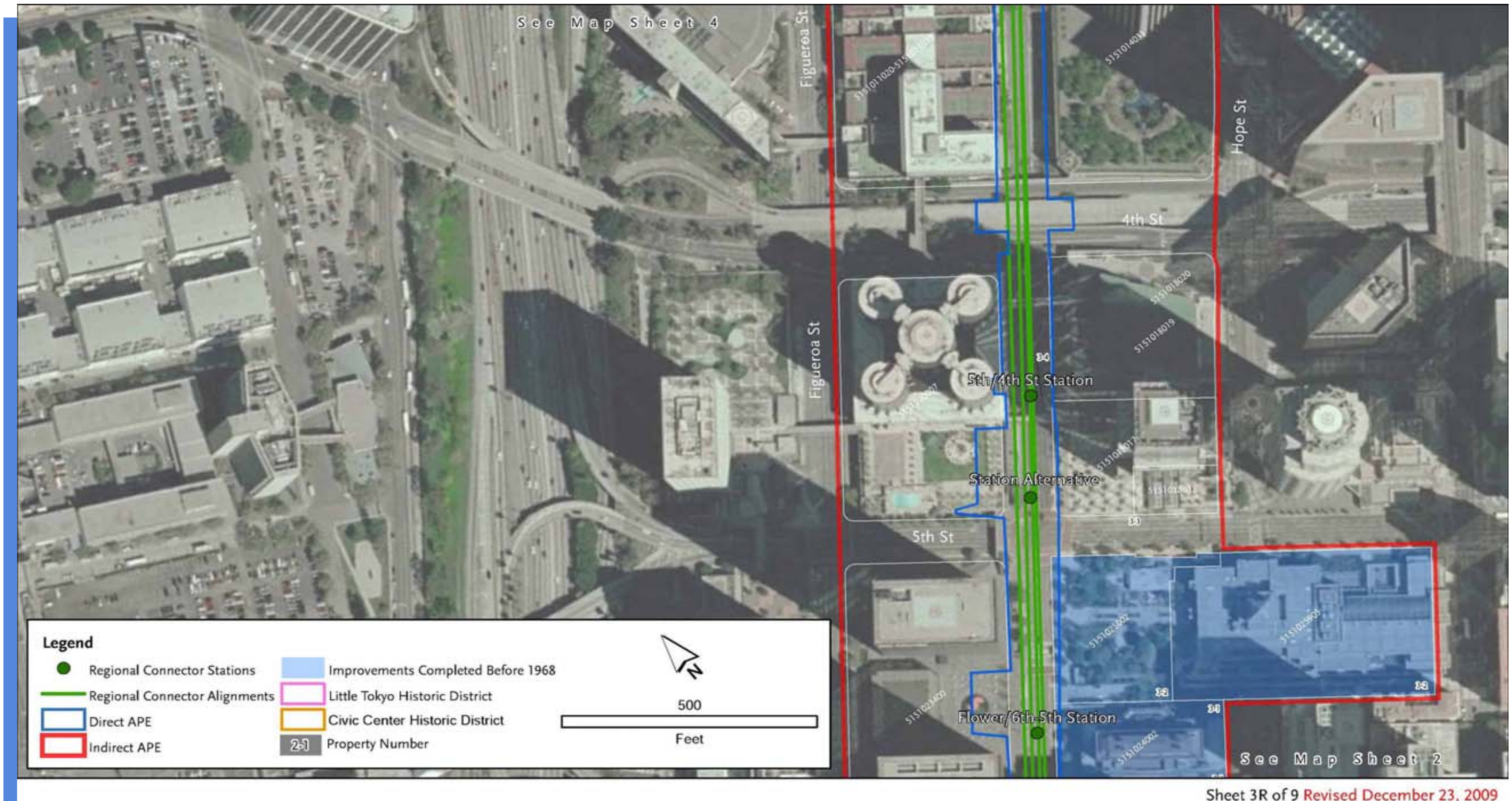


Figure 4.12-3. Historic Resources APE – Sheet 3

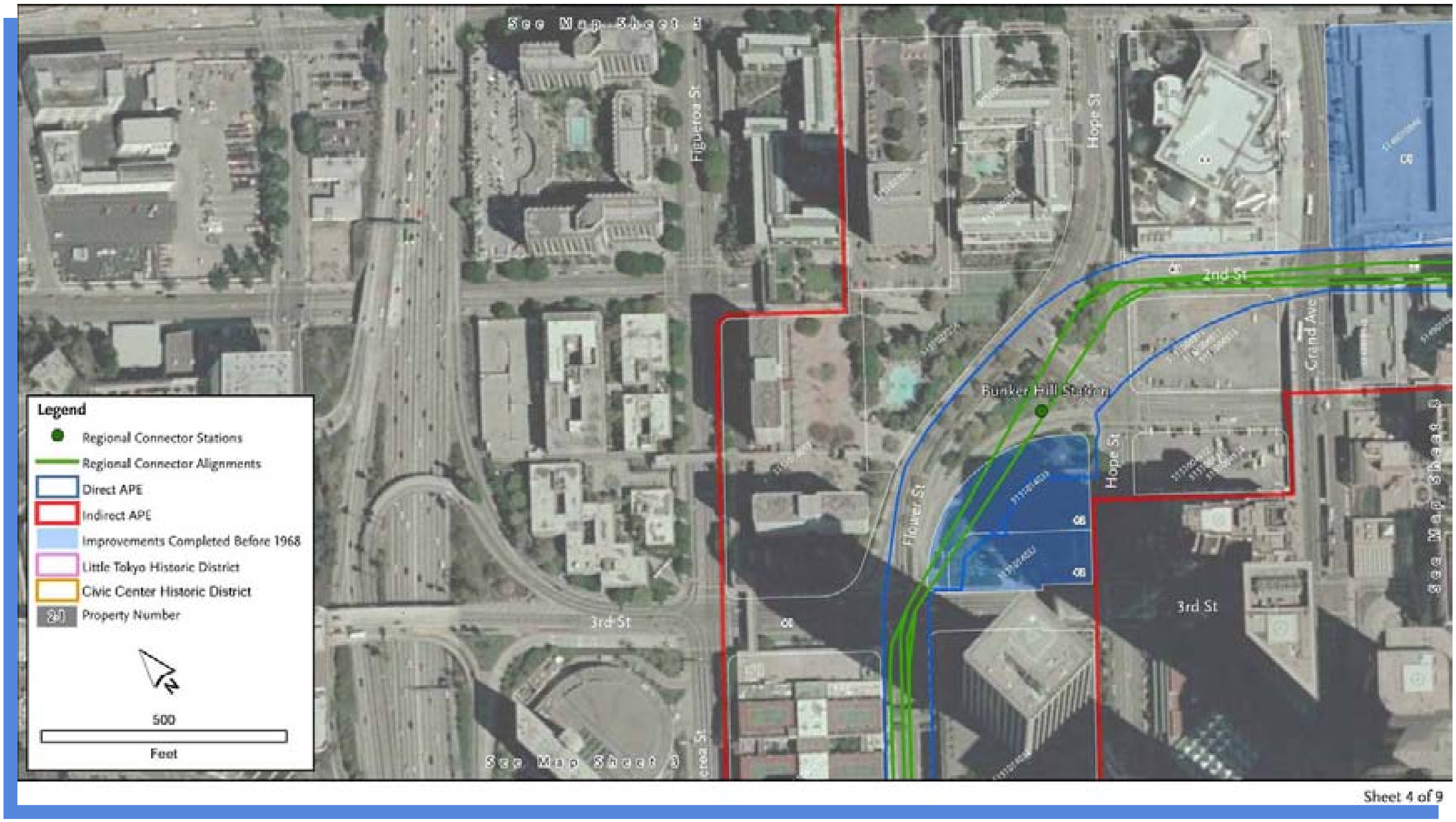


Figure 4.12-4. Historic Resources APE – Sheet 4

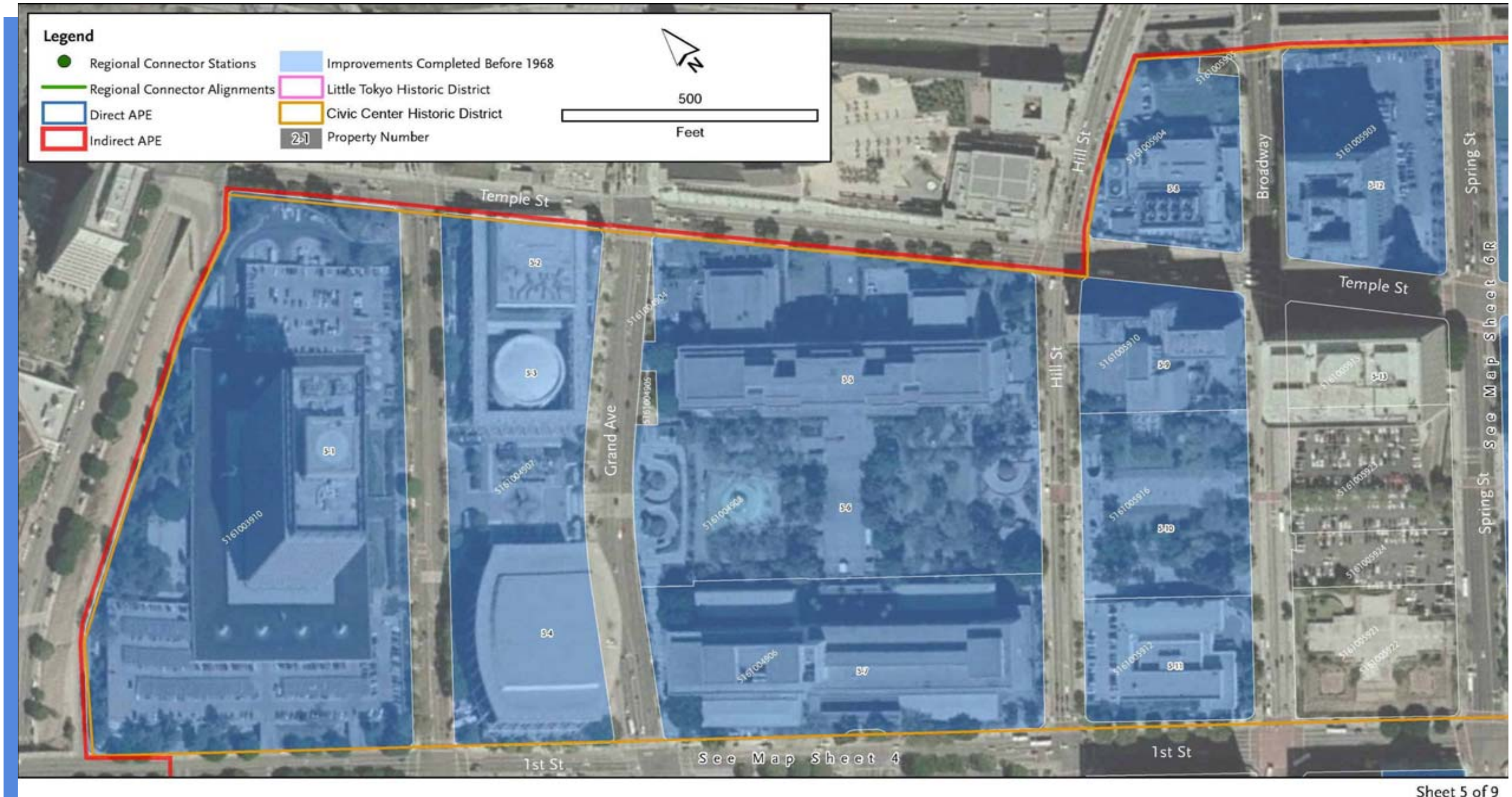


Figure 4.12-5. Historic Resources APE – Sheet 5

Figure 4.12-6. Historic Resources APE – Sheet 6

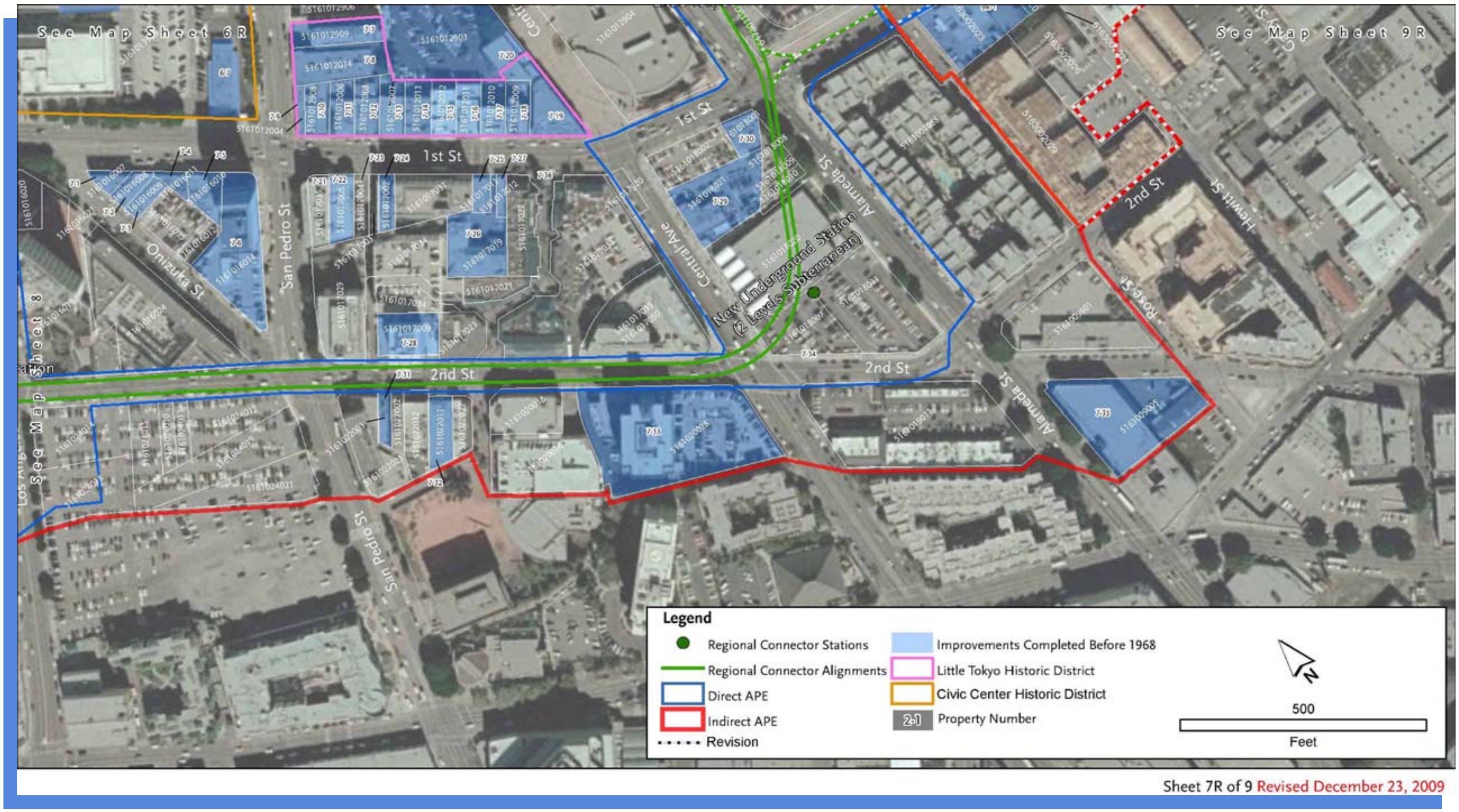


Figure 4.12-7. Historic Resources APE – Sheet 7

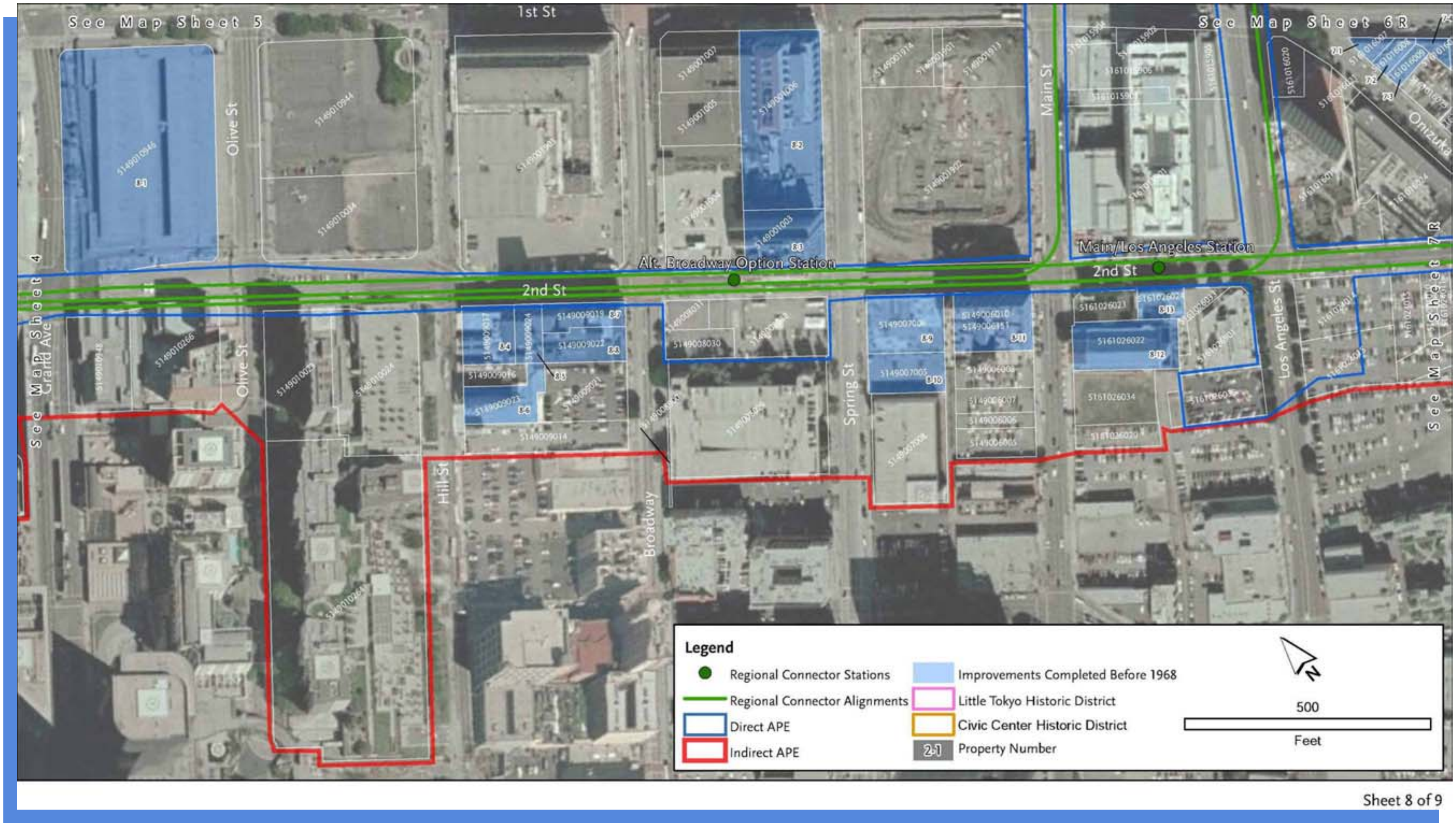


Figure 4.12-8. Historic Resources APE – Sheet 8

Figure 4.12-9. Historic Resources APE – Sheet 9

The APE contains portions of one NRHP/NHL-listed historic district (Little Tokyo Historic District) and one district that is eligible for inclusion in the CRHR (Civic Center Historic District). These districts each contain multiple historic resources that are individually eligible or as contributing resources for both the NRHP and CRHR.

4.12.1.3 Environmental Impacts/Environmental Consequences

The impact analysis examined likely adverse effects of the proposed Regional Connector Transit Corridor alternatives to historic properties under NHPA and potential significant impacts to historic resources under CEQA. This analysis incorporates the findings of other applicable technical studies as needed. APE map numbers provided in this section correspond to the APE maps shown in Figures 4.12-1 through 4.12-9.

Evaluation of Section 4(f) impacts of the proposed Regional Connector alternatives is documented in Chapter 5. The At-Grade Emphasis LRT Alternative would involve permanent incorporation of the 2nd Street Tunnel (APE Map #4-3) into the transportation project by constructing the transit tunnel through the 2nd Street Tunnel wall and extending the rails into the existing tunnel (Section 4.12.1.3.3.1). On June 1, 2010, the California SHPO concurred with FTA's determination of an adverse effect to the 2nd Street Tunnel (a copy of the SHPO concurrence letter is located in Appendix X).

Section 110(f) of the NHPA of 1966, as codified in 36 CFR 800.10, requires federal agencies to undertake planning and actions to minimize harm to designated National Historic Landmark (NHL) properties. If a proposed project is found to have the potential for an adverse effect on a NHL, the Secretary of the Interior (typically represented by a representative of the National Park Service) is invited to participate under Section 110(f) of the NHPA. For this project, the Little Tokyo Historic District NHL is situated within the APE and would not be adversely affected by any of the alternatives. If project planning necessitates changes, and potential adverse effects to the NHL arise, consultation with the National Park Service will be conducted.

CEQA also requires that proposed public projects 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."

4.12.1.3.1 No Build Alternative

The No Build Alternative would not result in any new construction or transit operations as part of the Regional Connector project. Impacts on historic resources would not occur under this alternative; however, existing impacts resulting from growing levels of vehicular traffic and lack of improved public transit options would persist.

4.12.1.3.1.1 NEPA Finding

The No Build Alternative would not include capital improvements. Thus, the No Build Alternative would not have adverse construction or implementation-related effects on historic properties in the project APE.

4.12.1.3.1.2 CEQA Determination

The No Build Alternative would have no effect on historical resources in the project APE. The No Build Alternative would not be expected to result in cumulative impacts to historical resources, other than potential impacts on resources through continued high and escalated levels of vehicular traffic, unabated by additional mass transit options. The No Build Alternative would not contribute to a cumulative impact on these resources.

4.12.1.3.2 TSM Alternative

The TSM Alternative would include two new shuttle buses linking 7th Street/Metro Center Station and Union Station. The new transit infrastructure (two new bus routes and associated stops and structures) would use the existing street and sidewalk networks and would not require the displacement or relocation of properties, residents, or employees. Improvements under this alternative would entail minor physical modifications, such as the installation of bus stops along existing city streets and rebuilding some curbs, sidewalks, and street surfaces to accommodate increased bus weights and traffic frequency. These activities would not have any significant effects on historical resources, alter significant characteristics of historic properties, or cause adverse noise or vibration impacts.

4.12.1.3.2.1 NEPA Finding

The TSM Alternative would not have direct or indirect adverse effects to historic properties from either construction or operation.

4.12.1.3.2.2 CEQA Determination

The TSM Alternative would not have direct or indirect significant impacts on historical resources from either construction or operation.

4.12.1.3.3 At-Grade Emphasis LRT Alternative

The At-Grade Emphasis LRT Alternative would add transit options that would be consistent with the historic use of streetcars within the APE. Additionally, the LRT improvement could benefit historic properties and historical resources in the APE by increasing pedestrian access and use of the area. Metro would install double-track light-rail guideways in the existing street system, rebuild street surfaces and underground utilities, rebuild curbs and sidewalks, and install stations, all within the APE.

Underground segments of the alternative would use parts of the existing 2nd Street Tunnel (APE Map #4-3) and would require new cut and cover tunneling under Flower Street between 7th and 4th Streets north of the 7th Street/Metro Center Station.

Construction activities may cause noise, dirt, congestion, and limitations on access to the project area, these activities would be short-term and would not have adverse effects on historic properties or significant impacts to historical resources. In addition, Metro would employ best management practices (BMPs) to ensure that these effects are short-term.

There would also be several partial takes of several historic properties and historical resources. Portions of properties occupied by the Los Angeles Police Facilities Building (APE Map #6-6), Motor Transport Division Building (APE Map #6-7), and City Health Building (City Hall South) (APE Map #6-4), three contributing resources to the Los Angeles Civic Center Historic District, would be acquired to accommodate new stations. Only a portion of these properties would be acquired and converted to new uses and the change would not affect the physical buildings, the historic district that they are a part of, or the characteristics that make them eligible for the NRHP. The project would not diminish their integrity of location, design, setting, materials, workmanship, feeling, or association and therefore, there would not be adverse effects.

4.12.1.3.3.1 Tunnels

The NRHP eligible 2nd Street Tunnel (APE Map #4-3) would be altered under this alternative. The walls of the tunnel would be partially demolished along its southwest interior wall to construct a new entrance and exit for the new tunnel in which the light rail would run. New elements that would be added to the tunnel include double tracks, catenary wires, and a sidewalk. The cut and cover trench would also require demolition of a portion of the CRHR eligible Belmont Tunnel (APE Map #3-4). The Belmont Tunnel is not eligible for the NRHP.

Section 106 Effects Analysis for Historic Properties

In applying the criteria of adverse effect for historic properties (36 CFR 800.5(a)(1)) potentially affected by the construction near 2nd Street, an adverse effect would occur due to the demolition of a portion of the NRHP eligible 2nd Street Tunnel and the subsequent change in use. The changes would directly alter a characteristic of the historic property in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association. The California SHPO concurred with FTA's determination of an adverse effect on June 1, 2010 (a copy of the SHPO concurrence letter is located in Appendix X). Documentation of the property in accordance with mitigation measure described in Section 4.12.1.4.1 is proposed to resolve the potential adverse effect.

Potential Effects to Section 4(f) Resources

The At-Grade Emphasis LRT Alternative would require the piercing and use of the 2nd Street Tunnel to accommodate the proposed LRT corridor. The "punch through" required by this alternative would adversely affect the characteristics that make the 2nd Street Tunnel eligible for the NRHP. This would constitute a direct use, as the tunnel would be permanently incorporated into the proposed project.

This use could only occur if:

- There is no prudent and feasible alternative to using the resource
- The project includes all possible planning to minimize harm to the tunnel from the use

Additional analysis and consultation with the California SHPO would be required for project alternatives. Further discussion of impacts to Section 4(f) resources is provided in the Section 4(f) Evaluation in Chapter 5.

CEQA Impact Analysis for Historical Resources

Potential changes to the 2nd Street Tunnel would constitute a substantial adverse change that would impair the significance of the historical resource. However, the majority of the resource's features would remain to convey its significance. Additionally, implementation of the mitigation measure described in Section 4.12.1.4.1 would reduce the impact to a less than significant level. The implementation of the documentation mitigation measure (Section 4.12.1.4.1) would reduce any impact to the CRHR-eligible Belmont Tunnel to a less than significant level.

4.12.1.3.3.2 Differential Settlement

According to the Description of Construction (Appendix K), some of the buildings situated near cut and cover excavation would be susceptible to differential settlement. Differential settlement is defined as "unequal settling of material; gradual downward movement of foundations due to compression of soil which can lead to damage if settlement is uneven" (Allaby 1999).

Differential settlement occurs when a building or feature's shape is twisted or is raised and lowered, sometimes imperceptibly, in different places. Differential settlement can cause foundations to settle and crack, floors to buckle and go out of level, walls to shift out of plumb and plane, and roofs to twist and deform. The resulting changes in structural systems and cladding or finish materials, including wood and masonry, floor tiles, wood flooring, concrete floors, plaster, marble, and other decorative wall and ceiling treatments, and adobe, stucco, and wood-framed walls can be cracks, fractures, and other noticeable (as well as long-term, not immediately visible) deformations and damage. Since historically significant buildings often have archaic construction and finish attachment systems, including unreinforced masonry, those building types are usually more susceptible to the effects of ground-borne vibration than more recently constructed buildings.

According to the Description of Construction (Appendix K), at least seven NRHP and/or CRHR eligible properties could be potentially affected by cut and cover construction associated with the At-Grade Emphasis LRT Alternative.

These seven buildings include:

- Superior Oil Company Building(APE Map #2-13)
- California Club (APE Map #3-1)
- 2nd Street Tunnel (APE Map #4-3)
- Walt Disney Concert Hall (APE Map #4-4; CRHR eligible only)
- Former Nishi Hongwanji Buddhist Temple (APE Map #7-19)
- Los Angeles Times Building (APE Map #8-2)
- St. Vibiana Cathedral (APE Map #8-12)

Section 106 Effects Analysis for Historic Properties

The implementation of mitigation measures would protect and stabilize the ground near historic properties (as noted in Sections 4.12.1.4.2, 4.12.1.4.3 and 4.12.1.4.5) and would avoid adverse effects to all properties. If these measures are properly implemented, short-term construction activities would not directly alter a characteristic of the historic property in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association.

CEQA Impact Analysis for Historical Resources

The potential for differential settlement could constitute a substantial adverse change that would impair the significance of seven properties listed below:

- The Superior Oil Company Building(APE Map #2-13)
- California Club (APE Map #3-1)
- 2nd Street Tunnel (APE Map #4-3)
- Walt Disney Concert Hall (APE Map #4-4; CRHR eligible only)
- Former Nishi Hongwanji Buddhist Temple (APE Map #7-19)
- Los Angeles Times Building (APE Map #8-2)
- St. Vibiana Cathedral (APE Map #8-12)

The implementation of mitigation measures described in Sections 4.12.1.4.2, 4.12.1.4.3, and 4.1.2.1.4.5 would reduce the potential impacts to these historical resources to a less than significant level.

4.12.1.3.3.3 Vibration

According to the Noise and Vibration Technical Memorandum (Appendix S), construction activities with the most potential for impacts under the At-Grade Emphasis LRT Alternative, include the cut and cover tunnel along Flower Street, the proposed cut and cover stations at Flower/6th/5th Streets and 2nd/Hope Street, and the Temple and Alameda junction, which includes lowering Alameda Street.

Ground borne vibration from these construction activities could affect historic structures. For the At-Grade Emphasis LRT Alternative, pre-augering would eliminate the need for impact pile driving of soldier piles at the cut and cover sections. This would leave "Large Bulldozer" and "Drill Rigs" as the main construction vibration sources (Section 4.7). If these large pieces of equipment are not used within the 21 feet of a historic property or historical resource, it is reasonably foreseeable that adverse effects or significant impacts could not occur to historic properties and historical resources from GBV.

Buildings near potential construction activities include:

- Barker Brothers (APE Map #2-1)
- Roosevelt Building (APE Map #2-7)
- General Petroleum-Mobil Oil Building (APE Map #2-12)
- Superior Oil Building (APE Map #2-13)
- California Club (APE Map #3-1)
- Los Angeles Central Library (APE Map #3-2)
- Second Street Tunnel (APE Map #4-3)
- Mirror Building (APE Map #8-3)
- Higgins Building(APE Map #8-11, CRHR-eligible only)
- Cathedral of Saint Vibiana (APE Map #8-12)
- Cathedral of Saint Vibiana Rectory (APE Map #8-13)

Section 106 Effects Analysis for Historic Properties

Adverse effects would not occur if mitigation measures described in Sections 4.12.1.4.2 and 4.12.1.4.3 are implemented within the project area. If these measures are properly implemented, potential effects of the At-Grade Emphasis LRT Alternative would not directly alter a characteristic of the historic property in a manner that would diminish the integrity of the historic properties' location, design, setting, materials, workmanship, feeling, or association.

CEQA Impact Analysis for Historical Resources

Under the At-Grade Emphasis LRT Alternative, construction-induced vibration could potentially cause a substantial adverse change that would impair the significance of any or all of the historical resources noted in this section. The implementation of mitigation measures described in Sections 4.12.1.4.2, 4.12.1.4.3, and 4.12.1.4.5 would reduce potential impacts to a less than significant level.

4.12.1.3.3.4 NEPA Finding

Construction of the At-Grade Emphasis LRT Alternative would be expected to result in one direct adverse effect. On June 1, 2010, the California SHPO concurred with FTA's finding of an adverse effect from the At-Grade Emphasis LRT Alternative on the 2nd Street Tunnel (a copy of the SHPO concurrence letter is located in Appendix X). Alteration of the 2nd Street Tunnel (APE Map #4-3) during construction to accommodate the LRT facility would require the implementation of mitigation measures described in Sections 4.12.1.4.1 and 4.12.1.4.5. Consistent with 36 CFR 800, additional consultation with the California SHPO and other consulting parties would need to be completed before beginning project construction. A summary of this information is presented in Table 4.12.1-1.

4.12.1.3.3.5 CEQA Determination

Construction of the At-Grade Emphasis LRT Alternative would potentially result in one direct significant impact and 14 indirect significant impacts to historical resources. All of these potential impacts could result in a substantial adverse change to a historical resource. Implementation of mitigation measures described in Sections 4.12.1.4.1 through 4.12.1.4.5 would reduce these potential impacts to a less than significant level. Project operation is not expected to cause direct or indirect impacts. Refer to Table 4.12.1-1 for additional information.

4.12.1.3.4 Underground Emphasis LRT Alternative

The Underground Emphasis LRT Alternative would add an underground double-track right-of-way and three new underground stations to the project area, all within the APE. The alignment would surface on the block bounded by 1st Street, Alameda Street, 2nd Street, and Central Avenue to connect at grade to the existing Metro Gold Line tracks. The proposed new transit infrastructure would be consistent with the historic use of streetcars within the APE. Additionally, the LRT could benefit historic properties and historical resources in the APE by increasing pedestrian use of the area. Construction activities may cause noise, dirt, congestion, and limitations on access to the project area. These activities would be short term and would not cause adverse effects to historic properties or significant impacts to historical resources.

4.12.1.3.4.1 Demolition, Partial Takes, or Alteration of a Property

To construct the Underground Emphasis LRT Alternative, one parcel would be acquired that contains a historical resource. The S. Kamada Restaurant, Atomic Café, Señor Fish, and Coast Imports (APE Map #7-30) is a CRHR-eligible (not NRHP-eligible) commercial building built in 1913 that is anticipated to be acquired and would serve as the underground egress/ingress portal. The California SHPO did not comment on properties identified solely for CRHR determination in the June 1, 2010 letter.

CEQA Impact Analysis for Historical Resources

The property acquisition and subsequent demolition of the S. Kamada Restaurant, Atomic Café, Señor Fish, and Coast Imports building would constitute a substantial adverse change that would impair the significance of the historical resource. However, implementation of mitigation measures described in Sections 4.12.1.4.1 and 4.12.1.4.5 would reduce potential impacts to a less than significant level.

4.12.1.3.4.2 Station Construction

For the Underground Emphasis LRT Alternative, a new station would be constructed beneath Flower Street between 5th and 4th Streets. This would require demolition of a portion of the CRHR eligible Belmont Tunnel (APE Map #3-4). The Belmont Tunnel is not eligible for the NRHP.

Table 4.12.1-1. At-Grade Emphasis LRT Alternative NEPA Findings and CEQA Determinations

APE Map No.	Name	NRHP Eligibility	CRHR Eligibility	Potential Impact	NEPA Finding	CEQA Determination	Can be Mitigated Below Level of Significance?	
							NEPA	CEQA
2-1	Barker Brothers	Eligible	Listed	Vibration	Effect Not Adverse	Significant Impact	N/A	Yes
2-7	Roosevelt Building	Listed	Listed	Vibration	Effect Not Adverse	Significant Impact	N/A	Yes
2-12	General Petroleum, Mobil Oil Building	Listed	Listed	Vibration	Effect Not Adverse	Significant Impact	N/A	Yes
2-13	Superior Oil Company Building	Listed	Listed	Vibration Settlement	Effect Not Adverse	Significant Impact	N/A	Yes
3-1	The California Club	Eligible	Listed	Vibration Settlement	Effect Not Adverse	Significant Impact	N/A	Yes
3-2	Los Angeles Central Library	Listed	Listed	Vibration	Effect Not Adverse	Significant Impact	N/A	Yes
3-4	Belmont Tunnel, Hollywood-Glendale-Burbank-San Fernando Valley Tunnel	Not Eligible	Eligible	Partial Removal	No Historic Property Affected	Significant Impact	N/A	Yes
4-3	2nd Street Tunnel, Bridge (tunnel) #53C 1318	Eligible	Eligible	Demolition	Adverse Effect	Significant Impact	Yes	Yes

Table 4.12.1-1. At-Grade Emphasis LRT Alternative NEPA Findings and CEQA Determinations (continued)

APE Map No.	Name	NRHP Eligibility	CRHR Eligibility	Potential Impact	NEPA Finding	CEQA Determination	Can be Mitigated Below Level of Significance?	
							NEPA	CEQA
4-4	Walt Disney Concert Hall	Not Eligible	Eligible	Vibration Settlement	No Historic Property Affected	Significant Impact	N/A	Yes
7-19	Former Nishi Hongwanji Buddhist Temple	Listed (NHL)	Listed	Settlement	Effect Not Adverse	Significant Impact	N/A	Yes
8-2	Los Angeles Times Building	Eligible	Listed	Settlement	Effect Not Adverse	Significant Impact	N/A	Yes
8-3	Mirror Building	Eligible	Eligible	Vibration	Effect Not Adverse	Significant Impact	N/A	Yes
8-11	Higgins Building, General Petroleum Building, (Los Angeles) County Engineers Building	Not Eligible	Eligible	Vibration Settlement	No Historic Property Affected	Significant Impact	N/A	Yes
8-12	Cathedral of Saint Vibiana	Eligible	Eligible	Vibration Settlement	Effect Not Adverse	Significant Impact	N/A	Yes
8-13	Cathedral of Saint Vibiana, Rectory	Eligible	Eligible	Vibration	Effect Not Adverse	Significant Impact	N/A	Yes

This alternative also evaluates two possible locations for the proposed 2nd Street station:

- Between Broadway and Spring Street. The Broadway Option would have entrances facing the NRHP eligible Mirror Building (APE Map #8-3).
- Between Main and Los Angeles Streets. The Los Angeles Street Option has proposed entrances opposite and next to the NRHP eligible St. Vibiana Rectory (APE Map #8-13).

Section 106 Effects Analysis for Historic Properties

Both of the 2nd Street station options would have an effect on historic properties, but that effect would not be adverse. The change in setting would not directly alter a characteristic of the historic property in a manner that would diminish the integrity of the historic properties' location, design, setting, materials, workmanship, feeling, or association.

CEQA Impact Analysis for Historical Resources

Construction of proposed stations would not constitute a substantial adverse change that would impair the significance of the historical resources.

The change in setting created by the station would not diminish the integrity of the properties' significant historic features. The Underground Emphasis LRT Alternative station construction would therefore have a less than significant impact on historical resources.

Implementation of the mitigation measure described in Section 4.12.1.4.1 would reduce any impact to the CRHR-eligible Belmont Tunnel to a less than significant level.

4.12.1.3.4.3 Vibration

According to the Noise and Vibration Technical Memorandum, construction activities with the most potential for impacts include the cut and cover tunnel under Flower Street, proposed underground cut and cover stations at Flower/6th/5th Streets and 2nd/Hope Street, and the junction at Temple and Alameda Streets, which includes lowering Alameda Street.

Ground borne vibration from these construction activities could affect historic structures. For the Underground Emphasis LRT Alternative, pre-augering of soldier piles at cut and cover sections would eliminate the need for impact pile driving. This would leave "Large Bulldozer" and "Drill Rigs" as the main sources of construction vibration. If these large pieces of equipment are not used within 21 feet of a historic property or historical resource, there would not be adverse effects and significant impacts would not occur to historic properties and historical resources from GBV. Properties that are close to the cut and cover construction activities and which may be affected by construction-related vibration include:

- Barker Brothers (APE Map #2-1)
- Roosevelt Building (APE Map #2-7)
- General Petroleum-Mobil Oil Building (APE Map #2-12)

- Superior Oil Building (APE Map #2-13)
- California Club (APE Map #3-1)
- Los Angeles Central Library (APE Map #3-2)
- 2nd Street Tunnel (APE Map #4-3)
- Mirror Building (APE Map #8-3)
- Higgins Building(APE Map #8-11)
- Cathedral of Saint Vibiana (APE Map #8-12)
- Cathedral of Saint Vibiana Rectory (APE Map #8-13)

The TBM associated with tunneling activities would not cause vibratory effects or impacts to historic properties or historical resources because the TBM performs a slow moving drilling process that generates very little vibration to the surrounding areas. Studies have measured TBM vibration to be in the range of 0.0024 to 0.0394 inches per second PPV at a distance at 33 feet. The proposed TBM tunnels on 2nd Street would vary in depth due to the existing topography and vertical curves in the alignment. The tunnel would range from about 140 feet below the surface (distance from street level to the top of the tunnel) to about 40 feet below the surface. The vibratory potential of the TBM is minimal and would be well below the FTA threshold for Category IV buildings (buildings extremely susceptible to vibration damage) of 0.12 inches per second PPV.

Section 106 Effects Analysis for Historic Properties

An effect, but not adverse in nature, would occur during construction at the following locations from vibration-induced damage, especially if mitigation measures described in Sections 4.12.1.4.2 and 4.12.1.4.3 are implemented within the project area:

- Barker Brothers (APE Map #2-1)
- Roosevelt Building (APE Map #2-7)
- General Petroleum Mobil Oil Building (APE Map #2-12)
- Superior Oil Building (APE Map #2-13)
- California Club (APE Map #3-1)
- Los Angeles Central Library (APE Map #3-2)
- 2nd Street Tunnel (APE Map #4-3)
- Mirror Building (APE Map #8-3)

- Cathedral of Saint Vibiana (APE Map #8-12)
- Cathedral of Saint Vibiana Rectory (APE Map #8-13)

If these mitigation measures are properly implemented, construction of this alternative would not directly alter a characteristic of these historic properties in a manner that would diminish the integrity of the historic properties' location, design, setting, materials, workmanship, feeling, or association.

CEQA Impact Analysis for Historical Resources

The potential for construction-related vibration could cause a substantial adverse impact that would impair the following locations:

- Barker Brothers (APE Map #2-1)
- Roosevelt Building (APE Map #2-7)
- General Petroleum Mobil Oil Building (APE Map #2-12)
- Superior Oil Building (APE Map #2-13)
- California Club (APE Map #3-1)
- Los Angeles Central Library (APE Map #3-2)
- 2nd Street Tunnel (APE Map #4-3)
- Mirror Building (APE Map #8-3)
- Cathedral of Saint Vibiana (APE Map #8-12)
- Cathedral of Saint Vibiana Rectory (APE Map #8-13)
- Higgins Building (APE Map #8-11)

The implementation of mitigation measures described in Sections 4.12.1.4.2, 4.12.1.4.3, and 4.12.1.4.5 would reduce the potential impacts to a less than significant level.

4.12.1.3.4.4 Differential Settlement

According to the Description of Construction, at least eight NRHP and/or CRHR eligible properties could be potentially affected by tunneling (TBM operation) and cut and cover construction, including:

- Standard Hotel (APE Map #2-13)
- California Club (APE Map #3-1)

- Walt Disney Concert Hall (APE Map #4-4)
- 2nd Street Tunnel (APE Map #4-3)
- Former Nishi Hongwanji Buddhist Temple (APE Map #7-19)
- Los Angeles Times Building (APE Map #8-2)
- Higgins Building (APE Map #8-11)
- St. Vibiana Cathedral (APE Map #8-12)

Implementation of mitigation measures described in Sections 4.12.1.4.2, 4.12.1.4.3, and 4.12.1.4.4 (when applicable) would avoid potential adverse effects to historic properties and reduce potential impacts to historical resources to a less than significant level.

Section 106 Effects Analysis for Historic Properties

Implementation of mitigation measures (as described in Sections 4.12.1.4.2, 4.12.1.4.3, and 4.12.1.4.5) to protect and stabilize the ground near the following locations would avoid adverse effects to all properties under this alternative:

- Standard Hotel (APE Map #2-13)
- California Club (APE Map #3-1)
- 2nd Street Tunnel (APE Map #4-3)
- Former Nishi Hongwanji Buddhist Temple (APE Map #7-19)
- Los Angeles Times Building (APE Map #8-2)
- St. Vibiana Cathedral (APE Map #8-12)

If these mitigation measures are properly implemented, differential settlement would not directly alter characteristics of historic properties in a manner that would diminish the integrity of each property's location, design, setting, materials, workmanship, feeling, or association.

CEQA Impact Analysis for Historical Resources

The potential for differential settlement could constitute a substantial adverse change that would impair the significance of any or all of the historical resources noted in this section. Implementation of mitigation measures described in Sections 4.12.1.4.2, 4.12.1.4.3, and 4.12.1.4.5 would reduce potential impacts to a less than significant level.

4.12.1.3.4.5 NEPA Finding

Construction and operation of the Underground Emphasis LRT Alternative would not be expected to result in any direct or indirect adverse effects to historic properties. On June 1, 2010, the California SHPO concurred with FTA's finding of no adverse effect from the

Underground Emphasis LRT Alternative (a copy of the SHPO concurrence letter is located in Appendix X).

4.12.1.3.4.6 CEQA Determination

Construction of the Underground Emphasis LRT Alternative would result in 1 direct significant impact and 14 indirect significant impacts to historical resources. Implementation of mitigation measures described in Sections 4.12.1.4.1 through 4.12.1.4.5 would reduce these potential impacts to a less than significant level. Project operation would not be expected to cause direct or indirect impacts. Refer to Table 4.12.1-2 for additional information.

4.12.1.3.5 Fully Underground LRT Alternative

The Fully Underground LRT Alternative would be identical to the Underground Emphasis LRT Alternative west of Central Avenue. East of Central Avenue, a new underground station would be built on the block bounded by 1st Street, Alameda Street, 2nd Street, and Central Avenue instead of a portal.

The alignment and junction would be underground beneath the intersection of 1st and Alameda, and two new portals would be constructed to connect to the at-grade Metro Gold Line tracks:

- In the median of 1st Street between Rose and Garey Streets
- Just northeast of Temple and Alameda Streets

Construction activities may cause noise, dirt, congestion, and limitations on access to the project area, these activities would be short-term and not cause adverse effects to historic properties or significant impacts to historical resources.

The potentially significant impacts and effects would be identical to those of the Underground Emphasis LRT Alternative, except in the ways described in the following subsections.

4.12.1.3.5.1 Station Construction

A new station would be constructed at 2nd Street and Central Avenue. This underground station may also include a small building at ground level on the southwest corner of 1st and Alameda Streets to house ventilation fans. The entrances would be similar to those proposed for the other stations and the changes would not result in a significant effect to the NRHP eligible John A. Roebling's Sons Co. Building (APE Map #7-35). The station would also be near the CRHR eligible S. Kamada Restaurant, Atomic Café, Señor Fish, Coast Imports (APE Map #7-30), and this building would be removed as a result of the open-cut method of construction in this portion of the alignment.

CEQA Impact Analysis for Historical Resources

The property acquisition and subsequent demolition of the S. Kamada Restaurant, Atomic Café, Señor Fish, and Coast Imports building would constitute a substantial adverse change that would impair the significance of the historical resource. However, implementation of the mitigation measure described in Sections 4.12.1.4.1 and 4.12.1.4.5 would reduce impacts to a less than significant level.

4.12.1.3.5.2 NEPA Finding

Construction and operation of the Fully Underground LRT Alternative would not be expected to result in any direct or indirect adverse effects to historic properties.

4.12.1.3.5.3 CEQA Determination

Construction of the Fully Underground LRT Alternative would potentially result in 1 direct significant impact and 14 indirect significant impacts to historical resources. Implementation of mitigation measures described in Sections 4.12.1.4.1 through 4.12.1.4.5 would reduce these potential impacts to a less than significant level. Project operation is not expected to cause direct or indirect impacts. The Fully Underground LRT Alternative would affect the same properties as the Underground Emphasis LRT Alternative, and the CEQA determinations would be the same. As such, the information in Table 4.12.1-2 would apply to both the Underground Emphasis LRT Alternative and the Fully Underground LRT Alternative.

4.12.1.4 Mitigation Measures

The following mitigation measures would help reduce the Regional Connector Transit Corridor's potential construction-related impacts on historic resources to a less than significant level. Effects on historic properties or impacts on historic resources as a result of project operations would not occur, so mitigation measures for operations would not be required.

4.12.1.4.1 Historic Properties/Historical Resources Documentation

Documentation of historic properties and historical resources adversely affected by the project would consist of the development of individual Historic American Building Survey/Historic American Engineering Record (HABS/HAER) submissions. The HABS/HAER documents would be prepared so that the original archival-quality documentation could be donated for inclusion in the Library of Congress if the National Park Service accepts these materials. Archival copies of the documentation would also be offered for donation to local repositories, including the Los Angeles Central Library and the Los Angeles Conservancy. The appropriate level of recordation would be established in consultation with the California SHPO and formalized as a part of a Memorandum of Agreement (MOA) as described in Section 4.12.1.4.5. The California SHPO has reviewed the technical memorandum and concurred with the determinations of eligibility and effect for the project on June 1, 2010. FTA is continuing consultation with the SHPO to develop a Memorandum of Agreement to finalize the mitigation measures for adverse effects to historic properties from the Project.

4.12.1.4.2 Pre-construction Baseline Survey and Geotechnical Investigations

A survey of historic properties and/or historical resources within 21 feet of vibration producing construction activity would be conducted to assess the building category and the potential for GBV to cause damage. The survey would also be used to establish baseline, pre-construction conditions for historic properties and historical resources.

Table 4.12.1-2. Underground Emphasis LRT Alternative NEPA Findings and CEQA Determinations

APE Map No.	Name	NRHP Eligibility	CRHR Eligibility	Potential Impact	NEPA Finding	CEQA Determination	Can be Mitigated Below Level of Significance?	
							NEPA	CEQA
2-1	Barker Brothers	Eligible	Listed	Vibration	Effect Not Adverse	Significant Impact	N/A	Yes
2-7	Roosevelt Building	Listed	Listed	Vibration	Effect Not Adverse	Significant Impact	N/A	Yes
2-12	General Petroleum, Mobil Oil Building	Listed	Listed	Vibration	Effect Not Adverse	Significant Impact	N/A	Yes
2-13	Superior Oil Company Building	Listed	Listed	Vibration Settlement	Effect Not Adverse	Significant Impact	N/A	Yes
3-1	The California Club	Eligible	Listed	Vibration Settlement	Effect Not Adverse	Significant Impact	N/A	Yes
3-2	Los Angeles Central Library	Listed	Listed	Vibration	Effect Not Adverse	Significant Impact	N/A	Yes
3-4	Belmont Tunnel, Hollywood-Glendale-Burbank-San Fernando Valley Tunnel	Not Eligible	Eligible	Partial Removal	No Historic Property Affected	Significant Impact	N/A	Yes
4-4	Walt Disney Concert Hall	Not Eligible	Eligible	Vibration Settlement	No Historic Property Affected	Significant Impact	N/A	Yes
7-19	Former Nishi Hongwanji Buddhist Temple	Listed	Listed	Settlement	Effect Not Adverse	Significant Impact	N/A	Yes

Table 4.12.1-2. Underground Emphasis LRT Alternative NEPA Findings and CEQA Determinations (continued)

APE Map No.	Name	NRHP Eligibility	CRHR Eligibility	Potential Impact	NEPA Finding	CEQA Determination	Can be Mitigated Below Level of Significance?	
							NEPA	CEQA
7-30	S. Kamada Restaurant, Atomic Café, Señor Fish, and Coast Imports	Not Eligible	Eligible	Demolition	No Historic Property Affected	Significant Impact	N/A	Yes
8-2	Los Angeles Times Building	Eligible	Listed	Settlement	Effect Not Adverse	Significant Impact	N/A	Yes
8-3	Mirror Building	Eligible	Eligible	Vibration	Effect Not Adverse	Significant Impact	N/A	Yes
8-11	Higgins Building, General Petroleum Building, (Los Angeles) County Engineers Building	Not Eligible	Eligible	Vibration Settlement	No Historic Property Affected	Significant Impact	N/A	Yes
8-12	Cathedral of Saint Vibiana	Eligible	Eligible	Vibration Settlement	Effect Not Adverse	Significant Impact	N/A	Yes
8-13	Cathedral of Saint Vibiana, Rectory	Eligible	Eligible	Vibration	Effect Not Adverse	Significant Impact	N/A	Yes

During preliminary and final design of the project, subsurface (geotechnical) investigations would be undertaken under this measure to evaluate soil, groundwater, seismic, and environmental conditions along the alignment. This analysis would assist in the development of appropriate support mechanisms for cut and fill construction areas. The subsurface investigation would also identify areas that could experience differential settlement as a result of using a TBM in close proximity to historic properties and/or historical resources. An architectural historian or historical architect who meets the Secretary of the Interior's Professional Qualification Standards would provide input and review of final design documents prior to implementation of measures (36 CFR Part 61).

4.12.1.4.3 Building Protection Measures, Geotechnical and Vibration Monitoring, and Post-Construction Survey

For those historic properties and historical resources that have the potential to be affected or impacted by ground-borne vibrations and/or differential settlement, Metro would use building protection measures such as underpinning, soil grouting, or other forms of ground improvement, as well as lower vibration equipment and/or construction techniques. These techniques, combined with a geotechnical and vibration monitoring program, would help protect identified historic properties and historical resources. The historic property and historical resource protection measures as well as the geotechnical and vibration monitoring program would be reviewed by an architectural historian or historical architect who meets the Secretary of the Interior's Professional Qualification Standards (36 CFR Part 61) to ensure that the measures would adequately protect the properties/resources. A post-construction survey would also be undertaken to ensure that adverse effects or significant impacts had not occurred to historic properties and historical resources.

4.12.1.4.4 TBM Specifications/Requirements Near Historic Properties and Historical Resources

For those historic properties and historical resources that have the potential to be affected or impacted by differential settlement caused by TBM construction, a contractor would be required to develop and use an earth pressure balance or slurry shield TBM. The method of machine operation would be based on the anticipated ground conditions near historic properties and historical resources. These construction methods and machinery types would reduce the potential for differential settlement near historic properties and historical resources.

4.12.1.4.5 Memorandum of Agreement

For those historic properties and historical resources that would be anticipated to experience adverse effects, an MOA would be developed to resolve those adverse effects consistent with 36 CFR 800. This agreement, developed by FTA and Metro in consultation with the California SHPO and other consulting parties would resolve and/or avoid, minimize, or mitigate potential effects to historic properties and/or historical resources. The agreement would include stipulations that outline the specific requirements for consultation and decision making between the lead federal agency and consulting parties, specify the level of HABS/HAER recordation, and outline specific requirements for pre- and post- construction surveys, geotechnical investigations, building protection measures, and TBM specifications.

4.12.2 Archaeological Resources

This section summarizes the existing archaeological resources located in the project area and the potential impacts of the proposed alternatives on these resources. Information in this section is based on the Cultural Resources – Archaeology Technical Memorandum prepared for the project and contained in Appendix Y of this DEIS/DEIR.

4.12.2.1 Regulatory Framework

NEPA guidelines include compliance with related federal laws that require identification of historic properties and consideration of project-related effects on those properties. This analysis was prepared to comply with Section 106 of the NHPA of 1966, as amended, and with regulations contained in 36 Code of Federal Regulations (CFR) Part 800. These regulations require federal agencies to consider the effects of proposed projects on historic properties as part of the environmental assessment process. Historic properties may include archaeological resources.

Other federal laws include the Archaeological Data Preservation Act of 1974, the American Indian Religious Freedom Act of 1978, the Archaeological Resources Protection Act of 1979, and the Native American Graves Protection and Repatriation Act of 1989, among others. Section 106 and NEPA procedures—particularly through involvement of Native American and other public constituents in the identification, evaluation, and mitigation processes—might address impact resolution through these other federal laws.

This analysis was also prepared to comply with requirements of CEQA and the CEQA Guidelines (CERES 2009) as they apply to cultural resources. Under CEQA, it is necessary for a lead agency to evaluate proposed projects for the potential to cause significant impacts on "historical resources." For CEQA conformance, historical resources include the built environment as well as "unique paleontological resources" or "unique geologic features." A proposed project that may affect historical resources is submitted to the SHPO for review and comment prior to project approval by the lead agency and before any project-related clearance, demolition, or construction activities are commenced.

Properties that may be historic resources within the identified project APE were evaluated for NRHP eligibility according to criteria set forth in 36 CFR Part 60.4. The age criterion for inclusion in the NRHP is 50 years and older, except in cases of overriding significance (criteria consideration G).

Properties were also considered for eligibility for inclusion in the CRHR; although there is no established age threshold for the CRHR, the same 50-year cutoff was used for this project. Under Public Resources Code (PRC) Section 5024.1, the CRHR was established to serve as an authoritative guide to the state's significant historical and archaeological resources.

NEPA does not provide specific definitions or criteria for determining the significance of historic properties. CEQ guidelines direct agencies to comply with Section 106 of the NHPA to be in compliance with NEPA. In accordance with CEQA and Section 106 regulations, a project would result in a significant impact on an archaeological resource if it would:

- Result in the physical destruction of an archaeological resource eligible for listing in the NRHP and the CRHR.

4.12.2.2 Affected Environment

The project-specific APE was established through consultation between the lead federal agency, FTA, the lead CEQA agency, Metro, the SHPO, and other consulting parties in accordance with 36 CFR 800.16(d).

For archaeological resources, the APE includes the proposed at-grade and underground right-of-way and/or areas of direct ground disturbance. This includes areas with permanent site improvements and areas for staging and temporary construction activities. The APE includes the full width of the street, the adjacent sidewalks, any additional street segments or portions of adjacent city blocks in areas of proposed stations, connections with existing rail lines, and alignments that deviate from existing streets. The vertical APE extends to approximately 100 feet below the existing ground surface.

A records and literature search indicated that 5 previously recorded archaeological resources CA-LAN-887H, CA-LAN-3588, P-19-003097, P-19-003338, and P-19-003339) are located within the APE (Table 4.12.2-1), and that all are historic archaeological sites. With regards to eligibility for listing in the NRHP or CRHR, some resources are identified in Table 4.12.2-1 as “No determination of eligibility,” which means that research has not been conducted to determine the eligibility of the site. Resources are “presumed eligible” when, in the professional opinion of a qualified archeologist, there are reasons to believe that it may be eligible for listing in the NRHP or CRHR, but there are factors that inhibit excavation or direct examination of the resource. Therefore, resources presumed eligible may or may not ultimately be determined eligible, which is why “no determination of eligibility” is used in the table.

The records and literature search also identified 143 previously conducted cultural resource studies within a 0.25-mile radius of the APE. Of these, 23 study areas are located within the project direct APE.

Historic maps indicate that the direct APE was completely developed prior to 1888 and that several streets within the project area have been realigned over the past 120 years. The Los Angeles Zanja System, the City’s original water system which operated from 1781 through the early 1900s, also crosses the direct APE in numerous locations.

The NAHC Sacred Lands File search indicated the presence of cultural resources important to Native Americans in the project area. The NAHC response included a list of five Native American contacts that may have knowledge of cultural resources in the project area. Location maps, a description of the proposed project, and its APE were sent to these five groups via U.S. mail; each letter was followed up with a telephone call. Responses were received from two of the five Native American contacts. These responses are documented in Appendix Y.

In the course of the pedestrian survey, a single archaeological site (RC-1) was encountered within the direct APE. This resource consists of a historic brick alignment, likely representing part of a late 19th/early 20th century structure foundation. Available evidence suggests that RC-1 lacks sufficient integrity and is not eligible for listing in the NRHP or CRHR.

None of the five previously recorded archaeological sites within the direct APE were observed during the pedestrian survey. Site P-19-003097, a historic site consisting of 19th and 20th century features and artifacts, was considered to be significant by its excavators. Data recovery in 2002 was conducted to mitigate impacts to this resource and the site was subsequently destroyed. Site CA-LAN-3588, a historic site consisting of features and artifacts dating to circa 1880 to 1935, is presumed eligible for listing on both the NRHP and CRHR due to its association with earliest Japanese occupation of Little Tokyo.

Sites P-19-003338 and P-19-003339 are American period artifact deposits that have not been formally evaluated. For purposes of this analysis they are presumed eligible for both registers.

The Los Angeles Zanja System (recorded as CA-LAN-887H, P-19-003103, and P-19-003352) crosses the direct APE in numerous places. A segment of the Zanja System (P-19-003103) north of the APE was nominated for listing in the NRHP under Criterion A at the local level of significance for its direct role in the development of Los Angeles between 1781 and circa 1900. The system as a whole is presumed eligible for listing in the NRHP and CRHR for the same reason.

Resources are "presumed eligible" when, in the professional opinion of a qualified archeologist, there are reasons to believe that it may be eligible for listing in the NRHP or CRHR, but there are factors that inhibit excavation or direct examination of the resource. Therefore, resources presumed eligible may or may not ultimately be determined eligible.

4.12.2.3 Environmental Impacts/Environmental Consequence

4.12.2.3.1 No Build Alternative

No operational or construction impacts to archaeological resources would occur under the No Build Alternative since construction would not be performed as part of this alternative.

Cumulative impacts would not occur since the No Build Alternative would not result in construction or operational impacts to archaeological resources.

4.12.2.3.1.1 NEPA Finding and CEQA Determination

The No Build Alternative would not result in adverse or significant impacts to archaeological resources.

4.12.2.3.2 TSM Alternative

Construction of the TSM Alternative has the potential to directly affect archaeological resources within the APE, including previously unidentified archaeological resources and the Los Angeles Zanja System. Such damage to archaeological resources would represent a significant impact. Implementation of mitigation measures described in Sections 4.12.2.4.1 and 4.12.2.4.2 would reduce this potential impact to less than significant level. The TSM Alternative would not result in operational impacts to archaeological resources.

Implementation of the mitigation measure described in Section 4.12.2.4.1 would reduce construction-related impacts to previously unidentified archaeological resources to less than significant level. Therefore, the TSM Alternative would not contribute to a cumulative impact on these resources. By providing documentation and interpretation of the Zanja System on a system-wide scale, implementation of the mitigation measure described in Section 4.12.2.4.2 would reduce both direct and cumulative impacts to this resource to less than significant level.

Table 4.12.2-1. Previously Recorded Archaeological Resources within the APE

Trinomial	Primary No.	Resource Description	Quadrangle	National and CA Register Eligibility	Recorded by and Year
CA-LAN-887H	P-19-000887	Historic: Segment of the Zanja Madre (water ditch) and associated artifacts	Los Angeles	Segment north of project recommended eligible; whole Zanja System presumed eligible	Padon, B. 1999; Costello, J. 1978
CA-LAN-3097	P-19-003097	Historic: structural remains and 3 privies with associated artifacts	Los Angeles	Presumed destroyed, no longer eligible	Applied Earthworks, Inc. 2002
CA-LAN-3338	P-19-003338	Historic: refuse deposit	Los Angeles	No determination of eligibility	Humphries, F. 2000
CA-LAN-3339	P-19-003339	Historic: refuse deposit	Los Angeles	No determination of eligibility	Humphries, F. 2000
CA-LAN-3588	P-19-003588	Historic: brick foundations and refuse deposits	Los Angeles	Presumed NRFP and CA Register eligible	Foster, J. 2006

4.12.2.3.2.1 NEPA Finding and CEQA Determination

With implementation of mitigation, potential construction and cumulative impacts would not be adverse or significant under NEPA or CEQA. Operation of the TSM Alternative would not result in adverse or significant impacts to archaeological resources.

4.12.2.3.3 At-Grade Emphasis LRT Alternative

Construction of the At-Grade Emphasis LRT Alternative has the potential to directly affect archaeological resources within the APE, including previously unidentified archaeological resources and previously undiscovered portions of site RC-1.

Site RC-1, a historic brick alignment (see Section 4.12.2.2), may be affected during ground disturbance from construction of a proposed pedestrian bridge at the intersection of Temple and Alameda Streets. Site RC-1 appears to not be eligible for either the National Register or the California Register. However, previously unrecorded parts of the site that retain substantial integrity may be present.

This alternative also has the potential to affect previously unrecorded archaeological resources during ground disturbance from constructing new underground tunnel segments, stations, and the automobile underpass and pedestrian overpass on Alameda Street at Temple Street. Such damage to archaeological resources would represent a significant effect.

Implementation of the mitigation measure described in Section 4.12.2.4.1 would reduce construction impacts to previously unidentified archaeological resources and previously undiscovered portions of site RC-1 to a less than significant level.

The At-Grade Emphasis LRT Alternative would not result in operational impacts to archaeological resources.

4.12.2.3.3.1 NEPA Finding and CEQA Determination

With implementation of mitigation measures, potential construction and cumulative impacts would not be adverse or significant under NEPA or CEQA. The At-Grade Emphasis LRT Alternative would not result in adverse or significant operational impacts to archaeological resources.

4.12.2.3.4 Underground Emphasis LRT Alternative

Construction of the Underground Emphasis LRT Alternative has the potential to directly affect archaeological resources within the APE, including previously unidentified archaeological resources, the Los Angeles Zanja System, and site CA-LAN-3588. Although the precise location and local integrity of the zanjas have not been established, the project's 2nd Street alignment likely crosses the system multiple times.

Archaeological remains associated with these sites may extend into the project area and be subject to direct alteration. This would result in a significant effect. Construction of new stations could affect any extant archaeological resources within their footprints. Construction of new tunnel segments through deep tunneling, as opposed to cut-and-cover techniques, could avoid effects to shallow archaeological resources, although the maximum depth of these resources and minimum depth of construction would both need to be established to ascertain actual effects. Implementation of mitigation measures described in Sections 4.12.2.4.1 and 4.12.2.4.2 would reduce potential construction impacts to both identified and previously unidentified archaeological resources to a less than significant level. The Underground Emphasis LRT Alternative would not result in operational impacts to archaeological resources.

Given that implementation of the mitigation measure described in Section 4.12.2.4.1 would reduce potential construction impacts to previously unidentified archaeological resources to a less than significant level, the Underground Emphasis LRT Alternative would not contribute to a cumulative impact on unidentified archaeological resources.

Potential destruction of portions of the Los Angeles Zanja System could contribute to a cumulative impact to this resource. Implementation of the mitigation measure described in Section 4.12.2.4.2 would reduce both direct and cumulative impacts to known archaeological resources, including the Zanja System, to a less than significant level.

4.12.2.3.4.1 NEPA Finding and CEQA Determination

Construction of the Underground Emphasis LRT Alternative has the potential to adversely affect previously unknown resources. With implementation of mitigation measures, potential construction and cumulative impacts would not be adverse or significant under NEPA or CEQA. The Underground Emphasis LRT Alternative would not result in adverse or significant operational impacts to archaeological resources.

4.12.2.3.5 Fully Underground LRT Alternative

Construction of the Fully Underground LRT Alternative has the potential to directly affect archaeological resources within the APE, including previously unidentified archaeological resources, the Los Angeles Zanja System, and sites CA-LAN-3588, P-19-003338, and P-19-003339.

As with the Underground Emphasis LRT Alternative, archaeological features associated with these sites may extend into the project area and be subject to direct alteration. This would result in a significant effect. Implementation of mitigation measures described in Sections 4.12.2.4.1 and 4.12.2.4.2 would reduce potential direct impacts to identified and previously unidentified archaeological resources to a less than significant level. The Fully Underground LRT Alternative would not result in operational impacts to both identified and previously unidentified archaeological resources.

Given that implementation of the mitigation measure described in Section 4.12.2.4.1 would reduce potential construction impacts to previously unidentified archaeological resources to a less than significant level, the Fully Underground LRT Alternative would not contribute to a cumulative impact on unidentified archaeological resources.

Potential destruction of portions of the Los Angeles Zanja System could contribute to a cumulative impact to this resource. Implementation of the mitigation measure described in Section 4.12.2.4.2 would reduce both direct and cumulative impacts to known archaeological resources, including the Zanja System, to a less than significant level.

4.12.2.3.5.1 NEPA Finding and CEQA Determination

Construction of the Fully Underground LRT Alternative has the potential to affect previously unknown resources. With implementation of mitigation measures, potential construction and cumulative impacts would not be adverse or significant under NEPA or CEQA. The Fully Underground LRT Alternative would not result in adverse or significant operational impacts to archaeological resources.

4.12.2.4 Mitigation Measures

Construction of the Regional Connector Transit Corridor project may impact one or more NRHP- or CRHR-eligible archaeological sites along with an unknown number of previously unidentified archaeological resources.

Since operational impacts to archaeological resources, including both previously recorded and undiscovered resources, are not expected for any of the project alternatives, mitigation for operation would not be required for this project.

In the event that resource avoidance is not possible, and to mitigate impacts to previously unidentified archaeological resources, the following mitigation measures related to construction activities are recommended.

4.12.2.4.1 Treatment of Undiscovered Archaeological Resources

A detailed Cultural Resources Monitoring and Mitigation Plan (CRMMP) would be prepared prior to implementing this project, similar in scope to the CRMMP that was prepared for Metro's Eastside Gold Line Transit Corridor (Glenn and Gust 2004). Implementing a CRMMP during ground disturbance in highly sensitive archaeological areas would ensure that cultural resources are identified and adequately protected.

If cultural resources are discovered or if previously identified resources are affected in an unexpected manner, the CRMMP would ensure that such resources receive mitigation to reduce the impact to a less than significant level. This plan would include, but not be limited to, the following elements:

- Worker training
- Archaeological monitoring
- The scientific evaluation and mitigation of archaeological discoveries
- Native American participation, as needed
- Appropriate treatment of human remains
- Reporting of monitoring and mitigation results

Worker Training

Prior to initiating ground-disturbing activities, a qualified archaeologist would conduct a short awareness training session for all construction workers and supervisory personnel. The session would explain the importance of and legal basis for protecting significant archaeological resources.

Each worker would also learn the proper procedures to follow in the event cultural resources or human remains are uncovered during ground-disturbing activities. These procedures include work curtailment or redirection and the immediate contact of the supervisor and the archaeological monitor.

This worker education session could include visual representations of artifacts (prehistoric and historic) that might be found in the project vicinity, and it could take place on-site immediately prior to the start of ground disturbance.

Supervisory personnel may benefit from longer training sessions, while a brief training would suffice for non-supervisory workers. The brief (approximate 30- to 45-minute) training session may be conducted on-site by video, PowerPoint presentation, or similar media.

Archaeological Monitoring, Evaluation, and Mitigation

Due to poor surface visibility and high archaeological sensitivity of the direct APE, an archaeological monitor would be present during ground-disturbing activities in archaeologically sensitive areas. This would reduce the potential level of impact to buried archaeological resources to a less than significant level. This work would be completed under the direction of an archaeologist who meets the Secretary of the Interior's Standards for archaeologists. An adequate number of monitors would be present to ensure that all earth-moving activities are observed and would be on-site during all grading activities for areas to be monitored.

During the original excavation of previously undisturbed soils, the archaeological monitor(s) would be on-site at a frequency determined by the lead archaeologist. Inspection frequency may vary based on the rate of excavation, the materials excavated, and the presence and abundance of artifacts and features. Full-time monitoring is warranted within one-half block of potentially significant archaeological resources that are known or suspected to be present within the direct APE.

If potentially significant archaeological resources are exposed during ground-disturbing activities, the project manager would be notified immediately. Archaeological monitor(s) would have the authority to divert or temporarily halt ground-disturbing operations in the area of discovery to allow the resources to be evaluated. Excavation work would halt until the archaeological monitor makes a determination of the significance of the archaeological resource. Construction activities may continue in other areas.

Evaluation of such resources is typically accomplished by a test-level excavation designed to determine the horizontal and vertical extent of the resource, and to characterize its contents. If the discovery proves to be potentially eligible for listing on the NRHP or the CRHR and project plans cannot be altered to avoid affecting the site, then an adverse effect would result within the project area. This adverse effect may be resolved by implementing a Memorandum of Agreement (MOA) between Metro and the SHPO.

Before construction activities are allowed to resume in an affected area, artifacts would be recovered and features recorded using professional archaeological methods. The lead archaeologist operating under the direction of the MOA would determine the amount of material to be recovered for an adequate artifact sample for analysis.

All cultural material collected during the construction monitoring program would be processed using professional archaeological methods. An appropriate sample of recovered materials, selected by the lead archaeologist, would be curated at a curation facility that meets federal standards per 36 CFR Part 79 and made available to other archaeologists and researchers for further study.

Native American Participation

If Native American cultural resources (i.e., prehistoric or ethnohistoric-period artifacts, food remains, or features associated with Native Americans) are exposed during project-related ground disturbance, Metro would contact the Gabrielino/Tongva San Gabriel Band of Mission Indians and the Tongva Ancestral Territorial Tribal Nation. Both groups have expressed interest in the project. One or both of these groups would be asked to provide the services of a trained

Native American consultant to monitor ground-disturbing work in the area containing the Native American cultural resources. This monitoring would occur on an as-needed basis, and would be intended to ensure that Native American concerns are taken into account during the construction process.

Human Remains

The discovery of human remains is always a possibility during ground disturbance. For example, an unmarked early Spanish period Native American cemetery was recently discovered near the APE (Applied Earthworks 1999).

The State of California Health and Safety Code Section 7050.5 addresses what should be done when human remains are found during construction. This code section states that when human remains are encountered, no further disturbance would occur until the County Coroner has made a determination of origin and disposition pursuant to Public Resources Code (PRC) Section 5097.98. The County Coroner would be immediately notified of the find.

If the human remains are determined to be prehistoric, the Coroner would notify the Native American Heritage Commission, which would determine and notify a Most Likely Descendant (MLD). The MLD shall complete inspection of the site within 48 hours of notification and may recommend scientific removal and nondestructive analysis of human remains and items associated with Native American burials. Impacts to human remains may remain significant even after mitigation.

Reporting

If cultural resources are not discovered in the course of construction monitoring, a brief letter to that effect would be prepared by the consulting archaeologist, indicating that the monitoring activities have been satisfied. If previously unidentified cultural resources are discovered in the course of construction monitoring, a report would be prepared following Archaeological Resource Management Report (OHP 1990) guidelines that documents field and analysis results and interprets the data within an appropriate research context.

4.12.2.4.2 Treatment of Known Archaeological Resources

Destruction of a resource that is eligible for listing in the NRFP or CRHR would be a significant adverse effect. This effect may be resolved through by implementing an MOA between FTA, Metro, and the SHPO, as well as other interested parties.

Four archaeological sites that are either within or immediately adjacent to the direct APE are presumed eligible for listing on both the NRHP and the CRHR. These include the Los Angeles Zanja System (the Zanja Madre, CA-LAN-887H, and numerous unrecorded numbered zanjas) and sites CA-LAN-3588, P-19-003338, and P-19-003339.

Effects to the data potential of archaeological sites can be mitigated to a less than significant level by preparing and implementing a data recovery plan under Section 106 and CEQA. The actual mitigation measures agreed upon in the MOA may vary in substance and degree, but the MOA would include a process to resolve any adverse effects upon archaeological resources within the direct APE that are eligible for listing in the NRHP or CRHR. The treatment of sites

CA-LAN-3588, P-19-003338, and P-19-003339 may include systematic and scientific exposure, evaluation, and if necessary, archaeological data recovery.

Los Angeles Zanja System

The Los Angeles Zanja system was an extensive and integrated water conveyance network that served large areas of the City for multiple generations. Generally speaking, previous construction projects in downtown Los Angeles have unexpectedly encountered and documented limited exposures of a single zanja segment, often after the segment has been damaged by construction equipment. This incomplete approach does not permit the overall Zanja system to be evaluated, given the requirements that the OHP clarified in its recent letter (Toffelmier 2009).

It is likely that other projects (such as emergency utility repair) have damaged segments of the Zanja system without documentation. This repeated damage (both monitored and unmonitored construction impacts) constitutes a cumulative effect that should be mitigated. Construction monitoring alone is insufficient mitigation to address this effect, particularly given the likelihood of damaging the zanjas prior to discovery during project construction process.

Inadvertent project-related damage to the zanjas may constitute an adverse effect under the Criteria of Adverse Effect, "physical destruction or damage" (36 CFR Part 800.5(a) (2) and material impairment as defined in CEQA. This action would contribute to, rather than mitigate, these cumulative effects.

Both Section 106 of the NHPA (as amended) and CEQA require identification, documentation, and evaluation of historic properties/historic resources in a project area (or direct APE). For a poorly mapped and buried linear resource like the Zanja system, identification alone is challenging.

Rather than a costly archaeological excavation program or a remote sensing (ground-penetrating radar, etc.) survey that is unlikely to produce clear-cut results, a proactive identification and documentation program that would facilitate preservation or mitigation in a cost-effective manner is recommended.

This would include using additional documentary research to identify, as accurately as possible, the precise alignments of the zanjas within the APE. Where these alignments are expected to be affected by the proposed project, particularly where cut-and-cover or other near-surface construction techniques (as opposed to tunneling 20 or more feet below the ground surface) are planned in the vicinity of mapped zanja segments, full-time archaeological monitoring would be instituted to ensure documentation.

The archaeological monitors would work closely with equipment operators to ensure that every effort is made to avoid damaging zanja segments prior to their adequate documentation.

Documenting and evaluating the Los Angeles Zanja system would be best accomplished with a system-wide approach that incorporates historical, archaeological, and engineering research and documentation. This systemic approach to documentation and evaluation is a particularly appropriate mitigation measure for the Regional Connector Transit Corridor project, which has the potential to impact multiple zanja segments. Documentation of the zanja segments' alignments and slopes would have the added benefit of enabling future projects to more accurately predict the location of zanja segments outside of the project area.

To mitigate potential impacts to the Los Angeles Zanja system, the project MOA would provide that the system be adequately documented under the direction of an experienced archaeologist and an experienced historical architect, architectural historian, or historian, both meeting the Secretary of the Interior's qualification standards. This documentation would include a combination of historical research, archaeological testing, and architectural documentation, and would be followed by a formal evaluation of NRFP and CRHR eligibility.

It should be noted that substantial documentation already exists for the Zanja system in the form of maps and engineering records, published books and articles, unpublished technical reports, and site records. The collation of available data for the system as a whole would accomplish much of the documentation effort that is proposed here, while intensive, original research would be restricted to the zanja segments that cross the direct APE.

Research and documentation may include such specific measures as:

- Historical research using historical maps, photographs, and other written sources to document creation, maintenance, modification, and abandonment of the system.

- Archaeological research to establish the physical condition, presence of associated features and artifacts, and precise location of each zanja segment within the project's direct APE by using physical exposure through controlled excavation following its discovery during construction monitoring. Resources would be documented using DPR series 523 primary and detail forms, maps, and photographs. The results would be presented in a detailed technical report following Archaeological Resource Management Report (OHP 1990) guidelines. The report would address research questions and assess the NRHP and CRHR eligibility of the system.

- Architectural documentation of exposed zanja segments by producing narrative records, measured drawings, and photographs in conformance with Historic American Engineering Record (HAER) standards prior to any alteration or demolition activity.

- Preserving the results of the historical, archaeological, and historic architectural studies in repositories (e.g., the local main library branch, the lead agency headquarters library, and with identified non-profit historic groups interested in the subject matter).

- Interpretation of the Los Angeles Zanja system for the public through signage along the project alignment, visual representations of zanja alignments using colored pavement, or other appropriate means such as a dedicated internet website.

4.12.3 Paleontological Resources

This section summarizes the existing paleontological resources located in the project study area and the potential impacts of the proposed alternatives on these resources. Information in this section is based on the Cultural Resources – Paleontology Technical Memorandum prepared for the project and contained in Appendix Z of this EIS/EIR.

4.12.3.1 Regulatory Framework

Fossils are classified as nonrenewable scientific resources and are protected by various laws, ordinances, regulations, and standards across the country. The Society of Vertebrate Paleontology (SVP) (1995) has established professional standards for assessment and mitigation of adverse impacts to paleontological resources. Regulations and standards that are applicable to paleontological resources within the project area include:

- American Antiquities Act of 1906
- The National Environmental Policy Act of 1969
- National Historic Preservation Act of 1966
- Federal Land Management and Policy Act of 1976
- Federal Land Management and Policy Act of 1962, Section 2
- Paleontological Resources Preservation Act (PRPA)
- California Environmental Quality Act
- Public Resources Code (Section 1.7), Sections 5097.5 and 30244
- City of Los Angeles General Plan, Conservation Element
- Society of Vertebrate Paleontology (SVP)

In its "Standard Guidelines for the Assessment and Mitigation of Adverse Impacts to Nonrenewable Paleontologic Resources," the SVP (1995:23) defines three categories of paleontological sensitivity (potential) for sedimentary rock units:

- High Potential. Rock units from which vertebrate or significant invertebrate fossils or suites of plant fossils have been recovered and are considered to have a high potential for containing significant nonrenewable fossiliferous resources. For geologic units with high potential, full-time monitoring typically is recommended during any project-related ground disturbance.
- Low Potential. Reports in the paleontological literature or field surveys by a qualified vertebrate paleontologist may allow determination that some areas or units have low potentials for yielding significant fossils. Such units will be poorly represented by specimens in institutional collections. For geologic units with low potential, protection or salvage efforts typically are not required.
- Undetermined Potential. Specific areas underlain by sedimentary rock units for which little information is available are considered to have undetermined fossiliferous potentials. For

geologic units with undetermined potential, field surveys by a qualified paleontologist are usually recommended to specifically determine the paleontologic potential of the rock units present within the study area.

In general terms, for geologic units with high potential, full-time monitoring typically is recommended during any project-related ground disturbance. For geologic units with low potential, protection or salvage efforts typically are not required. For geologic units with undetermined potential, field surveys by a qualified paleontologist are usually recommended to specifically determine the paleontologic potential of the rock units present within a study area.

For this project, a paleontological collections records search was conducted, a detailed review of museum collections records was performed to identify any known vertebrate fossil localities within at least 1 mile of the proposed project and to identify the geologic units within the project area and vicinity, and published geologic maps were consulted.

4.12.3.2 Affected Environment

For paleontological resources, the APE includes the proposed at-grade and underground right-of-way and/or areas of direct ground disturbance. This includes areas with permanent site improvements and areas for staging and temporary construction activities. The APE includes the full width of the street, the adjacent sidewalks, any additional street segments or portions of adjacent city blocks in areas of proposed stations, connections with existing rail lines, and alignments that deviate from existing streets (Figure 4.12.3-1). The vertical APE extends to approximately 100 feet below the existing ground surface.

According to geologic mapping published by Yerkes and Graham (1997a; 1997b) and records maintained by the Natural History Museum of Los Angeles County, the project area is underlain by the following geologic units, from oldest to youngest:

- Miocene Puente Formation
- Pliocene Fernando Formation
- Quaternary terrace deposits
- Quaternary alluvium

These geologic units and respective paleontological resource sensitivity are depicted on Figure 4.12.3-2 and Figure 4.12.3-3, respectively. Museum records revealed that at least 12 previously recorded vertebrate fossil localities have been documented either along the proposed project alignment or within a 2-mile radius from the same sedimentary deposits underlying the project (Table 4.12.3-1). Information from previous finds in similar rock formations outside of the APE help to determine the sensitivity of the geologic units within the APE.

The combined results of the museum records search and literature review indicate that the geologic units underlying the project area have a paleontological sensitivity ranging from low to high.

4.12.3.3 Environmental Impacts/Environmental Consequence

Direct adverse impacts on surface or subsurface paleontological resources are the result of destruction by breakage and crushing, typically in construction-related excavations. In areas containing paleontologically sensitive geologic units, surface disturbance has the potential to adversely impact an unknown quantity of surface and subsurface fossils. Without mitigation, these fossils, as well as the paleontological data they could provide if properly salvaged and documented, could be adversely impacted (destroyed), rendering them permanently unavailable.

Direct adverse impacts can typically be mitigated to below a level of significance by implementing paleontological mitigation. Mitigation also creates a beneficial effect because it results in the salvage of fossils that may never have been unearthed via natural processes. With mitigation, these newly salvaged fossils become available for scientific research, education, display, and preservation into perpetuity at a public museum.

Indirect adverse impacts typically include those effects that result from normal ongoing operations of facilities constructed within a given project area. They also occur as the result of constructing new access roads in areas that were previously less accessible. This increases public access and therefore increases the likelihood of the loss of paleontological resources through vandalism and unlawful collecting. No indirect impacts are expected as the result of this project because the area of potential effect is highly urbanized.

The incremental loss of paleontological resources over a period of time as a result of project-related ground disturbance has the potential to result in significant cumulative effects because it could result in destruction of nonrenewable paleontological resources and irretrievable loss of scientific information. However, when paleontological monitoring and mitigation is implemented prior to and during project construction, fossils are protected and information is obtained. By implementing monitoring and mitigation where feasible, the cumulative effects to paleontological resources resulting from the project would be negligible. Further, any scientifically significant fossils discovered prior to or during ground disturbances related to the proposed project would benefit the scientific community by increasing knowledge associated with the fossils.

4.12.3.3.1 No Build Alternative

Since construction would not occur under the No Build Alternative, construction or operational impacts also would not occur to paleontological resources. Since the No Build Alternative would not result in construction or operational impacts to paleontological resources, cumulative impacts are not anticipated.

4.12.3.3.1.1 NEPA Finding and CEQA Determination

The No Build Alternative would not result in adverse or significant impacts to paleontological resources.

4.12.3.3.2 TSM Alternative

Construction of the TSM Alternative has the potential to directly affect paleontological resources within the project area should excavations related to the construction of new bus stations occur in paleontologically sensitive geologic units.

Implementation of mitigation measures would reduce potential adverse impacts to a less than significant level. The TSM Alternative would not result in operational impacts to paleontological resources.

Given that construction-related impacts would be reduced to a less than significant level with implementation of mitigation and operational impacts would be less than significant, the TSM Alternative would not contribute to a cumulative impact on paleontological resources.

4.12.3.3.2.1 NEPA Finding and CEQA Determination

The TSM Alternative could have adverse effects on paleontological resources. With implementation of proposed mitigation, potential construction and cumulative impacts would not be significant under NEPA or CEQA. Operation of the TSM Alternative would not result in adverse or significant impacts to paleontological resources.

Table 4.12.3-1. Previously Discovered Paleontological Resources In and Around the Direct APE

LACM Locality Number(s) and Approximate Location	Geologic Formation	Age	Taxa
LACM 5845; Western Avenue and Beverly Boulevard	Quaternary alluvium	Pleistocene	*Mammutidae* (fossil mastodon)
LACM 3250; east of Vermont Avenue near Madison Avenue and Middlebury Street	Quaternary alluvium	Pleistocene	*Mammuthus* (fossil mammoth)
LACM 6971; 6th and Flower Streets; LACM 4726; 4th and Hill Streets	Fernando	Pliocene	*Myliobatis* (eagle ray), *Carcharodon carcharias* (white shark), *Isurus oxyrinchus* (bonito shark), *Carcharhinus* (requiem shark), *Semicossyphus* (sheepshead)
LACM 3868; Wilshire Boulevard and Lucas Avenue	Fernando Formation	Pliocene	*Carcharodon sulcidens* (white shark)
LACM 5961; 1st and Hill Streets	Puente Formation	Late Miocene	*Cyclothone* (bristlemouth fish)
LACM 6198- 6203; Wilshire Boulevard from intersection of Alvarado Street west to past Vermont Avenue	Puente Formation	Late Miocene	*Osteichthyes* (bony fish), *Cetacea* (whale)

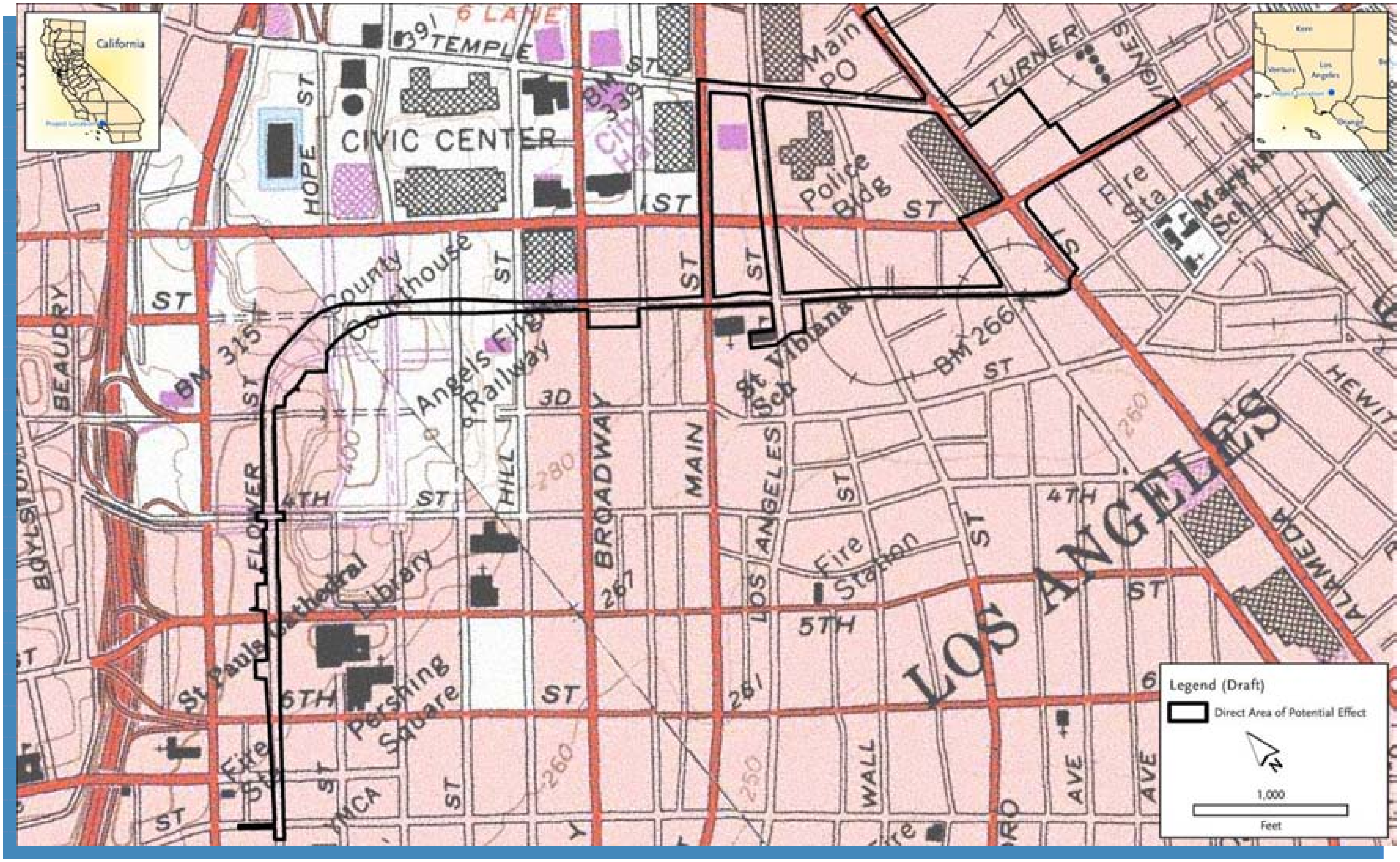


Figure 4.12.3-1. Project Area of Potential Effect

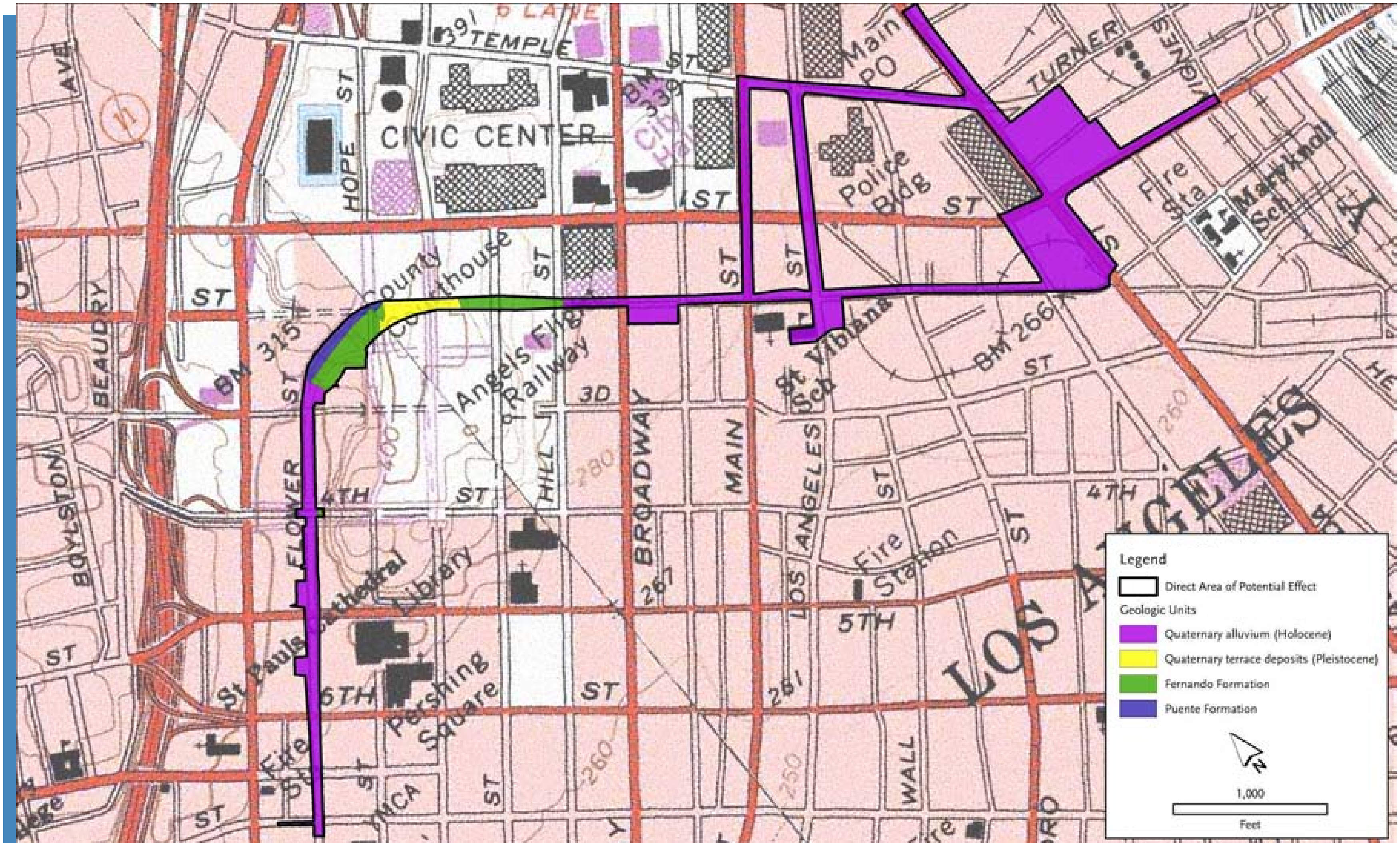


Figure 4.12.3-2. Geologic Map

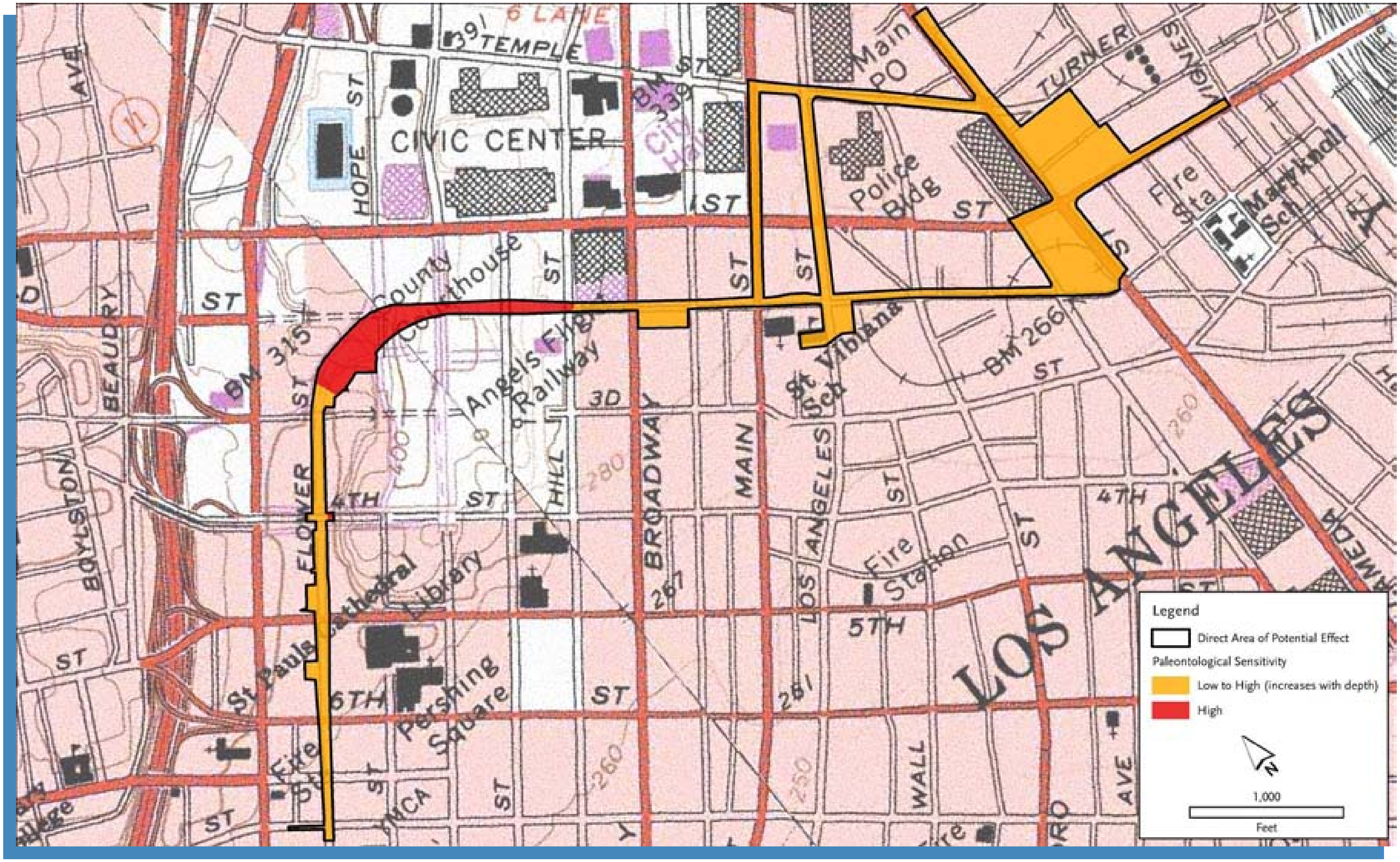


Figure 4.12.3-3. Paleontological Sensitivity Map

4.12.3.3.3 At-Grade Emphasis LRT Alternative

The At-Grade Emphasis LRT Alternative has the potential to adversely impact paleontological resources at the surface and at depth within the project area as a result of ground disturbance related to construction of new underground tunnel segments between 7th and Hope Streets and at new proposed stations at Flower/6th/5th Street, 2nd/Hope Street, Main/1st Street, and Los Angeles/1st Street. Any ground disturbances in areas of high sensitivity (See Figure 4.12.3-3) will have the potential to impact paleontological resources at the surface and at depth; areas of ground disturbance in areas of sensitivity ranging from low to high have the potential to impact paleontological resources at a depth of 5 feet or greater below the ground surface. In areas where mitigation measures can be implemented, potential impacts could be reduced to a less than significant level.

The At-Grade Emphasis LRT Alternative would not result in operational impacts to paleontological resources. In areas where mitigation measures can be implemented, potential impacts can be reduced to a less than significant level, thus reducing any cumulative impact on paleontological resources to less than significant.

4.12.3.3.3.1 NEPA Finding and CEQA Determination

Construction of the At-Grade Emphasis LRT Alternative could potentially have adverse effects on paleontological resources. With implementation of mitigation, potential construction and cumulative impacts would not be adverse under NEPA. The At-Grade Emphasis LRT Alternative would not have significant effects on paleontological resources with implementation of proposed mitigation measures. The At-Grade Emphasis LRT Alternative would not result in adverse or significant operational impacts to paleontological resources.

4.12.3.3.4 Underground Emphasis LRT Alternative

Construction of the Underground Emphasis LRT Alternative involves ground disturbance associated with excavations of a new underground tunnel along most of the alignment; new underground stations at Flower/5th/4th Street, 2nd/Hope Street, 2nd Street station (either at Broadway or at Los Angeles Street); an automobile underpass on Alameda Street between 2nd Street and Temple Street; and a proposed pedestrian bridge at the intersection of Alameda and 1st Streets. Any ground disturbances in areas of high sensitivity (See Figure 4.12.3-3) will have the potential to impact paleontological resources at the surface and at depth; areas of ground disturbance in areas of sensitivity ranging from low to high have the potential to impact paleontological resources at a depth of 5 feet or more below the ground surface. In areas where mitigation measures can be implemented, potential impacts can be reduced to a less than significant level. In areas where new underground TBM segments would be constructed, mitigation for paleontological resources would not be feasible and are thus unavoidable.

The Underground Emphasis LRT Alternative would not result in operational impacts to paleontological resources.

In areas where mitigation measures can be implemented, potential impacts can be reduced to a less than significant level thus reducing any cumulative impact on paleontological resources to less than significant. In areas where mitigation measures cannot be implemented, such as areas where new underground TBM segments would be constructed, cumulative impacts may be unavoidable.

4.12.3.3.4.1 NEPA Finding and CEQA Determination

Construction of the Underground Emphasis LRT Alternative could potentially have adverse effects on paleontological resources. With implementation of mitigation, potential construction and cumulative impacts would not be adverse under NEPA. The Underground Emphasis LRT Alternative would not have significant effects on paleontological resources with implementation of proposed mitigation measures with the exception of areas where tunneling operations cannot be mitigated. In areas where new underground TBM segments would be constructed, mitigation for paleontological resources would not be feasible and thus construction and cumulative impacts would be significant and unavoidable.

The Underground Emphasis LRT Alternative would not result in adverse or significant operational impacts to paleontological resources.

4.12.3.3.5 Fully Underground LRT Alternative

The Fully Underground LRT Alternative involves ground disturbance associated with excavations to construct four new stations and an entirely underground tunnel located from the 7th Street/Metro Center Station to east of the intersection of 1st and Alameda Streets. Any ground disturbances in areas of high sensitivity (See Figure 4.12.3-3) will have the potential to impact paleontological resources at the surface and at depth; areas of ground disturbance in areas of sensitivity ranging from low to high have the potential to impact paleontological resources at a depth of 5 feet or more below the ground surface. In areas where mitigation measures can be implemented, potential impacts can be reduced to a less than significant level. In areas where new underground TBM segments would be constructed, mitigation for paleontological resources would not be feasible resulting in significant and unavoidable impacts.

The Fully Underground LRT Alternative would not result in operational impacts to paleontological resources.

In areas where mitigation measures can be implemented, potential impacts can be reduced to a less than significant level thus reducing any cumulative impact on paleontological resources to less than significant. In areas where mitigation measures cannot be implemented, such as in areas where new underground TBM segments would be constructed, cumulative impacts may be unavoidable.

4.12.3.3.5.1 NEPA Finding and CEQA Determination

The Fully Underground LRT Alternative could have adverse effects on paleontological resources. With implementation of mitigation, potential construction and cumulative impacts would not be adverse under NEPA. The Fully Underground LRT Alternative would not have significant effects on paleontological resources with implementation of proposed mitigation measures with the exception of areas where tunneling operations cannot be mitigated. In areas where new underground TBM segments would be constructed, mitigation for paleontological resources would not be feasible and thus construction and cumulative impacts would be significant and unavoidable.

The Fully Underground LRT Alternative would not result in adverse or significant operational impacts to paleontological resources.

4.12.3.4 Mitigation Measures

4.12.3.4.1 Construction Mitigation Measures

The following mitigation measures have been developed in accordance with the SVP (1995) standards and guidelines and meet the paleontological requirements of CEQA.

- A qualified paleontologist would produce a Paleontological Monitoring and Mitigation Plan for the proposed project and supervise monitoring of construction excavations. Paleontological resource monitoring would include inspection of exposed rock units during active excavations within sensitive geologic sediments. The monitor would have authority to temporarily divert grading away from exposed fossils to professionally and efficiently recover the fossil specimens and collect associated data.

- All project-related ground disturbances that could potentially affect the Puente Formation, Fernando Formation, and Quaternary older alluvium and terrace deposits would be monitored by a qualified paleontological monitor on a full-time basis (where feasible) because these geologic sediments are determined to have a high paleontological sensitivity (Figure 4.12.3-3). Very shallow surficial excavations (less than 5 feet) within Quaternary younger alluvium would be monitored on a part-time basis to ensure that underlying sensitive units are not adversely affected (Figure 4.12.3-3). Construction monitoring during any tunneling activity is not warranted as any potential fossil specimens present within sensitive geologic units would be crushed and destroyed by the nature of tunneling methodology.

- At each fossil locality, field data forms would be used to record pertinent geologic data, stratigraphic sections would be measured, and appropriate sediment samples would be collected and submitted for analysis.

- Due to the likelihood of the presence of microfossils, matrix samples would be collected and tested within the Puente Formation and Fernando Formation. Testing for microfossils would consist of screen-washing samples (approximately 30 pounds) to determine if significant fossils are present. Productive tests would result in screen-washing of additional bulk matrix up to a maximum of 2,000 pounds per locality to ensure recovery of a scientifically significant sample.

- Recovered fossils would be prepared to the point of curation, identified by qualified experts, listed in a database to facilitate analysis, and reposited in a designated paleontological curation facility (such as the Natural History Museum of Los Angeles County).

- The paleontologist would prepare a final monitoring and mitigation report to be filed, at a minimum with Metro and the repository.

4.12.3.4.2 Operational Mitigation Measures

No mitigation is required because operational impacts to paleontological resources are not expected for any of the project alternatives.

4.13 Parklands and Other Community Facilities

This section identifies existing parklands and community facilities along and/or within 0.25 miles of either side of proposed project alignments, stations, and sites associated with construction activities and the project's potential to affect these facilities. Information in this section is based on the Parklands and Other Community Facilities Technical Memorandum prepared for the project and contained in Appendix AA, Parklands and Other Community Facilities of this DEIS/DEIR.

4.13.1 Regulatory Framework

The following regulatory framework was used to guide the parkland and community facility impact evaluation: Section 4(f) of the USDOT Act of 1966, Uniform Fire Code (UFC), Title 24 of the California Building Code (CBC), California Education Code (CEC), Los Angeles County General Plan, City of Los Angeles General Plan, Central City Community Plan, and Central City North Community Plan. More information regarding the regulatory and analytical framework is available in Appendix AA.

NEPA does not have specific thresholds related to potential impacts on parklands and community facilities. In accordance with CEQA, a project would normally have a significant impact on parklands if it could:

- Result in substantial adverse physical impacts from new or physically altered government facilities, need for new or physically altered government facilities, and construction that could cause significant environmental impacts to maintaining acceptable service ratios, response times, or other performance objectives for parks.

- Increase the use of existing neighborhood and regional parks or other regional facilities to the extent that substantial physical deterioration of the facility would occur or be accelerated.

- Include recreational facilities or require construction or expansion of recreational facilities that might have a physical effect on the environment.

As indicated in the *L.A. CEQA Thresholds Guide* (City of Los Angeles 2006), significant impacts to community/public facilities would occur if the project could:

- Result in substantial adverse physical impacts associated with providing new or physically altered governmental facilities, need for new or physically altered governmental facilities, and construction that could cause significant environmental impacts to maintaining acceptable service ratios, response times, or other performance objectives for police protection, fire protection, schools, or other public facilities.

- Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan.

4.13.2 Affected Environment

An inventory was conducted of parklands and community facilities located within 0.25 miles of the proposed Regional Connector Transit Corridor project alignments. Results of the inventory are summarized below. Table 4.13-1 summarizes the number of parklands and community facilities located within 0.25 miles of the proposed project alignments. The parklands and community facilities that service the area or are within 0.25 miles of the proposed project alternatives alignments and stations are detailed in Figures 4.13-1 through 4.13-12 and Tables 4.13-2 through 4.13-4. Detailed information regarding the existing parklands and community facilities within the project area is available in Appendix AA.

Table 4.13-1. Summary of the Parklands and Community Facilities Located Within 0.25 Miles of the Alternative Alignments

Facility Type	Project Alternatives			
	TSM	At-Grade Emphasis LRT	Underground Emphasis LRT	Fully Underground LRT
Parks	5	5	5	5
Recreational Facilities	7	6	6	6
Police Services	4	3	3	3
Fire Services	2	2	2	2
Libraries	9	4	3	3
Day-Care and Pre-School	13	6	7	8
Public Elementary and Middle Schools	0	0	0	0
Public High Schools	3	2	2	2
Colleges, Universities, & Trade Schools	12	8	9	10
Private Schools	0	0	0	0
Government Offices	13	13	12	12
Medical Facilities	1	1	1	1
Religious Facilities	13	10	11	11
Museums	6	6	4	4

Source: CDM 2009

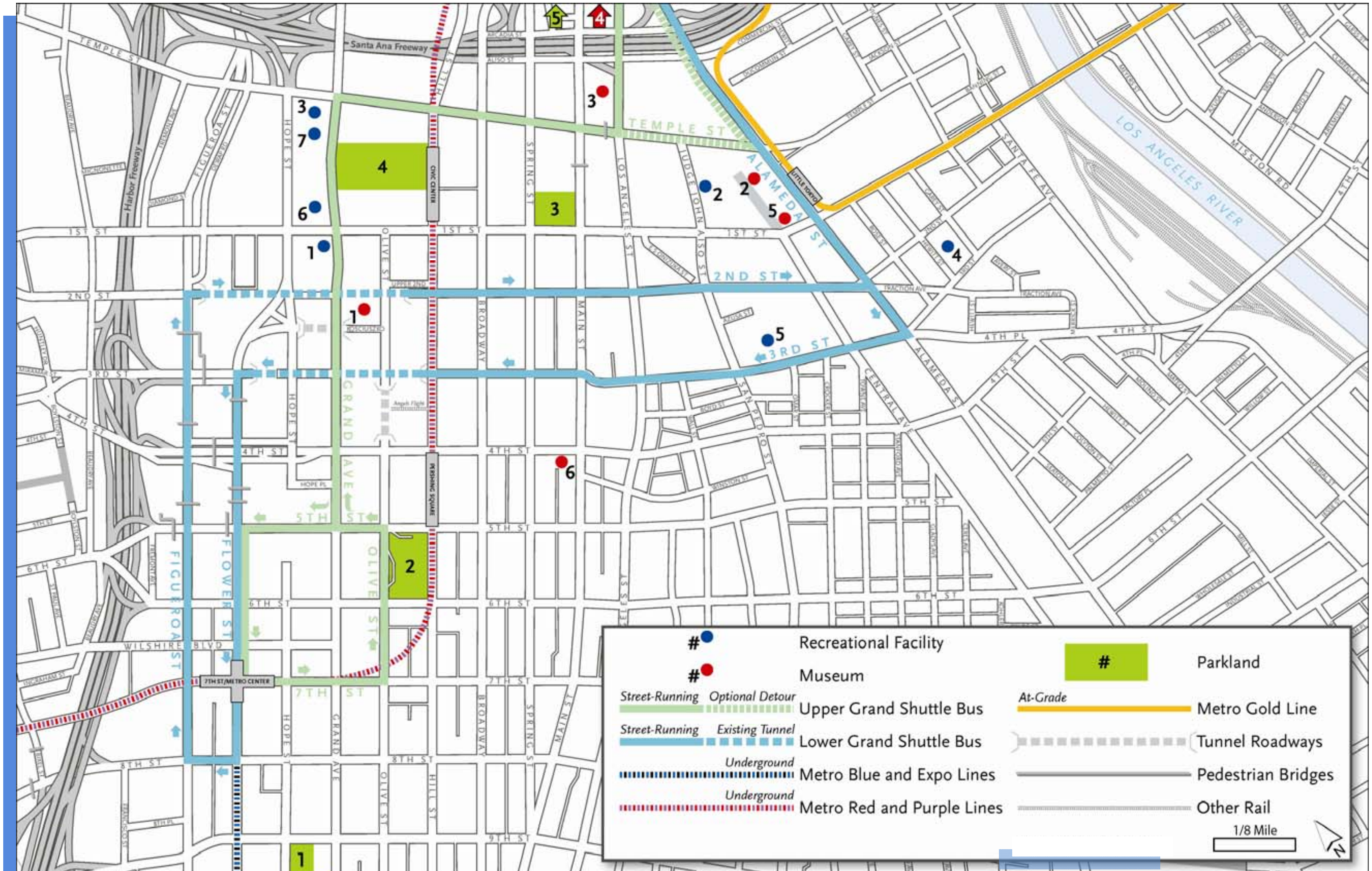


Figure 4.13-1. Parklands and Recreational Resources – TSM Alternative

Figure 4.13-2. Parklands and Recreational Resources – At-Grade Emphasis LRT Alternative

Figure 4.13-3. Parklands and Recreational Resources – Underground Emphasis LRT Alternative

Figure 4.13-4. Parklands and Recreational Resources – Fully Underground LRT Alternative

Table 4.13-2. Parklands and Recreational Resources Within 0.25 Miles of the Project Alternatives

Map No[1]	Name	Type of Facility	Approx Size (acres)	Location	Regulatory Agency	Proximity to Alignment (miles[2])
Parklands						
1	Grand Hope Park	Special Features: • Decorative sidewalks • 2 fountains • Clock tower • Pergolas • Children's play area • Displays of various artists' work	2.5	919 S Grand Avenue	City of Los Angeles	0.16 ALRT 0.16 ULRT 0.16 FLRT 0.16 LTSM 0.25 UTSM
2	Pershing Square	Special Features: • Ice Skating Rink (seasonal) • Stage • Sunken Amphitheatre Other Programs: • Earth Day • Shakespeare in the Park • Special Events Concert • St. Patrick's Day Parade	5.0	532 S Olive Street	City of Los Angeles	0.24 ALRT 0.24 ULRT 0.24 FLRT 0.24 LTSM 0.01 UTSM
3	City Hall South Lawn Park	Landscaped grounds of City Hall	4.0	200 N Main Street	City of Los Angeles	0.04 ALRT 0.14 ULRT 0.14 FLRT 0.14 LTSM 0.13 UTSM
4	Civic Center Mall	Special Features: • Large fountain • Multi-story parking garage for county employees underneath • Coffee shop	5.0	Block bounded by S Hill Street, S Grand Avenue, W 1st Street, & W Temple Street	County of Los Angeles	0.14 ALRT 0.14 ULRT 0.14 FLRT 0.14 LTSM 0.01 UTSM
5	Los Angeles Plaza Park	Special Features: • Part of El Pueblo de Los Angeles (see Museums) • Restaurants and Shops • Olvera Street	7.0	125 Paseo de la Plaza	City of Los Angeles	0.25 ALRT 0.25 ULRT 0.25 FLRT 0.10 LTSM 0.01 UTSM

Table 4.13-2. Parklands and Recreational Resources Within 0.25 Miles of the Project Alternatives (continued)

Map No[1]	Name	Type of Facility	Approx Size (acres)	Location	Regulatory Agency	Proximity to Alignment (miles[2])
Museums						
1	Museum of Contemporary Art (MOCA)	Museum devoted to contemporary art	N/A	250 S Grand Avenue	City of Los Angeles	0.09 ALRT 0.09 ULRT 0.09 FLRT 0.03 LTSM 0.04 UTSM
2	The Geffen Contemporary at MOCA	Museum devoted to contemporary art, it is part of MOCA	N/A	152 N Central Avenue	City of Los Angeles	0.09 ALRT 0.09 ULRT 0.09 FLRT 0.03 LTSM 0.04 UTSM
3	Los Angeles Children's Museum	Not open to the public yet. Beginning fabrication of exhibits.	1.3	310 N Main Street	Private	0.06 ALRT 0.32 ULRT 0.28 FLRT 0.18 LTSM 0.03 UTSM
4	El Pueblo de Los Angeles State Historical Monument	A living museum whose role is as a historic and symbolic heart of the City Attractions include: • Avila Adobe • Chinese American Museum • Plaza Firehouse Museum • Sepulveda House • Italian Hall Museum • Pico House • Olvera Street	44.0	500 Block of N Main Street	City of Los Angeles	0.24 ALRT 0.50 ULRT 0.20 FLRT 0.08 LTSM 0.03 UTSM
5	Japanese American National Museum	Museum to promote understanding and appreciation of America's ethnic and cultural diversity by sharing the Japanese American experience.	N/A	369 E 1st Street	Private	0.13 ALRT 0.02 ULRT 0.02 FLRT 0.01 LTSM 0.13 UTSM

Table 4.13-2. Parklands and Recreational Resources Within 0.25 Miles of the Project Alternatives (continued)

Map No[1]	Name	Type of Facility	Approx Size (acres)	Location	Regulatory Agency	Proximity to Alignment (miles[2])
6	Museum of Neon Art (MONA)	Museum to encourage learning and curiosity through the preservation, collection, and interpretation of neon art.	N/A	136 W 4th Street	Private	0.26 ALRT 0.26 ULRT 0.26 FLRT 0.13 LTSM 0.35 UTSM
Recreational Facilities						
1	The Walt Disney Concert Hall	Concert House, Los Angeles Music Center	3.6	111 S Grand Avenue	County of Los Angeles	0.06 ALRT 0.06 ULRT 0.06 FLRT 0.04 LTSM 0.08 UTSM
2	Union Center for the Arts	Exhibition space for LA Artcore where new and original art works are displayed each month.	N/A	120 Judge John Aiso Street	Private	0.10 ALRT 0.14 ULRT 0.14 FLRT 0.14 LTSM 0.10 UTSM
3	Ahmanson Theatre	Performance Center	N/A	135 N Grand Avenue	County of Los Angeles	0.29 ALRT 0.29 ULRT 0.29 FLRT 0.29 LTSM 0.03 UTSM
4	Maryknoll Shotokan Karate Club	Nonprofit organization dedicated to teaching traditional karate.	N/A	222 S Hewitt Street	Private	0.20 ALRT 0.20 ULRT 0.10 FLRT 0.16 LTSM 0.34 UTSM
5	Japanese American Cultural and Community Center	Mission is to present, perpetuate, transmit and promote Japanese and Japanese American arts and culture to diverse audiences, and to provide a center to enhance community programs.	N/A	244 S San Pedro Street, Suite 505	Private	0.13 ALRT 0.07 ULRT 0.07 FLRT 0.07 LTSM 0.13 UTSM

Table 4.13-2. Parklands and Recreational Resources Within 0.25 Miles of the Project Alternatives (continued)

Map No[1]	Name	Type of Facility	Approx Size (acres)	Location	Regulatory Agency	Proximity to Alignment (miles[2])
6	Dorothy Chandler Pavilion	Concert House, Los Angeles Music Center	N/A	135 N Grand Avenue	County of Los Angeles	0.14 ALRT 0.14 ULRT 0.14 FLRT 0.14 LTSM 0.03 UTSM
7	Mark Taper Forum	Performance Center	N/A	135 N Grand Avenue	County of Los Angeles	0.25 ALRT 0.25 ULRT 0.25 FLRT 0.25 LTSM 0.04 UTSM

Source: CDM, 2009
[1] Map numbers correspond to Figures 4.13-1 through 4.13-4.
[2] Distance to At-Grade Emphasis (ALRT), Underground Emphasis (ULRT), Fully Underground LRT Alternative (FLRT), Transportation System Management (TSM) Lower Grand Shuttle Bus (LTSM) and TSM Upper Grand Shuttle Bus (UTSM) unless otherwise noted. Some distances may be greater than 0.25 miles since a facility would be included if it is within 0.25 of at least one of the proposed alignment and it may be further away from other alignments.
Note: Distances are approximate following a straight line from location to the alternative line.

Table 4.13-3. Public Services and Religious Facilities Within 0.25 mile of the Project Alternatives

Map No[1]	Facility	Address	Proximity to Alignment (miles)[2]
Police Services[3]			
1	LAPD Parker Center	150 N Los Angeles Street	0.00 ALRT 0.14 ULRT 0.14 FLRT 0.14 LTSM 0.12 UTSM
2	New LAPD Headquarters	100 W 1st Street	0.01 ALRT 0.00 ULRT 0.00 FLRT 0.01 LTSM 0.17 UTSM
3	LAPD Central Division	251 E 6th Street	0.40 ALRT 0.40 ULRT 0.40 FLRT 0.24 LTSM 0.70 UTSM
4	Los Angeles Federal Metropolitan Detention Center	535 N Alameda Street	0.10 ALRT 0.20 ULRT 0.20 FLRT 0.01 LTSM 0.01 UTSM
Fire Services			
1	Fire Station #3	108 N Fremont Avenue	0.25 ALRT 0.25 ULRT 0.25 FLRT 0.15 LTSM 0.25 UTSM
2	Fire Station #4	450 E Temple Street	0.20 ALRT 0.20 ULRT 0.20 FLRT 0.20 LTSM 0.20 UTSM
Libraries			
1	Little Tokyo Branch Public Library	203 S Los Angeles Street	0.02 ALRT 0.01 ULRT 0.01 FLRT 0.32 LTSM 0.02 UTSM

Table 4.13-3. Public Services and Religious Facilities Within 0.25 mile of the Project Alternatives (continued)

Map No[1]	Facility	Address	Proximity to Alignment (miles)[2]
2	Los Angeles County Law Library	301 W 1st Street	0.13 ALRT 0.13 ULRT 0.13 FLRT 0.13 LTSM 0.16 UTSM
3	Los Angeles Central Library	630 W 5th Street	0.09 ALRT 0.09 ULRT 0.13 FLRT 0.09 LTSM 0.03 UTSM
4	Nonprofit Resource Library	1000 N Alameda Street, Ste 250	0.25 ALRT 0.25 ULRT 0.25 FLRT 0.25 LTSM 0.02 UTSM
5	United States Court Library	312 N Spring Street, #G8	0.08 ALRT 0.29 ULRT 0.29 FLRT 0.29 LTSM 0.02 UTSM
Government Offices			
1a	Los Angeles City Hall	200 N Spring Street	0.03 ALRT 0.20 ULRT 0.20 FLRT 0.20 LTSM 0.07 UTSM
1b	City Hall East/Annex	200 N Main Street	0.00 ALRT 0.11 ULRT 0.11 FLRT 0.12 LTSM 0.01 UTSM
2	Los Angeles County Archives & Records Center	222 N Hill Street	0.11 ALRT 0.25 ULRT 0.25 FLRT 0.25 LTSM 0.03 UTSM

Table 4.13-3. Public Services and Religious Facilities Within 0.25 mile of the Project Alternatives (continued)

Map No[1]	Facility	Address	Proximity to Alignment (miles)[2]
3	Los Angeles Superior Stanley Mosk Courthouse	110 N Grand Avenue	0.15 ALRT 0.15 ULRT 0.15 FLRT 0.15 LTSM 0.08 UTSM
4	Los Angeles Superior Stanley Mosk Courthouse	111 N Hill Street	0.15 ALRT 0.15 ULRT 0.15 FLRT 0.15 LTSM 0.14 UTSM
5	State of California Administrative Offices	300 S Spring Street	0.13 ALRT 0.13 ULRT 0.13 FLRT 0.01 LTSM 0.32 UTSM
6	State of California Department Offices	320 W 4th Street	0.26 ALRT 0.26 ULRT 0.26 FLRT 0.13 LTSM 0.22 UTSM
7	Former Site of State of California Department Offices (Planned Federal Courthouse Site)	107 S Broadway	0.09 ALRT 0.09 ULRT 0.09 FLRT 0.09 LTSM 0.21 UTSM
8	United States Federal Government Offices	251 S Olive Street	0.09 ALRT 0.09 ULRT 0.09 FLRT 0.04 LTSM 0.07 UTSM
9	United States Federal Building (Roybal Center)	255 E Temple Street	0.01 ALRT 0.23 ULRT 0.18 FLRT 0.23 LTSM 0.03 UTSM
10	United States Federal Courthouse	312 N Spring Street	0.06 ALRT 0.30 ULRT 0.30 FLRT 0.30 LTSM 0.03 UTSM

Table 4.13-3. Public Services and Religious Facilities Within 0.25 mile of the Project Alternatives (continued)

Map No[1]	Facility	Address	Proximity to Alignment (miles)[2]
11	Caltrans – District 7	100 S Main Street	0.01 ALRT 0.00 ULRT 0.00 FLRT 0.02 LTSM 0.25 UTSM
12	Los Angeles Superior Courthouse – Clara Shortridge Foltz Criminal Justice Center	210 W Temple Street	0.10 ALRT 0.23 ULRT 0.23 FLRT 0.23 LTSM 0.01 UTSM
13	Kenneth Hahn Hall of Administration	500 W Temple Street	0.25 ALRT 0.23 ULRT 0.23 FLRT 0.23 LTSM 0.01 UTSM
Medical Facilities			
1	Veterans Administration Los Angeles Ambulatory Care Center	351 E Temple Street	0.02 ALRT 0.17 ULRT 0.15 FLRT 0.05 LTSM 0.01 UTSM
Religious Facilities			
1	Third Church of Christ Scientist	730 S Hope Street	0.10 ALRT 0.10 ULRT 0.10 FLRT 0.10 LTSM 0.07 UTSM
2	Higashi Hongwanji Buddhist Temple	505 E 3rd Street	0.13 ALRT 0.13 ULRT 0.13 FLRT 0.12 LTSM 0.10 UTSM
3	Koyasan Buddhist Temple	342 E 1st Street	0.18 ALRT 0.05 ULRT 0.05 FLRT 0.04 LTSM 0.18 UTSM

Table 4.13-3. Public Services and Religious Facilities Within 0.25 mile of the Project Alternatives (continued)

Map No[1]	Facility	Address	Proximity to Alignment (miles)[2]
4	Union Church of Los Angeles	401 E 3rd Street	0.19 ALRT 0.12 ULRT 0.12 FLRT 0.01 LTSM 0.36 UTSM
5	Centenary United Methodist Church	300 S Central Avenue	0.22 ALRT 0.22 ULRT 0.22 FLRT 0.09 LTSM 0.45 UTSM
6	St. Francis Xavier Chapel Japanese Catholic Center	222 S Hewitt Street	0.19 ALRT 0.19 ULRT 0.15 FLRT 0.13 LTSM 0.33 UTSM
7	Zenshuji Soto Mission	123 S Hewitt Street	0.12 ALRT 0.13 ULRT 0.08 FLRT 0.12 LTSM 0.23 UTSM
8	Nishi Hongwanji Buddhist Temple	815 E 1st Street	0.28 ALRT 0.20 ULRT 0.01 FLRT 0.22 LTSM 0.28 UTSM
9	Jodo Shu North America Buddhist	442 E 3rd Street	0.13 ALRT 0.13 ULRT 0.13 FLRT 0.01 LTSM 0.36 UTSM
10	Vision Full Gospel Church	420 S Grand Avenue	0.15 ALRT 0.15 ULRT 0.15 FLRT 0.15 LTSM 0.01 UTSM
11	Church Federation of Southern California	401 E 3rd Street	0.01 ALRT 0.13 ULRT 0.13 FLRT 0.13 LTSM 0.36 UTSM

Table 4.13-3. Public Services and Religious Facilities Within 0.25 mile of the Project Alternatives (continued)

Map No[1]	Facility	Address	Proximity to Alignment (miles)[2]
12	Cathedral of Our Lady of the Angels	555 W Temple Street	0.30 ALRT 0.30 ULRT 0.30 FLRT 0.30 LTSM 0.01 UTSM

Source: CDM, 2009
[1] Map numbers correspond to Figures 4.13-5 through 4.13-8.
[2] Distance to At-Grade Emphasis (ALRT), Underground Emphasis (ULRT), Fully Underground LRT Alternative (FLRT), TSM Lower Grand Shuttle Bus (LTSM), and TSM Upper Grand Shuttle Bus (UTSM) unless otherwise noted. Some distances may be greater than 0.25 miles since a facility would be included if it is within 0.25 of at least one of the proposed alignment and it may be further away from other alignments.
[3] The Central Community Police Station of the Central Bureau serves the project area, but is not located within 0.25 miles of the proposed project alternatives.
Note: Distances are approximate following a straight line from location to the alternative line.

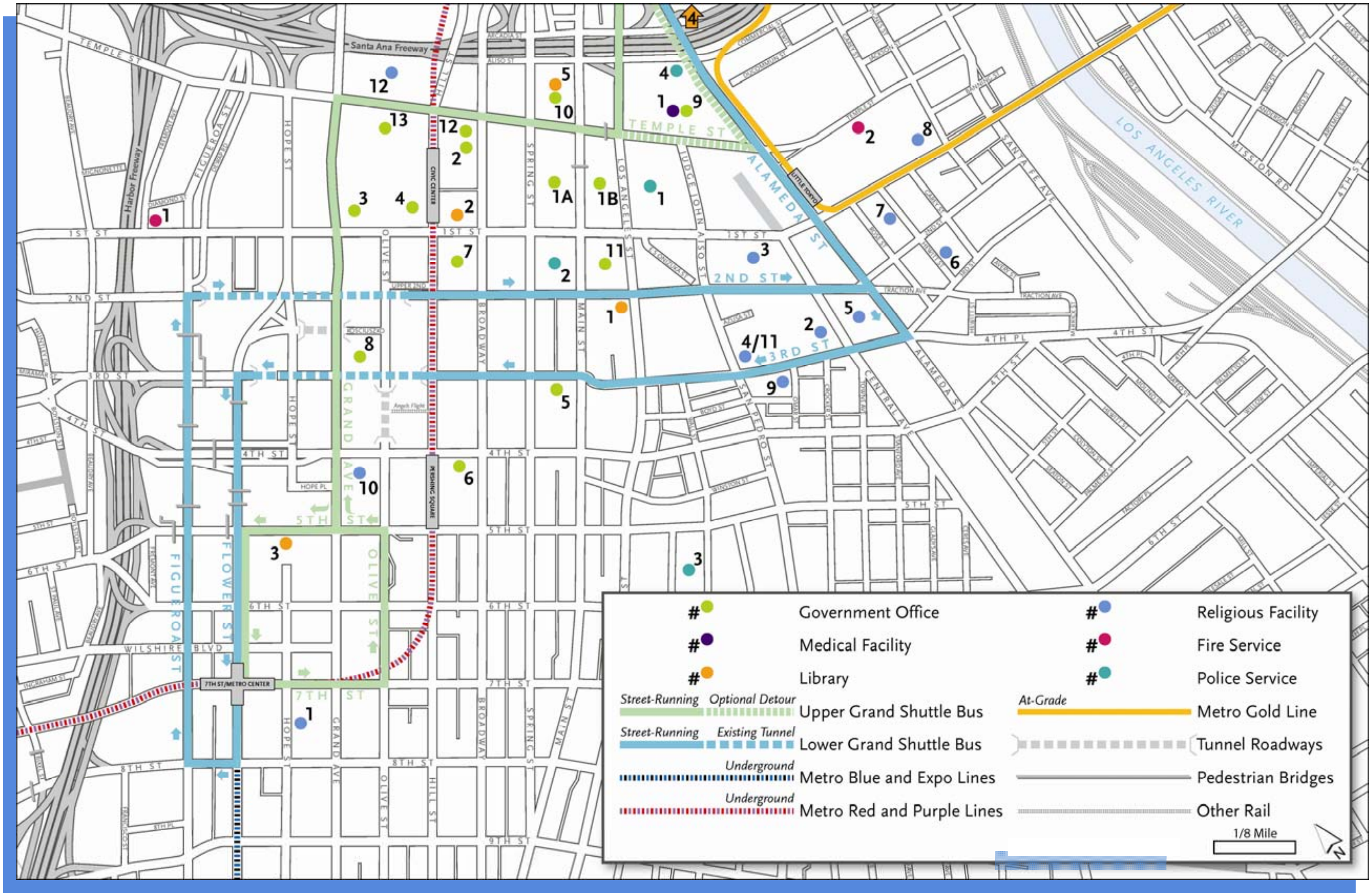


Figure 4.13-5. Public Services and Religious Facilities – TSM Alternative

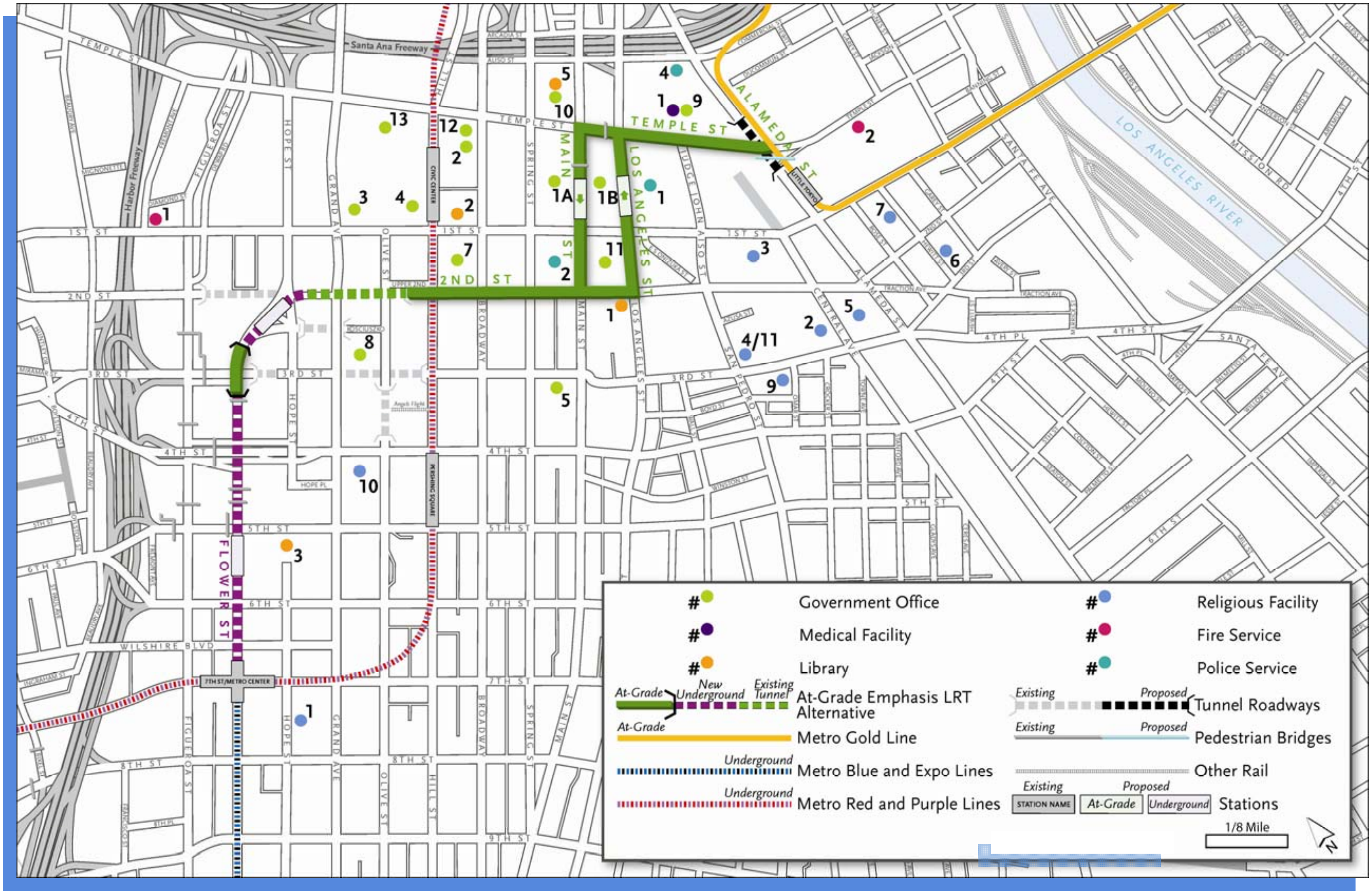


Figure 4.13-6. Public Services and Religious Facilities – At-Grade Emphasis LRT Alternative

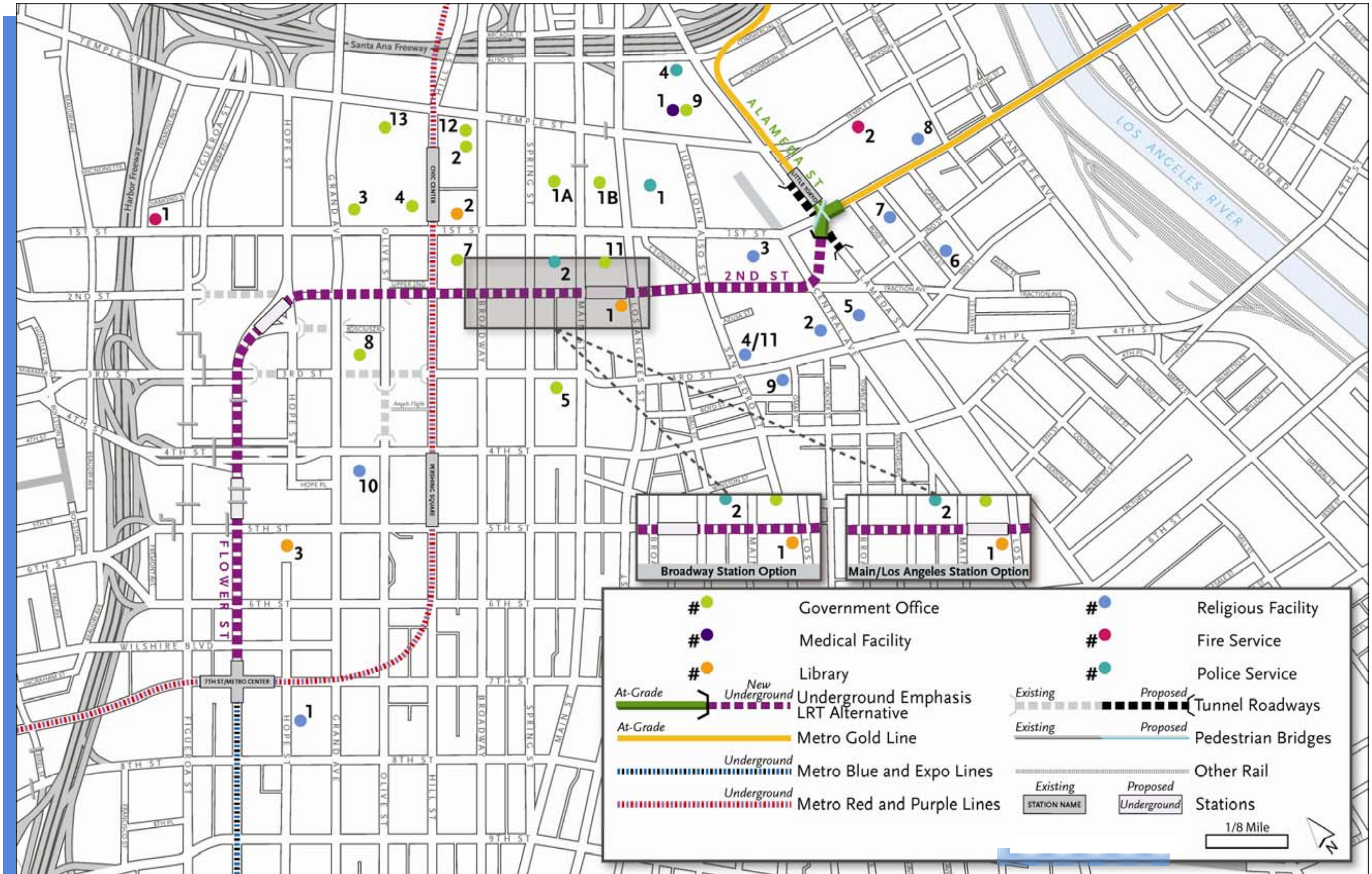


Figure 4.13-7. Public Services and Religious Facilities – Underground Emphasis LRT Alternative

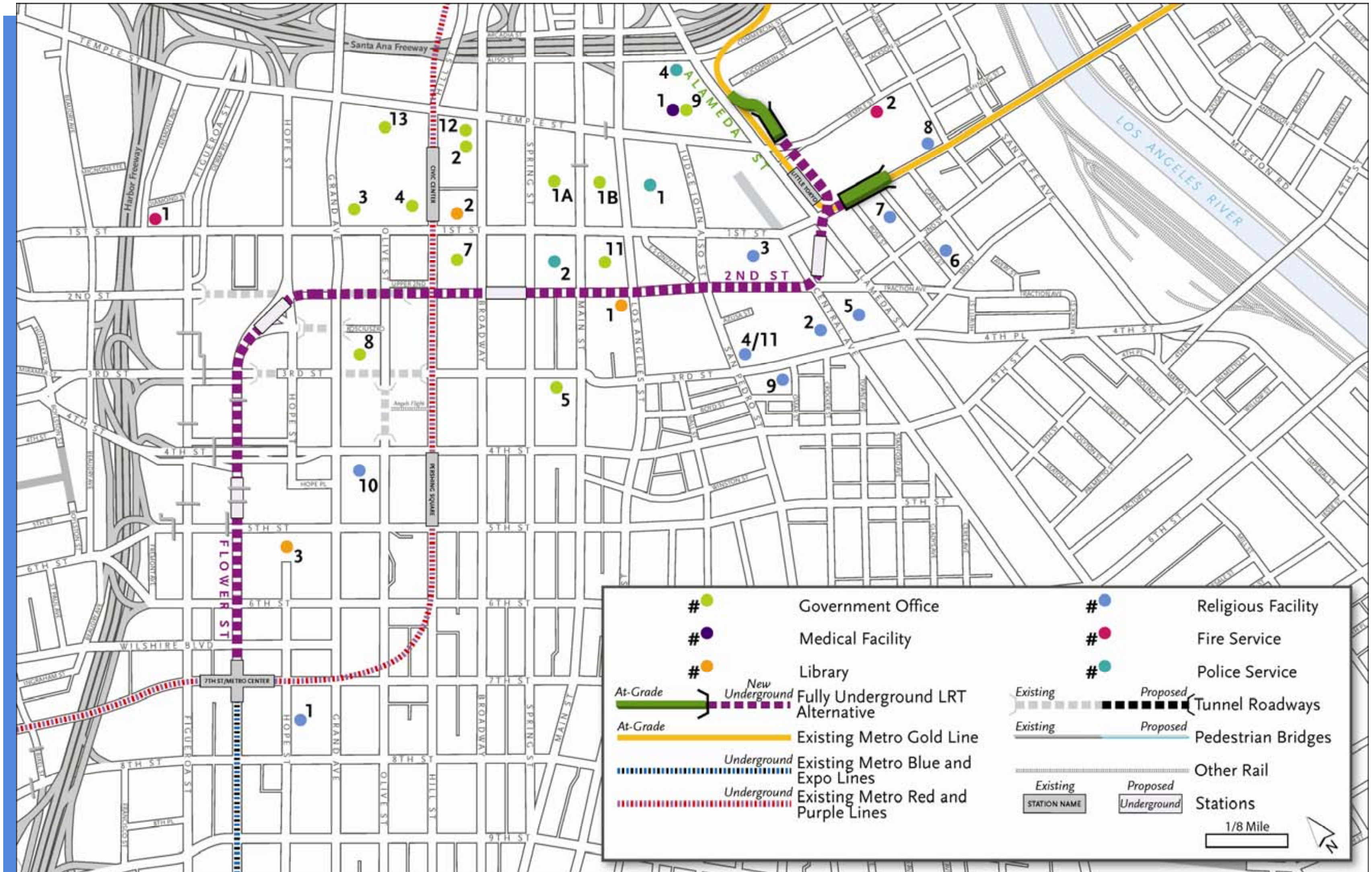


Figure 4.13-8. Public Services and Religious Facilities – Fully Underground LRT Alternative

Table 4.13-4. Educational Facilities Within 0.25 Miles of the Project Alternatives

Map No[1]	Name	Location	Proximity to Alignment (miles)[2]
Day Care and Preschools			
1	Nishi Hongwanji Child Development Center	815 E 1st Street	0.28 ALRT 0.20 ULRT 0.01 FLRT 0.22 LTSM 0.28 UTSM
2	Lumbini Child Development Center	505 E 3rd Street	0.33 ALRT 0.08 ULRT 0.08 FLRT 0.02 LTSM 0.32 UTSM
3	Cal Tot Child Care Center-a Serendipity School	300 S Spring Street	0.13 ALRT 0.13 ULRT 0.13 FLRT 0.01 LTSM 0.41 UTSM
4	H. Pregerson Child Care Center	255 E Temple Street	0.01 ALRT 0.26 ULRT 0.20 FLRT 0.26 LTSM 0.01 UTSM
5	Grace Lino Child Care Center	231 E 3rd Street	0.12 ALRT 0.11 ULRT 0.11 FLRT 0.03 LTSM 0.36 UTSM
6	Bright Horizons	550 S Hope Street	0.09
7	Tiny DOTs – Early Education Center	100 S Main Street, suite 130	0.01 ALRT 0.00 ULRT 0.00 FLRT 0.02 LTSM 0.25 UTSM
8	Joy Picus Child Development Center	111 E 1st Street	0.02 ALRT 0.13 ULRT 0.13 FLRT 0.13 LTSM 0.13 UTSM
Public High Schools			

Table 4.13-4. Educational Facilities Within 0.25 Miles of the Project Alternatives (continued)

Map No[1]	Name	Location	Proximity to Alignment (miles)[2]
1	California Academy for Liberal Studies Early College High School	700 Wilshire Blvd, 4th Floor	0.07 ALRT 0.07 ULRT 0.07 FLRT 0.07 LTSM 0.04 UTSM
2	Oscar de la Hoya Animo Leadership Charter High School	350 S Figueroa St, Ste 100	0.07 ALRT 0.07 ULRT 0.07 FLRT 0.01 LTSM 0.23 UTSM
3	High School for the Visual and Performing Arts (formerly known as Central Los Angeles Area New High School #9)	450 N Grand Ave	0.40 ALRT 0.40 ULRT 0.40 FLRT 0.40 LTSM 0.15 UTSM
College or Trade Schools			
1	The Colburn School of Performing Arts	200 S Grand Avenue	0.02 ALRT 0.02 ULRT 0.02 FLRT 0.02 LTSM 0.01 UTSM
2	The Colburn School Conservatory of Music	200 S Grand Avenue	0.02 ALRT 0.02 ULRT 0.02 FLRT 0.02 LTSM 0.01 UTSM
3	Chicago School of Professional Psychology	617 W 7th Street, 8th Floor	0.12 ALRT 0.12 ULRT 0.12 FLRT 0.12 LTSM 0.01 UTSM
4	Bukkyo University Los Angeles Extension	442 E 3rd Street	0.27 ALRT 0.12 ULRT 0.12 FLRT 0.01 LTSM 0.35 UTSM

Table 4.13-4. Educational Facilities Within 0.25 Miles of the Project Alternatives (continued)

Map No[1]	Name	Location	Proximity to Alignment (miles)[2]
5	Golden Gate University	725 S Figueroa Street, Suite 1550	0.08 ALRT 0.08 ULRT 0.08 FLRT 0.01 LTSM 0.08 UTSM
6	Fashion Institute of Design & Merchandising (FIDM)	919 S Grand Avenue	0.19 ALRT 0.19 ULRT 0.19 FLRT 0.19 LTSM 0.27 UTSM
7	University of Southern California (Annenberg School for Communication; Institute for Justice and Journalism; Western Knight Center for Specialized Journalism)	300 S Grand Avenue, Suite 3950	0.02 ALRT 0.02 ULRT 0.02 FLRT 0.02 LTSM 0.04 UTSM
8	University of Southern California (Marshall School of Business; Institute for Communication Technology Management; Sports Business Institute)	444 S Flower Street, Suite 1000	0.08 ALRT 0.08 ULRT 0.08 FLRT 0.04 LTSM 0.01 UTSM
9	Southern California Institute of Architecture	960 E 3rd Street	0.35 ALRT 0.30 ULRT 0.20 FLRT 0.30 LTSM 0.35 UTSM
10	University of California, Los Angeles (UCLA Extension at Figueroa Courtyard)	261 S Figueroa Street	0.16 ALRT 0.16 ULRT 0.16 FLRT 0.02 LTSM 0.23 UTSM

Source: CDM, 2009
[1] Map numbers correspond to Figures 4.13-9 through 4.13-12.
[2] Distance to At-Grade Emphasis (ALRT), Underground Emphasis (ULRT), Fully Underground LRT Alternative (FLRT), TSM Lower Grand Shuttle Bus (LTSM), and TSM Upper Grand Shuttle Bus (UTSM) unless otherwise noted. Some distances may be greater than 0.25 miles since a facility would be included if it is within 0.25 of at least one of the proposed alignment and it may be further away from other alignments.
Note: Distances are approximate following a straight line from location to the alternative line.

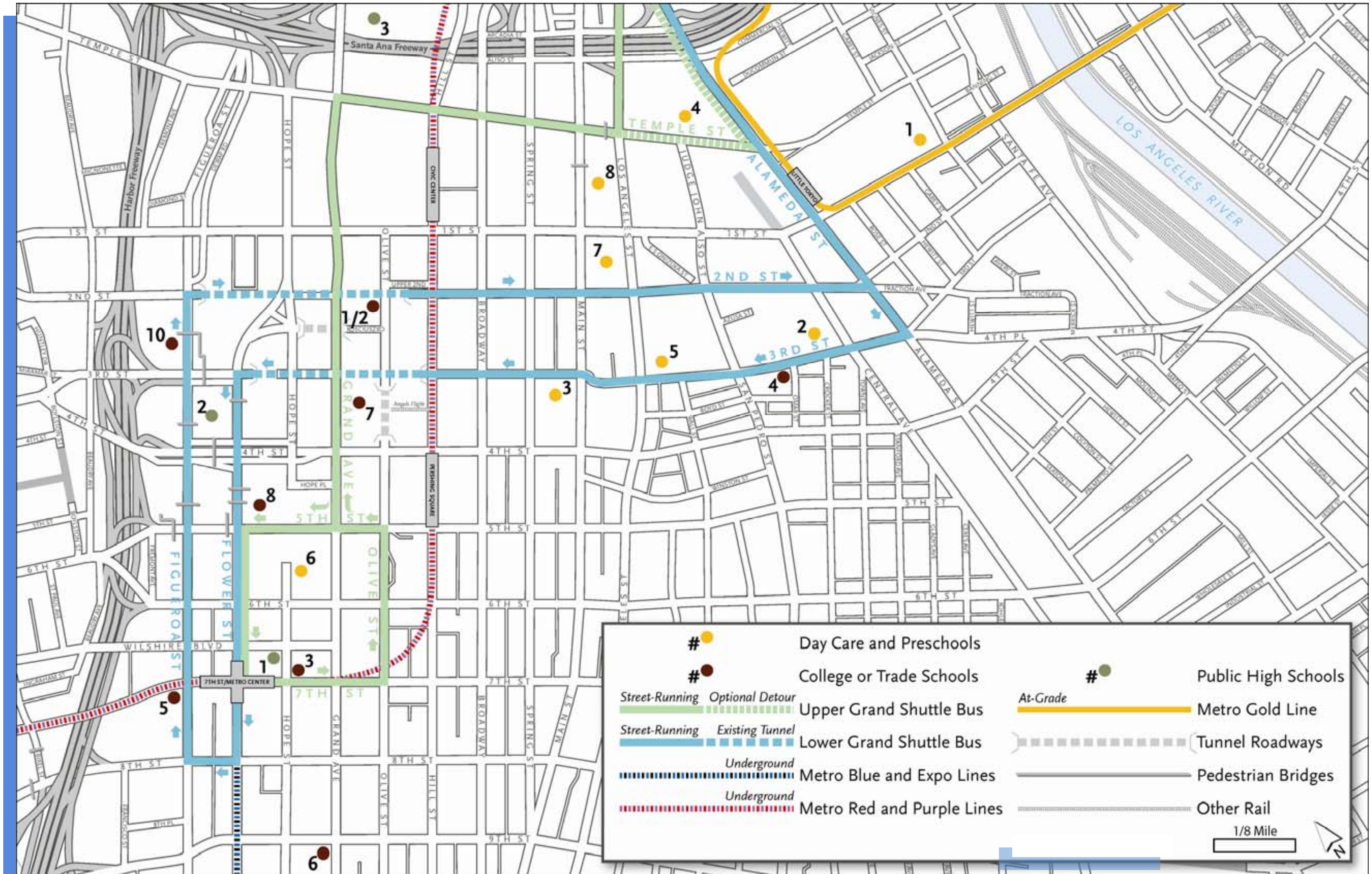


Figure 4.13-9. Educational Facilities – TSM Alternative

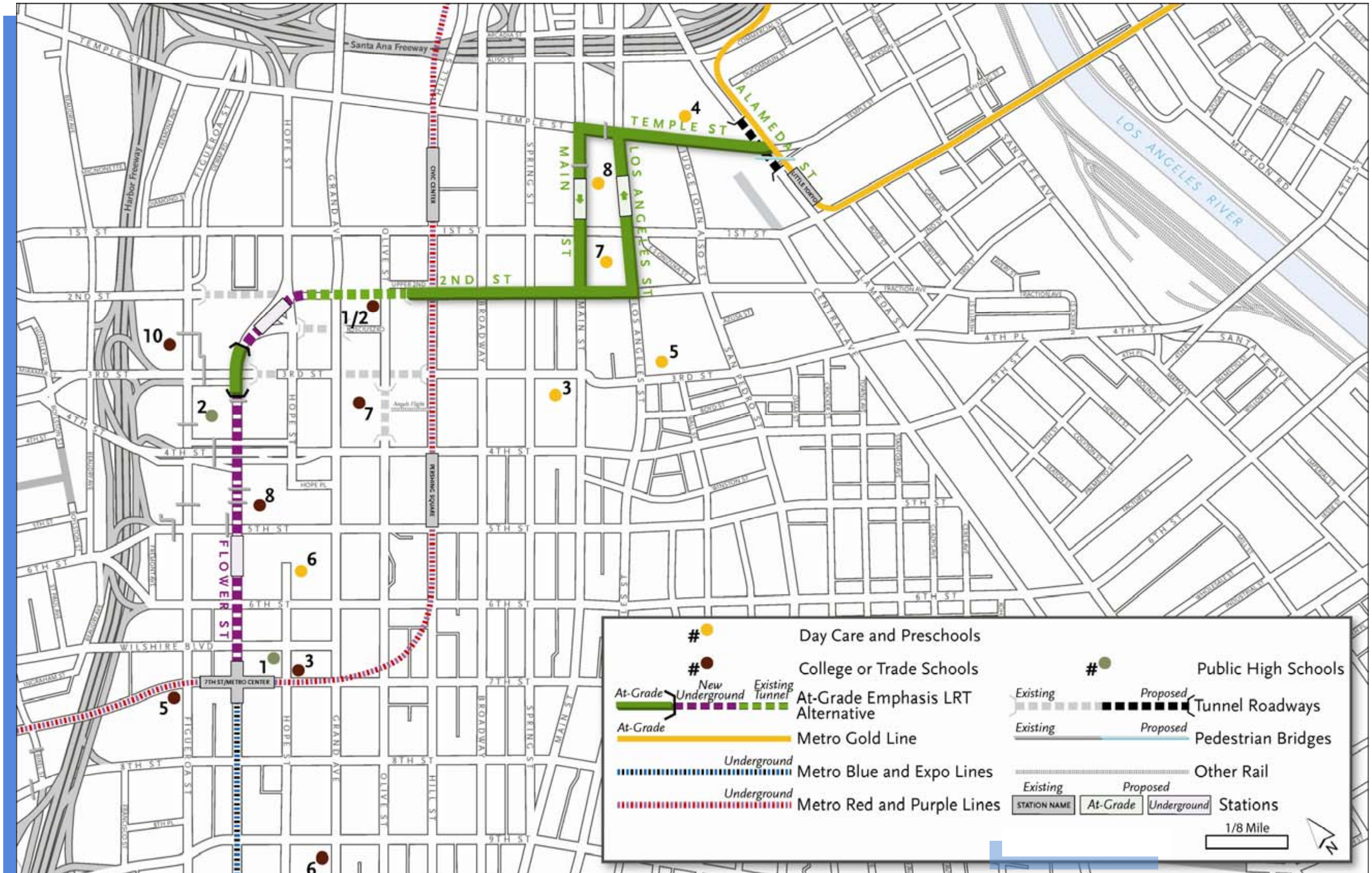


Figure 4.13-10. Educational Facilities – At-Grade Emphasis LRT Alternative

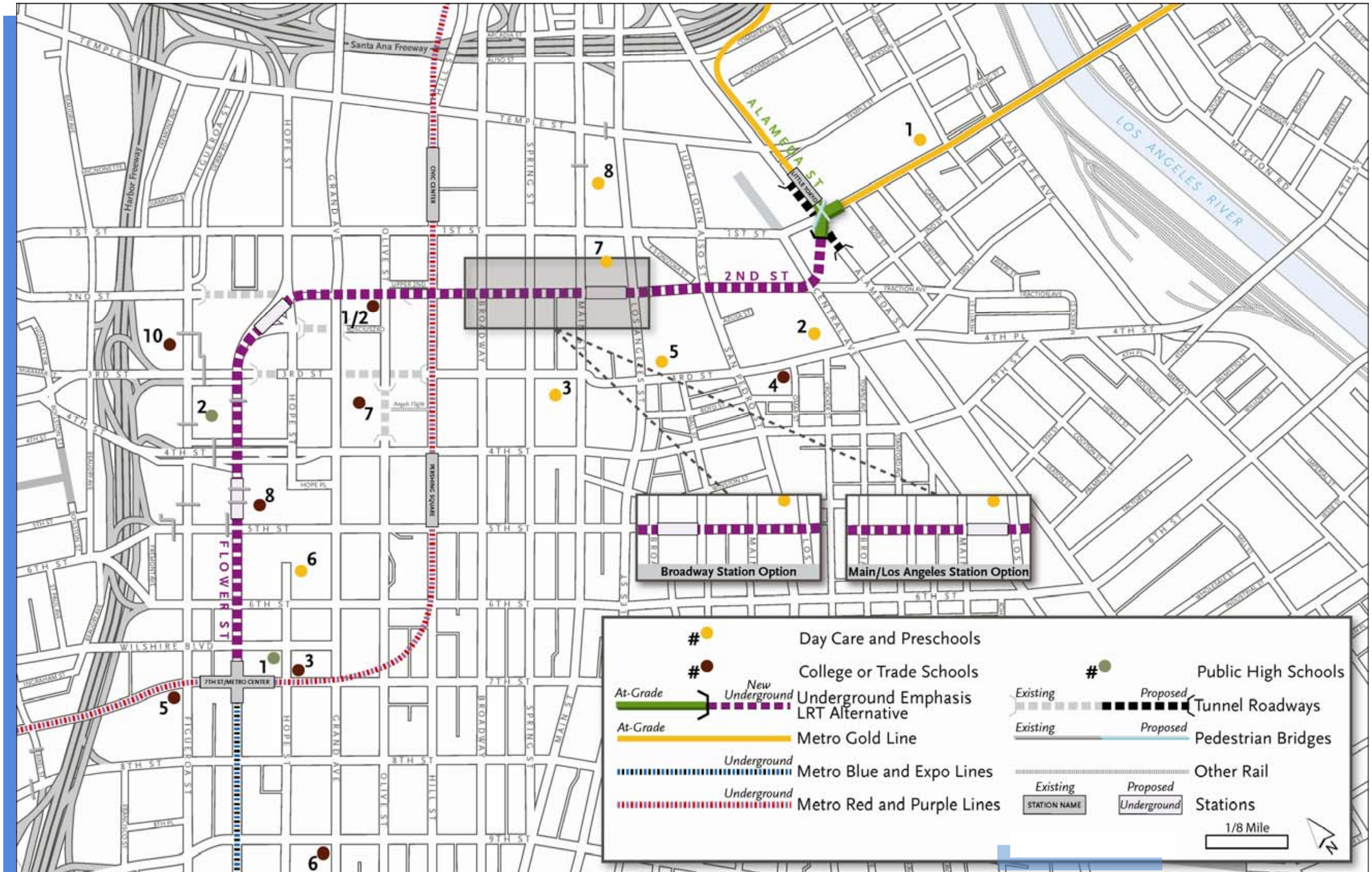


Figure 4.13-11. Educational Facilities – Underground Emphasis LRT Alternative

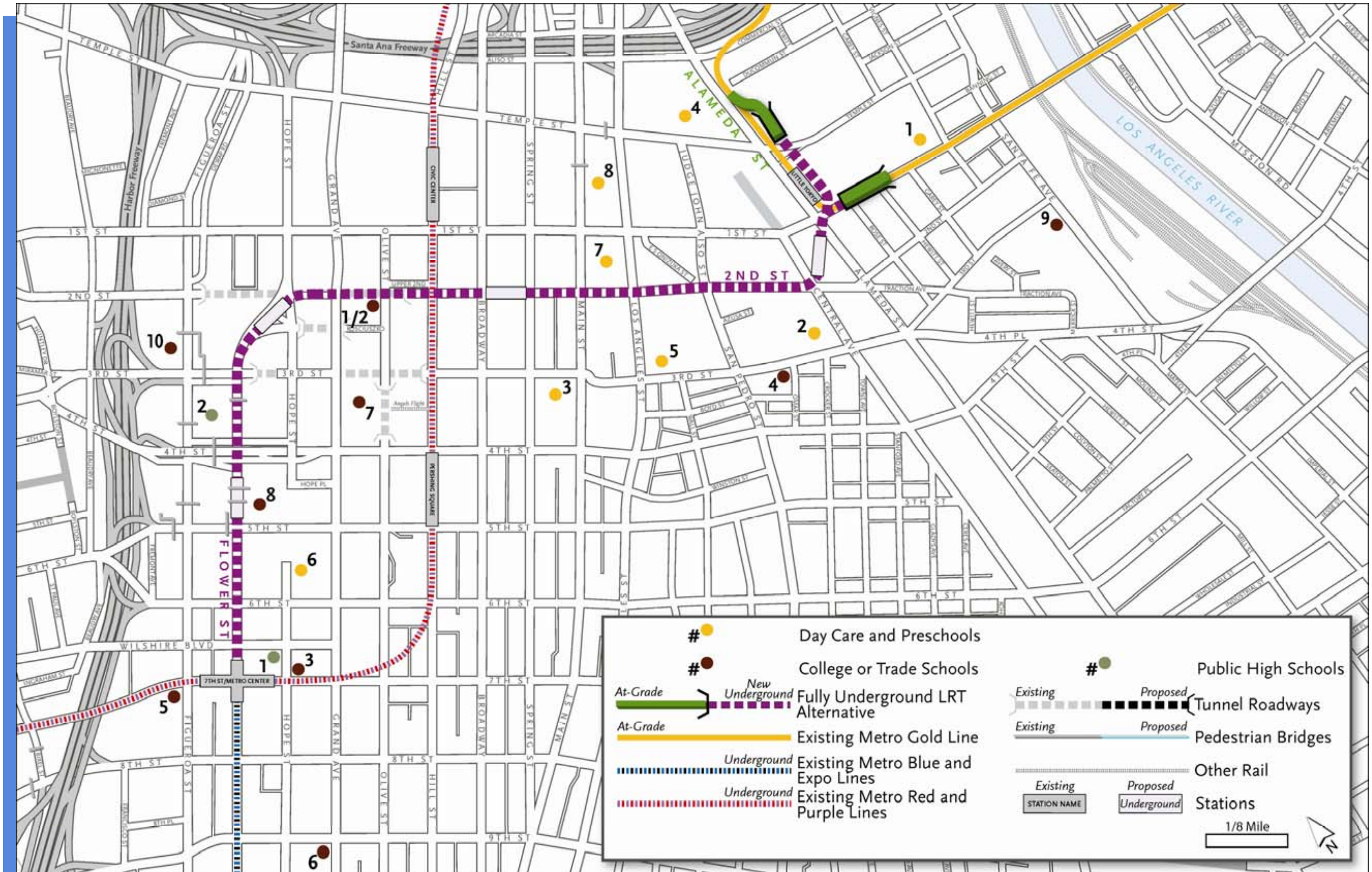


Figure 4.13-12. Educational Facilities – Fully Underground LRT Alternative

4.13.3 Environmental Impacts/Environmental Consequence

The following sections summarize the evaluation of potential parkland and community facility impacts for each alternative. Table 4.13-5 summarizes the results of the analysis.

Table 4.13-5. Summary of Potential Impacts to Parklands and Other Community Facilities

Alternative	Parklands [1]	Deteriorate Condition [2]	New or Expanded Facilities [3]	Emergency Response Time [4]	Mitigation Measures
No Build	None	None	None	None	None
TSM	None	None	None	None	None
At-Grade LRT	None	None	None	Adverse effect near Temple and Alameda avoided through coordination	None
Underground LRT	None	None	None	Beneficial effect near Alameda and 1st Street	None
Fully Underground LRT	None	None	None	None	None

[1] A direct impact could occur if a park or recreational facility were to be acquired, an easement obtained, or access blocked to the park.
[2] An impact would occur if use of a facility is increased to the extent that substantial physical deterioration of the facility would occur or be accelerated.
[3] An impact would occur if the use of a facility is increased to the extent that expansion or construction of new facilities is required.
[4] An impact could occur if there is an effect on emergency response times.

4.13.3.1 No Build Alternative

The No Build Alternative would maintain existing transit service through the year 2035. New transit infrastructure would not be built aside from projects currently under construction or identified in Metro's *2009 LRTP*. Therefore, the No Build Alternative would not affect parklands and other community facilities.

The No Build Alternative would not result in significant adverse physical impacts. Potential impacts could occur if there was a need to provide new or physically altered parks or community facilities. The No Build Alternative also would not increase the use of existing neighborhood and regional parks or other recreational facilities to the extent that substantial physical deterioration would occur or be accelerated at the facility. The No Build Alternative would not require construction or expansion of parklands and recreational resources that might then have a physical impact on the environment. The No Build Alternative would not have the beneficial impact of increasing non-auto access to recreational and community facilities throughout the region, including to and from downtown.

4.13.3.1.1 NEPA Finding and CEQA Determination

The No Build Alternative would not result in adverse or significant impacts on parklands and community facilities.

4.13.3.2 TSM Alternative

The TSM Alternative would add two shuttle bus routes to provide a transit link between 7th Street/Metro Center and Union Stations. The TSM Alternative would be operated within existing public right-of-way (i.e., streets) and would not physically affect or increase the use of existing neighborhood and regional parks or other community facilities to the extent that substantial physical deterioration of the facility would occur or be accelerated.

The TSM Alternative would not result in physical environmental impacts that might otherwise occur if new or physically altered parks or community facilities were required. The alternative would not affect existing community facilities' ability to maintain acceptable service ratios, response times, or other performance objectives for police protection, fire protection, and other public services. The TSM Alternative would neither physically affect an adopted emergency response plan or evacuation plan, nor would it expose people or structures to a significant risk of loss, injury, or death.

4.13.3.2.1 NEPA Finding and CEQA Determination

The TSM Alternative would not have adverse or significant impacts on parklands or other community facilities.

4.13.3.3 At-Grade Emphasis LRT Alternative

Table 4.13-6 summarizes potential impacts related to the physical property (acquisitions), access, and parking associated with parklands and recreational resources located within 0.25 miles of the At-Grade Emphasis LRT Alternative. Parklands and other community facilities could experience potential impacts during construction of the At-Grade Emphasis LRT Alternative.

However, impacts would be temporary and would not significantly affect the amenities or access to facilities.

The At-Grade Emphasis LRT Alternative would not result in direct impacts to parkland or other community facilities. The proposed At-Grade Emphasis LRT Alternative would potentially make surrounding parklands and other community facilities more accessible. However, the alternative would not increase use of existing parklands or other community facilities to the extent that substantial physical deterioration of the facility would occur or be accelerated, nor would it require the construction or expansion of parklands or other community facilities.

The At-Grade Emphasis LRT Alternative could potentially affect emergency vehicle routes in the vicinity of Temple and Alameda Streets, due to the proximity of the proposed junction and underpass to the fire station located near Temple and Garey Streets (Fire Station #4). However, Metro would coordinate with the Los Angeles Fire Department (LAFD) to minimize or avoid impacts to emergency vehicle response times. This alternative would not expose people or structures to any significant risk of loss, injury, or death.

Table 4.13-6. Parklands and Recreational Resources
Within 0.25 Miles of the Proposed At-Grade Emphasis LRT Alternative

Map No[1]	Name	Location	Proximity to Alignment (miles)	Within ¼ mile of station	Land Acquisition	Loss of street parking	Affect vehicle access	Barrier to Pedestrian Access
Parklands								
1	Grand Hope Park	919 S Grand Avenue	0.16	Yes	No	No	No	No
2	Pershing Square	532 S Olive Street	0.24	Yes	No	No	No	No
3	City Hall South Lawn Park	200 N Spring Street	0.04	Yes	No	Yes	No	Yes[2]
4	Civic Center Mall	Block bounded by S Hill Street, S Grand Ave, W 1st Street, and W Temple Street	0.14	Yes	No	No	No	No
5	Los Angeles Plaza Park	125 Paseo de la Plaza	0.25	No	No	No	No	No
Museums								
1	Museum of Contemporary Art (MOCA)	250 S Grand Avenue	0.09	Yes	No	No	No	No
2	The Geffen Contemporary at MOCA	152 N Central Avenue	0.09	Yes	No	Yes[2]	Yes[2]	Yes[2]
3	Los Angeles Children's Museum	310 N Main Street	0.06	Yes	No	No	No	No
4	El Pueblo de Los Angeles State Historical Monument	500 Block of N Main Street	0.24	Yes	No	No	No	No
5	Japanese American National Museum	369 E 1st Street	0.13	Yes	No	Yes	Yes	Yes[2]

Table 4.13-6. Parklands and Recreational Resources
Within 0.25 Miles of the Proposed At-Grade Emphasis LRT Alternative (continued)

Map No[1]	Name	Location	Proximity to Alignment (miles)	Within ¼ mile of station	Land Acquisition	Loss of street parking	Affect vehicle access	Barrier to Pedestrian Access
6	Museum of Neon Art (MONA)	136 W 4th Street	0.26	No	No	No	No	No
Recreational Facilities								
1	The Walt Disney Concert Hall	111 S Grand Avenue	0.06	Yes	No	Yes[2]	No	No
2	Union Center for the Arts	120 Judge John Aiso Street	0.10	Yes	No	No	No	No
4	Maryknoll Shotokan Karate Club	222 S Hewitt Street	0.20	Yes	No	No	No	No
5	Japanese American Cultural and Community Center	244 S San Pedro Street, Suite 505	0.13	Yes	No	No	No	No
6	Dorothy Chandler Pavilion	135 N Grand Avenue	0.14	Yes	No	No	No	No
7	Mark Taper Forum	135 N Grand Avenue	0.25	Yes	No	No	No	No

Source: CDM, 2009
[1] Map numbers correspond to Figures 4.13-1 through 4.13-4.

4.13.3.3.1 NEPA Finding and CEQA Determination

The At-Grade Emphasis LRT Alternative would not have adverse or significant impacts to parklands or other community facilities.

4.13.3.4 Underground Emphasis LRT Alternative

Table 4.13-7 summarizes impacts related to the physical property (acquisitions), access, and parking associated with parklands and recreational resources located within 0.25 miles of the Underground Emphasis LRT Alternative. The Underground Emphasis LRT Alternative would not have direct or indirect adverse impacts to parklands or community facilities..

Although most of construction and operation of the Underground Emphasis LRT Alternative would be underground, several public service and educational facilities could experience potential impacts during construction. These impacts, however, would be temporary and less than significant.

The Underground Emphasis LRT Alternative would not displace existing parklands. This Alternative would have the beneficial effect of potentially increasing accessibility to parklands and other community facilities adjacent to the alignment. However, the Alternative would not increase use of existing parklands or other community facilities to the extent that substantial physical deterioration of the facility would occur or be accelerated, nor would it require the construction or expansion of parklands or other community facilities.

The Underground Emphasis LRT Alternative would not affect adopted emergency response plans or emergency evacuation plans or expose people or structures to a significant risk of loss, injury, or death.

This alternative may improve response times for emergency vehicles traveling on Alameda Street through the intersection with 1st Street because traffic would be grade separated.

Table 4.13-7. Parklands and Recreational Resources Within 0.25 Miles of the Proposed Underground Emphasis LRT Alternative

Map No[1]	Name	Location	Proximity to Alignment (miles)	Within ¼ mile of station	Land Acquisition	Loss of street parking	Affect vehicle access	Barrier to Pedestrian Access
Parklands								
1	Grand Hope Park	919 S Grand Avenue	0.16	Yes	No	No	No	No
2	Pershing Square	532 S Olive Street	0.24	Yes	No	No	No	No
3	City Hall South Lawn Park	200 N Spring Street	0.14	Yes	No	No	No	No
4	Civic Center Mall	Block bounded by S Hill Street, S Grand Ave, W 1st Street, and W Temple Street	0.14	Yes	No	No	No	No
5	Los Angeles Plaza Park	125 Paseo de la Plaza	0.25	No	No	No	No	No

Table 4.13-7. Parklands and Recreational Resources Within 0.25 Miles of the Proposed Underground Emphasis LRT Alternative (continued)

Map No[1]	Name	Location	Proximity to Alignment (miles)	Within ¼ mile of station	Land Acquisition	Loss of street parking	Affect vehicle access	Barrier to Pedestrian Access
Museums								
1	Museum of Contemporary Art (MOCA)	250 S Grand Avenue	0.09	Yes	No	No	No	No
2	The Geffen Contemporary at MOCA	152 N Central Avenue	0.09	Yes	No	Yes	Yes[2]	Yes[2]
5	Japanese American National Museum	369 E 1st Street	0.02	Yes	No	Yes	Yes	Yes[2]
6	Museum of Neon Art (MONA)	136 W 4th Street	0.26	No	No	No	No	No
Recreational Facilities								
1	The Walt Disney Concert Hall	111 S Grand Avenue	0.06	Yes	No	Yes[2]	No	No
2	Union Center for the Arts	120 Judge John Aiso Street	0.14	Yes	No	No	No	No
4	Maryknoll Shotokan Karate Club	222 S Hewitt Street	0.20	Yes	No	No	No	No
5	Japanese American Cultural and Community Center	244 S San Pedro Street, Suite 505	0.07	Yes	No	No	No	No
6	Dorothy Chandler Pavilion	135 N Grand Avenue	0.14	Yes	No	No	No	No
7	Mark Taper Forum	135 N Grand Avenue	0.25	Yes	No	No	No	No

Source: CDM, 2009
[1] Map numbers correspond to Figures 4.13-1 through 4.13-4.

4.13.3.4.1 NEPA Finding and CEQA Determination

The Underground Emphasis LRT Alternative would not have adverse or significant impacts on parklands or other community facilities.

4.13.3.5 Fully Underground LRT Alternative

Table 4.13-8 summarizes impacts related to the physical property (acquisitions), access, and parking associated with parklands and recreational resources located within 0.25 miles of the Fully Underground LRT Alternative. The Fully Underground LRT Alternative would not result in direct or indirect impacts (i.e., acquisition or easement) to any parkland or recreational resource.

Although most construction and operation of the Fully Underground LRT Alternative would be underground, several public service and educational facilities could experience potential impacts during construction. However, these impacts would be temporary and not significant.

The Fully Underground LRT Alternative would result in a beneficial impact by potentially making the parklands and community facilities adjacent to the alignment more accessible. However, the Alternative would not increase the use of existing parklands and other community facilities to the extent that substantial physical deterioration of the facility would occur or be accelerated or require the construction or expansion of parklands and other community facilities.

The Fully Underground LRT Alternative would not affect adopted emergency response or emergency evacuation plans or expose people or structures to a significant risk of loss, injury, or death.

Effects on emergency vehicle response times are not anticipated.

4.13.3.5.1 NEPA Finding and CEQA Determination

The Fully Underground LRT Alternative would not have adverse or significant impacts on parklands or other community facilities.

4.13.4 Mitigation Measures

Adverse construction or operational impacts to parklands and other community facilities would not occur, and the project would comply with applicable regulations. Therefore, mitigation measures would not be required for this project. However, permanent replacement bus loading spaces should be identified near the JANM for the At-Grade Emphasis LRT Alternative and the Underground Emphasis LRT Alternative. Temporary replacement spaces should be identified for the Fully Underground LRT Alternative during construction.

Table 4.13-8. Parklands and Recreational Resources Within 0.25 Miles of the Proposed Fully Underground LRT Alternative

Map No[1]	Name	Location	Proximity to Alignment (miles)	Within ¼ mile of station	Land Acquisition	Loss of street parking	Affect vehicle access	Barrier to Pedestrian Access
Parklands								
1	Grand Hope Park	919 S Grand Avenue	0.16	Yes	No	No	No	No
2	Pershing Square	532 S Olive Street	0.24	Yes	No	No	No	No
3	City Hall South Lawn Park	200 N Spring Street	0.14	Yes	No	No	No	No
4	Civic Center Mall	Block bounded by S Hill Street, S Grand Avenue, W 1st Street, and W Temple Street	0.14	Yes	No	No	No	No
5	Los Angeles Plaza Park	125 Paseo de la Plaza	0.25	No	No	No	No	No
Museums								
1	Museum of Contemporary Art (MOCA)	250 S Grand Avenue	0.09	Yes	No	No	No	No
2	The Geffen Contemporary at MOCA	152 N Central Avenue	0.09	Yes	No	Yes	Yes[2]	Yes[2]
4	El Pueblo de Los Angeles State Historical Monument	500 Block of N Main Street	0.20	No	No	No	No	No
5	Japanese American National Museum	369 E 1st Street	0.02	Yes	No	Yes	Yes[2]	Yes[2]
6	Museum of Neon Art (MONA)	136 W 4th Street	0.26	No	No	No	No	No
Recreational Facilities								

Table 4.13-8. Parklands and Recreational Resources Within 0.25 Miles of the Proposed Fully Underground LRT Alternative (continued)

Map No[1]	Name	Location	Proximity to Alignment (miles)	Within ¼ mile of station	Land Acquisition	Loss of street parking	Affect vehicle access	Barrier to Pedestrian Access
1	The Walt Disney Concert Hall	111 S Grand Avenue	0.06	Yes	No	Yes[2]	No	No
2	Union Center for the Arts	120 Judge John Aiso Street	0.14	Yes	No	No	No	No
4	Maryknoll Shotokan Karate Club	222 S Hewitt Street	0.10	Yes	No	No	No	No
5	Japanese American Cultural and Community Center	244 S San Pedro Street, Suite 505	0.07	Yes	No	No	No	No
6	Dorothy Chandler Pavilion	135 N Grand Avenue	0.14	Yes	No	No	No	No
7	Mark Taper Forum	135 N Grand Avenue	0.25	Yes	No	No	No	No

Source: CDM, 2009
[1] Map numbers correspond to Figures 4.13-1 through 4.13-4.

4.14 Economic and Fiscal Impacts

This section evaluates potential impacts to local and regional economies during construction and operation of each project alternative. The analysis for construction and property tax-related impacts focused on properties that would abut the proposed alignments. Information in this section is based on the Economic and Fiscal Impacts Technical Memorandum prepared for the project and contained in Appendix BB, Economic and Fiscal Impacts of this DEIS/DEIR.

4.14.1 Regulatory Framework

NEPA does not include specific guidelines on measuring adverse economic impacts. Therefore, impacts were measured based on multipliers from the U.S. Department of Commerce (developed to estimate potential construction-related employment spending and economic impacts).

The DEIS/DEIR process must adhere to CEQA guidelines which state that economic changes resulting from a project shall not be treated as significant effects on the environment. Economic effects of a physical change, however, may be used to determine that the physical change is a significant change to the environment (CEQA 15358b).

In the absence of specific thresholds of significance for economic impacts, CEQA guidelines encourage each public agency to develop its own set of thresholds. The following thresholds of adverse significance were applied in the analysis of economic and fiscal impacts of the Regional Connector Transit Corridor project alternatives.

- The alternative would substantially reduce the amount or value of taxable property in the project area.
- Construction of the alternative would have substantial, adverse effects on businesses along the alignment.

4.14.2 Affected Environment

The project area for purposes of evaluating economic and fiscal impacts is generally the same as in Section 4.16, Growth-Inducing Impacts. The analysis for direct and indirect regional economic and fiscal impacts focused on downtown Los Angeles and areas served by the transit lines that would connect to the Regional Connector in Los Angeles County (Long Beach, Pasadena, Culver City, and East Los Angeles).

The project area lies within the geographic scope of the City of Los Angeles Council of Governments (CLACG), a subregion of SCAG, which includes Los Angeles, San Fernando and portions of unincorporated areas of Los Angeles County. The analysis of potential property tax and construction-related impacts focuses on properties directly abutting the proposed alignments.

Table 4.14-1 shows employment growth for the project area, City of Los Angeles, and CLACG subregion. The table shows that the project area is expected to gain approximately 12,630 new jobs by 2035. This would be an increase in employment of approximately 0.26 percent per year between 2008 and 2035. The annual rate of growth for the project area would be similar to that in the City, but lower than in the CLACG subregion.

Table 4.14-1. Local Area Employment Growth 2008-2035

Area	2008	2035	2000-2008 Employment Change	2008-2035 Annual Average % Change
CLACG	1,839,988	2,037,473	197,485	0.40
City of Los Angeles	1,879,666	1,994,137	114,471	0.23
Project Area	169,328	181,962	12,634	0.26

Windshield surveys were conducted to identify and categorize local businesses by use. Vehicular and pedestrian access was identified for each business along the proposed alignments. Properties adjacent to proposed alignments include high-density multi-family, commercial, industrial, and government-related uses. Approximately 112 businesses and commercial office buildings are in areas that could be impacted along the proposed alignments.

Under the At-Grade Emphasis LRT Alternative, 56 privately owned properties would directly abut the alignment. These businesses represent a total tax base of $21,867,759.

With the Underground Emphasis LRT Alternative, 82 privately owned parcels would abut the alignment. This represents a property tax base of $24,280,248.

With the Fully Underground LRT Alternative, 90 privately owned properties would directly abut the alignment. These properties represent a property tax base of $24,365,168.

4.14.3 Environmental Impacts/Environmental Consequences

The following sections summarize the evaluation of potential economic and fiscal impacts for each alternative. Table 4.14-2 summarizes the results of the analysis.

Table 4.14-2. Summary of Potential Impacts to Economic and Fiscal Measures

Alternative	Tax Revenues[1]	Effects on Businesses	Mitigation Required
No Build	None (No beneficial effects either)	None (No beneficial effects either)	None
TSM	None	Potential effect would be mitigated if occurs	Mitigation measures proposed
At-Grade LRT	Reduction in property tax base due to acquisition less than significant	Adverse construction effects not significant after mitigation Beneficial operational effects	Mitigation measures proposed
Underground LRT	Reduction in property tax base due to acquisition less than significant	Adverse construction effects not significant after mitigation Beneficial operational effects	Mitigation measures proposed
Fully Underground LRT	Reduction in property tax base due to acquisition less than significant	Adverse construction effects not significant after mitigation Beneficial operational effects	Mitigation measures proposed

[1] *Includes property values and economic activity which affect tax revenues*

Construction activities under build alternatives could affect the mix of business and government-related uses along the alignment. Acquisitions of privately owned properties would affect city, county, and state property tax generation in this area. Each build alternative would require some acquisitions with a potential impact on property tax revenues.

Property tax losses would not occur from acquisitions of government-owned parcels. Thus, only partial and full takes of privately owned parcels are analyzed. Using Los Angeles County Tax Assessor 2009 data, property tax loss was calculated based on the amount of square feet to be acquired (the impact area). In addition, property tax losses from the acquisition of privately owned properties would likely be offset by increases in property values.

4.14.3.1 No Build Alternative

The No Build Alternative would not involve property acquisitions and therefore, would not have property tax revenue impacts. This Alternative would not substantially alter the physical environment and would not have significant, adverse economic impacts within the project area. Given that an LRT system through downtown Los Angeles would not be constructed under the No Build Alternative, there would be no economic benefits from direct and indirect job creation, investment, or spending by suppliers whose goods and services are used in a project. Since the No Build Alternative would forego beneficial economic impacts, the regional economy could be adversely affected.

4.14.3.1.1 NEPA Finding and CEQA Determination

The No Build Alternative would not have adverse or significant impacts to economic or fiscal resources because it does not involve construction of a new transit system in the project area. However, this Alternative would forego the beneficial economic impacts that would occur with development of the build alternatives.

4.14.3.2 TSM Alternative

The TSM Alternative would not involve property acquisitions or have property tax revenue impacts. The TSM Alternative could permanently displace up to 24 parking spaces along its alignment to make way for new bus stops. The loss of parking spaces could impact some businesses. It is difficult to estimate the exact impact because the bus station locations have yet to be determined. However, like the No Build Alternative, the TSM Alternative is not anticipated to have adverse economic or fiscal impacts. The TSM Alternative would not result in beneficial economic impacts to the extent associated with the other build alternatives.

4.14.3.2.1 NEPA Finding and CEQA Determination

The TSM Alternative would not involve substantial physical changes to the environment and therefore, would not have any adverse economic or fiscal impacts. However, the TSM Alternative would not result in beneficial economic impacts to the extent associated with the other build alternatives.

4.14.3.3 At-Grade Emphasis LRT Alternative

The At-Grade Emphasis LRT Alternative would require partial takes of five privately owned parcels for construction staging, new stations, a pedestrian overpass, and a traction power substation (TPSS) site. Total tax revenue loss due to land acquisitions with the At-Grade Emphasis LRT Alternative is estimated to be approximately $186,734. This loss would be approximately 0.85 percent of the total $21,867,759 property tax revenue from all privately owned businesses that directly abut the proposed alignment. This loss in revenue could be offset by an increase in property values near station sites. Therefore, this alternative would not have an adverse impact to property tax revenues.

During construction, street closures would be implemented in phases. Construction effects that would disrupt business activities would be limited to areas of cut and cover construction. Typical impacts could include disruption of access for adjacent land uses, increased levels of noise, vibration and dust, utility disruptions, displacement of up to 80 parking spaces, and a general disinterest in area businesses from potential customers due to construction. These impacts could have the secondary effect of reducing activity levels in the area and therefore, revenue for adjacent businesses.

Approximately 36 businesses along the At-Grade Emphasis LRT Alternative alignment could be adversely affected by construction. Implementation of mitigation measures, such as compensation to property owners for acquisitions and assistance to business owners, would lessen construction impacts. Depending on the success of mitigation measures, some residual impacts could remain from construction.

During construction, the At-Grade Emphasis LRT Alternative is estimated to create approximately 13,800 direct and indirect employment opportunities and generate approximately $1.9 billion in direct and indirect revenues. Such employment projections are consistent with estimated levels of growth for the project area. This would represent a beneficial impact.

Once construction is complete and the LRT system is operational, transit usage would increase, enhancing accessibility and attractiveness of businesses surrounding station sites.

Related projects could be under construction during the same time as the proposed alternative. Therefore, construction of this alternative could result in a considerable contribution to cumulative impacts on activity levels and revenue of businesses along the alignment. Project operational impacts would be less than significant, so they would not contribute to cumulative, adverse, economic, or fiscal operational impacts.

4.14.3.3.1 NEPA Finding and CEQA Determination

Construction of the At-Grade Emphasis LRT Alternative would have adverse effects with respect to economic and fiscal measures as it would affect activity levels and businesses along the alignment. The alternative would not have significant effects after implementation of proposed mitigation measures, although, if the mitigation is not effective there could be some residual impacts during construction.

Operation of the At-Grade Emphasis LRT Alternative would have beneficial effects on economic and fiscal measures by improving transit accessibility and mobility in the region. This could increase economic activity and benefit businesses and employees traveling to and from work. This alternative would also result in an increase in employment and tax revenue, which would beneficially impact local and regional economies.

4.14.3.4 Underground Emphasis LRT Alternative

The Underground Emphasis LRT Alternative would require the acquisition of more privately owned parcels than the At-Grade Emphasis LRT Alternative. Acquisitions would be required for construction staging, new stations, portals, a bridge pier, and a pedestrian overpass. Both partial and full takes would be required. Twenty privately owned parcels would be impacted under this alternative. Nine of these parcels are in the Little Tokyo area, on the block bounded by 1st, 2nd, and Alameda Streets, and Central Avenue.

Total tax revenue loss from property acquisitions under the Underground Emphasis LRT Alternative is estimated to be approximately $286,847. Losses to property tax revenues would be approximately 1.2 percent of the $24,280,248 total property tax base for properties that directly abut the proposed alignment. This would be a less than significant impact to revenues and offset by property value increases near stations.

The Underground Emphasis LRT Alternative would require acquisition of 20 privately owned parcels for tunnel boring and station construction. Construction could significantly impact 38 businesses along the alignment due to street and sidewalk closures, the permanent displacement of up to 20 parking spaces, dust, and noise.

Construction of the Underground Emphasis LRT Alternative could have significant construction impacts to businesses near station sites. Depending on tunneling and construction techniques used to construct the tunnel, phased street closures may be required. However, impacts would not be as significant as under the At-Grade Emphasis LRT Alternative. Economic impacts caused by the Underground Emphasis LRT Alternative would mostly be limited to businesses surrounding station sites and cut-and-cover construction areas. Cut-and-cover construction would generate temporary inconveniences like increased noise, vibration, and dust, decreased views of signage, and limited access to businesses within close proximity of new station areas, and creating a general customer perception of disruption in the area.

Temporary and intermittent street closures for 1st and Alameda Streets throughout the 24- to 36-month construction process could significantly impact businesses in Little Tokyo. Implementation of mitigation measures (e.g., compensation to property owners for acquisitions and assistance to business owners) would lessen construction impacts. Depending on the success of mitigation measures, some residual impacts could remain during construction. However, once construction is complete and the LRT system is operational, transit usage would increase, enhancing accessibility and attractiveness of businesses surrounding stations sites.

During construction, this alternative would lead to a $2.8 billion increase in regional economic output and would create 20,700 direct and indirect employment opportunities. This increase in employment opportunities is within projected levels of growth for the project area and would be a beneficial impact. Additionally, new job growth and spending could increase income and sales tax revenues by $117 million.

Related projects would be under construction during the same time as the proposed alternative. Therefore, construction of this alternative could result in a considerable contribution to cumulative impacts on activity levels and revenue of businesses along the alignment. Project operational impacts would be less than significant, so they would not contribute to cumulative, adverse, economic, or fiscal operational impacts.

4.14.3.4.1 NEPA Finding and CEQA Determination

Construction of the Underground Emphasis LRT Alternative would have adverse effects with respect to economic and fiscal measures as it would affect activity levels and businesses along the alignment. The alternative would not have significant effects after implementation of proposed mitigation measures, although, if the mitigation is not effective there could be some residual impacts during construction.

Operation of the Underground Emphasis LRT Alternative would have beneficial effects on economic and fiscal measures by improving accessibility and mobility and reducing travel time and costs in the region. This could encourage greater economic activity and would benefit businesses and commuting employees. This alternative would also result in an increase in employment and tax revenue, which would benefit local and regional economies.

4.14.3.5 Fully Underground LRT Alternative

The Fully Underground LRT Alternative would have similar construction impacts to businesses as the Underground Emphasis LRT Alternative, except for businesses near the intersection of 1st and Alameda Streets. Neither a pedestrian overpass nor an automobile underpass would be built within the 1st and Alameda Streets intersection under this alternative; thus, impacts to nearby businesses would be less significant than with the Underground Emphasis LRT Alternative.

Approximately five businesses along the south side of 1st Street could be significantly impacted by street relocation during construction of the Fully Underground LRT Alternative. Implementation of mitigation measures (e.g., compensation to property owners for acquisitions and assistance to business owners) would lessen construction impacts. Depending on the success of mitigation measures, some residual impacts could remain during construction.

The Fully Underground LRT Alternative would require removal of fewer parking spaces than the At-Grade Emphasis LRT Alternative and the Underground Emphasis LRT Alternative. Approximately seven parking spaces would be displaced under this alternative. This would result in a less than significant impact to businesses.

Additionally, this alternative would necessitate acquisition of 17 privately owned parcels. Fewer parcels would be acquired under this alternative than under the Underground Emphasis LRT Alternative. However, the parcels on the block bounded by 1st, 2nd, and Alameda Streets and Central Avenue would be fully acquired as opposed to partial takes in the Underground Emphasis LRT Alternative. This acquisition is needed to stage construction and build a new underground station, station entrances, and ancillary facilities. As a result, property tax loss for the Fully Underground LRT Alternative would be slightly higher than the Underground Emphasis LRT Alternative. However, Metro intends to maintain some of the existing businesses acquired on Central Avenue between 1st and 2nd Streets that would not be directly impacted by construction. Property tax losses for the Fully Underground LRT Alternative would be approximately $281,775. This is slightly less than the Underground Emphasis LRT Alternative.

Property tax revenue losses would still equal 1.2 percent of the property tax base of properties that directly abut the proposed alignment. This loss would result in a less than significant impact and would be offset by property values increased near stations.

Higher capital costs associated with this alternative could induce a total economic output of over $3.2 billion and create 23,500 jobs during construction. This increase in employment opportunities is within projected levels of growth for the project area and would result in a beneficial impact.

Related projects could be under construction during the same time as the proposed alternative. Therefore, construction of this alternative could result in a considerable contribution to cumulative impacts on activity levels and revenue of businesses along the alignment. Project operational impacts would be less than significant, and would not contribute to cumulative, adverse, economic, or fiscal operational impacts.

4.14.3.5.1 NEPA Finding and CEQA Determination

Construction of the Fully Underground LRT Alternative would have adverse economic and fiscal impacts as it would affect activity levels and businesses along the alignment. The alternative would not have significant effects after implementation of proposed mitigation measures, although, if the mitigation is not effective there could be some residual impacts during construction.

Operation of the Fully Underground LRT Alternative would have beneficial economic and fiscal effects by improving accessibility and mobility and reducing travel time and costs in the region. This could encourage greater economic activity and would benefit businesses and commuters. This alternative would also increase employment and tax revenue; representing a beneficial impact to local and regional economies.

4.14.4 Mitigation Measures

The No Build and TSM alternatives are not anticipated to create adverse economic impacts and therefore, would not require implementation of any mitigation measures.

Mitigation measures for the build alternatives could include:

- Compensation to property owners for acquisition of property in compliance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970
- Relocation assistance for affected property and business owners in compliance with the California Relocation Act
- Measures to assist business owners significantly impacted by temporary construction (temporary parking, marketing programs, and other measures to be identified by Metro, working with the appropriate businesses)

- Replacement parking locations and strategies (Metro is committed to implementing a feasible parking replacement plan that would reduce parking impacts to a less than significant level)

4.15 Safety and Security

This section summarizes Metro's existing safety and security measures, the existing police and fire protection services covering Metro facilities, and other safety and security issues in the project area. Potential impacts of the proposed alternatives on safety and security are evaluated in this section. Information in this section is based on the Safety and Security Technical Memorandum prepared for the project and contained in Appendix CC, Safety and Security of this DEIS/DEIR.

4.15.1 Regulatory Framework

NEPA does not include specific guidance or direction for evaluating alternatives and relative effects of alternatives on public safety and security. Appendix G of the CEQA Guidelines draws particular attention to those projects that would "create a potential public health hazard" or "interfere with emergency response plans or emergency evacuation plans."

Appendix G of the California State CEQA Guidelines draws particular attention to those projects that would "create a potential public health hazard" or "interfere with emergency response plans or emergency evacuation plans." A significant adverse safety and security impact would occur under CEQA if an alternative would:

- Create the potential for increased pedestrian and/or bicycle safety risks
- Create substantial adverse safety conditions, including station, boarding, and disembarking accidents, right-of-way accidents, collisions, fires, and major structural failures
- Substantially limit the delivery of community safety services, such as police, fire, or emergency services, to locations along the proposed alignment
- Create the potential for adverse security conditions, including incidents, offenses, and crimes

Other safety and security regulations that would be applicable to the proposed project include:

- Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU)
- FTA's State Safety Oversight Rule
- Uniform Fire Code
- CPUC Safety Rules and Regulations Governing Light-Rail Transit in California
- California Health and Safety Code

- Metro Emergency Response Plan
- Fire/Life Safety Design Criteria

More information regarding these regulations and criteria is available in Appendix CC.

The evaluation of potential safety and security impacts focuses on criteria related to accident prevention (pedestrians, bicyclists, and employees), construction safety, fire protection and safety, security preventing criminal activity, security preventing terrorist attacks, and emergency response.

4.15.2 Affected Environment

Existing conditions along the Regional Connector Transit Corridor alternatives alignments were assessed to establish a baseline for comparing alternatives. The assessment of existing safety and security conditions in the project area is described below.

4.15.2.1 Safety

Metro is the regional agency that serves as transportation planner and coordinator, designer, builder, and regional operator of transit services in Los Angeles County. Metro is regulated by the CPUC. Metro operates all transit-related vehicles according to the guidelines established by the CPUC. In operating LRT, subways, and bus transit (including dedicated bus transit ways) throughout Los Angeles County, Metro has established departments to address specific issues. One department is the Transit Education Programs Department, which creates programs to educate the public on proper safety practices with respect to LRT.

4.15.2.1.1 Pedestrian Safety

Downtown Los Angeles contains a great diversity of streets, places, buildings, and environments. A high level of pedestrian traffic occurs in the project area. Pedestrian density is most concentrated in the vicinity of commercial and governmental facilities in the Civic Center and Financial District. Most intersections in the project area allow pedestrian crossings along all four sides, though some crossings are prohibited, particularly at three-way intersections or intersections between two-way and one-way streets. Colored asphalt is used in many project area crosswalks for enhanced visibility. Because the streets are on a grid with few curves, sight distance is good overall, and there are only a handful of atypical intersections (five-way, frontage road, etc.). Streets are well-lit throughout the project area. More information about the existing at-grade intersection conditions applicable to pedestrian safety within the project area are provided in Appendix CC.

4.15.2.2 Security

The affected environment is the security on the rail system, both at the stations and in the light rail vehicles. Passengers, transit employees, vendors, contractors, and the general public who come in contact with the system as well as the transit property and equipment would be susceptible to the same crimes as experienced in the surrounding neighborhoods of all four alternative alignments.

Features included for passenger security are closed-circuit television cameras (CCTV), emergency call boxes, fully lighted station stops, and transit parking areas. These features are within all trains and buses, as well as rail stations, and are designed to offer security and a personal sense of well being for passengers.

The Los Angeles Police Department (LAPD) has primary policing responsibility for this area. The Los Angeles County Sheriff's Department's (LACSD) Transit Services Bureau, the second largest transit services bureau in the Country, already provides exclusive contract police services to Metro, which operates the public transit system serving Los Angeles County. Sheriff Deputies provide police services for both the light rail and bus transportation systems throughout 1,433 square miles.

The contract with LACSD would be extended to cover the Regional Connector Transit Corridor. LACSD security personnel and deputies patrol the transit system routes and stations. LACSD security personnel work primarily on fare evasion and passenger complaints. Both the LAPD and LACSD are active members of the Regional Transit Security Working Group. Additionally, Metro personnel receive Community Emergency Response Training in collaboration with the Los Angeles Fire Department (LAFD). This training includes earthquake awareness, disaster medical procedures, and rescue operations.

Metro and LACSD regularly coordinate with the Department of Homeland Security (DHS) at several levels. They both work through the Regional Transit Security Working Group, are members of the local Joint Terrorist Task Force, and both coordinate with the area Federal Security Director for the Transportation Security Administration (TSA). Metro is currently in compliance with all TSA directives as well as with 49 CFR1580, which requires designating a rail security coordinator and reporting significant security concerns to TSA. For more information regarding existing security conditions and statistics on Metro operations within the project area, please refer to Appendix CC.

4.15.3 Environmental Impacts/Environmental Consequences

The following sections summarize the evaluation of potential safety and security impacts for each alternative. Table 4.15-1 summarizes the results of the analysis.

4.15.3.1 No Build Alternative

The No Build Alternative would maintain the current level of transit service in the project corridor and therefore, would not have a direct or indirect impact on public safety or accidents during construction or operation of the alternative. Given that the alternative would not have a direct or indirect impact on public safety or accidents, the No Build Alternative would not result in a cumulative impact.

4.15.3.1.1 NEPA Finding and CEQA Determination

The No Build Alternative would have no effect on safety or security within the project area.

Table 4.15-1. Summary of Potential Impacts to Safety and Security Conditions

Alternative	Potential Effects	Mitigation Measures
No Build	None	None
TSM	None	None
At-Grade LRT	Effect not significant after mitigation	Mitigation measures proposed
Underground LRT	Effect not significant after mitigation (potential effect less than At-Grade Alternative)	Mitigation measures proposed
Fully Underground LRT	Effect not significant after mitigation	Mitigation measures proposed

4.15.3.2 TSM Alternative

The TSM Alternative would maintain the current level of transit service in the project corridor and also increase cross-station opportunities by adding two new express shuttle buses. The TSM Alternative would not have a detrimental and/or increased impact on public safety or accidents. Buses would operate on existing streets, so changes to the existing environment and direct impacts would not occur with this alternative. A potential indirect impact would be the “induced demand” created by better and more frequent service for the overall LRT system by providing the express shuttle buses. More people could be brought into a defined geographic area, possibly resulting in potential new conflicts between transit and pedestrians and motorists.

When considered in combination with other reasonably foreseeable projects in the project area, the TSM Alternative would not have either a construction-related or operational cumulative effect because there would not be direct or indirect effects.

4.15.3.2.1 NEPA Finding and CEQA Determination

The TSM Alternative would not result in adverse or significant safety or security impacts.

4.15.3.3 At-Grade Emphasis LRT Alternative

The At-Grade Emphasis LRT Alternative could affect the pedestrian environment, motorist safety, and emergency response times for emergency service providers during both construction and LRT operation.

4.15.3.3.1 Pedestrian Safety

Pedestrian safety was evaluated at proposed station locations (near the trackway) and at designated grade crossings. Adding light rail vehicles would be the primary new safety hazard for pedestrian traffic along the proposed alignment. The speed of the vehicles would be similar to or slower than adjacent automobile traffic. The LRV would be electrically powered and, therefore, quieter than most automobile traffic and may not be easily heard. This hazard includes crossings at intersections where pedestrians cross over the light rail tracks, and human intrusion on the ROW (jaywalking). Of the build alternatives, the At-Grade Emphasis LRT Alternative has the greatest length of street running alignment, and therefore more locations where pedestrian safety concerns could occur.

4.15.3.3.2 Motorist Safety

Design solutions and operating characteristics would address potential motorist safety issues. Measures would include sizing stations to accommodate the anticipated number of passengers, channelization techniques to direct pedestrians to designated pedestrian crossings, "Train Approaching" signs, traffic-signal phasing (all-red phase and lagging left turns), low operating speeds of light rail vehicles (LRVs), left-turn restrictions along 2nd Street when LRVs are approaching, and preparation of grade crossing applications in coordination with the CPUC. These design solutions and LRT operating characteristics would reduce potential pedestrian and motorist safety concerns to a less than significant level.

4.15.3.3.3 Security

Security issues may be related to police and fire response, emergency evacuation, and addressing criminal and terrorist activity. The project would include coordination with police and fire services to develop construction and operation plans and provide appropriate public safety and security for the Metro system, employees, and surrounding communities. The LACSD policing contract with Metro would be extended to include the Regional Connector Transit Corridor project, and the project would be coordinated and compliant with TSA/DHS. To mitigate potential safety and security concerns, a complete Threat and Vulnerability Assessment in compliance with FTA regulations would be conducted for the selected locally preferred alternative.

Given project design features, the grade crossing application process, and the Threat and Vulnerability Assessment, potential indirect impacts associated with the At-Grade Emphasis LRT Alternative would not have a detrimental and/or increased impact on public safety or accidents during both construction and LRT operation.

As with the proposed project, other projects within the area of influence of this proposed alternative would address safety and security of pedestrians and motorists accessing the developments. From a cumulative perspective, potential impacts associated with the At-Grade Emphasis LRT Alternative would be mitigated to a less than significant level and would not have a cumulative effect on the safety and security environment in the project area during both construction and LRT operation.

4.15.3.3.4 NEPA Finding and CEQA Determination

The At-Grade Emphasis LRT Alternative would not have adverse effects on the safety and security conditions in the project area. The At-Grade Emphasis Alternative would not have significant effects on safety and security after proposed mitigation measures are implemented.

4.15.3.4 Underground Emphasis LRT Alternative

The Underground Emphasis LRT Alternative could affect the pedestrian environment, motorist safety, and emergency response times for emergency service providers during both construction and LRT operation.

4.15.3.4.1 Pedestrian Safety

Pedestrian safety considerations would apply primarily to proposed at-grade segments. These concerns do not arise with underground LRT facilities (there are no trackway crossings for pedestrians or vehicles) and where applicable, stations could be designed to avoid these concerns (e.g., a design that avoids the need for pedestrians to cross tracks and the potential for collisions with LRVs). Because the Underground Emphasis LRT Alternative alignment would be almost entirely underground, few pedestrian safety concerns would arise, compared to the At-Grade Emphasis LRT Alternative.

4.15.3.4.2 Motorist Safety

The only at-grade crossing proposed for the Underground Emphasis LRT Alternative is located at 1st and Alameda Streets. At this location, most vehicles and pedestrians would be grade-separated from the LRT tracks, with a potential pedestrian bridge proposed over the intersection and a new underpass allowing traffic on Alameda Street to travel below 1st Street and the LRT tracks. For motor vehicles and LRVs operating at-grade at this intersection, Metro would prepare grade crossing applications in coordination with the CPUC and local public agencies. The grade-separated nature of the Underground Emphasis LRT Alternative would avoid these potential effects which would not result in significant impacts to the project area.

4.15.3.4.3 Security

Security issues may be related to police and fire response, emergency evacuation, and addressing criminal and terrorist activity. The project would include coordination with police and fire services to develop construction and operation plans and provide appropriate public safety and security for the Metro system, employees, and surrounding communities. The LACSD policing contract with Metro would be extended to include the Regional Connector Transit Corridor project, and the project would be coordinated and compliant with TSA/DHS. To mitigate potential safety and security concerns, a complete Threat and Vulnerability Assessment in compliance with FTA regulations would be conducted for the selected locally preferred alternative. For the Underground Emphasis LRT Alternative, this would include a complete evacuation plan to mitigate any potential safety concerns.

Potential indirect impacts associated with the Underground Emphasis LRT Alternative would not have a detrimental or increased effect on public safety or accidents during both construction and LRT operation.

As with the proposed project, other projects within the area of influence of this proposed alternative would address safety and security of pedestrians and motorists accessing the developments. Potential impacts of the Underground Emphasis LRT Alternative would be mitigated to a less than significant level and therefore, would not have a cumulative effect on the safety and security environment in the project area during either construction or LRT operation.

4.15.3.4.4 NEPA Finding and CEQA Determination

The Underground Emphasis LRT Alternative would not have adverse effects on the safety and security environment in the project area. The Underground Emphasis LRT Alternative would not have significant effects on safety and security after proposed mitigation measures are implemented.

4.15.3.5 Fully Underground LRT Alternative

The potential effects of the Fully Underground LRT Alternative would be identical to those for the Underground Emphasis LRT Alternative for all areas west of Central Avenue.

4.15.3.5.1 Pedestrian and Motorist Safety

Pedestrian and motorist safety considerations identified previously would apply primarily to proposed at-grade locations. The Fully Underground LRT Alternative results in the entire LRT facility being placed underground, eliminating all potential conflicts with at-grade roadway and pedestrian infrastructure. Therefore, the proposed alternative and associated design would avoid potential safety effects related to both pedestrian and motorist crossings during operations. The grade-separated nature of the Fully Underground LRT Alternative would avoid these potential effects and no impact would occur. Mitigation measures are proposed in Section 4.15 to offset potential safety concerns during construction.

4.15.3.5.2 Security

With regards to security, the project would include coordination with police and fire services to develop construction and operation plans and provide appropriate public safety and security for the Metro system, employees, and surrounding communities. The LACSD policing contract with Metro would be extended to include the Regional Connector project, and the project would be coordinated and compliant with TSA/DHS. To mitigate potential safety and security concerns, a complete Threat and Vulnerability Assessment in compliance with FTA regulations would be conducted for the locally preferred alternative when one is selected. For the Fully Underground LRT Alternative, this would include a complete evacuation plan to mitigate any potential safety concerns.

Potential indirect impacts associated with the Fully Underground LRT Alternative would not have a detrimental or increased impact on public safety or accidents during both construction and LRT operation.

As with the proposed project, other projects within the area of influence of this proposed alternative would address safety and security of pedestrians and motorists accessing the developments. From a cumulative perspective, potential impacts associated with the Fully Underground LRT Alternative would be mitigated to a less than significant level and would not have a cumulative effect on the safety and security environment in the project area during both construction and LRT operation.

4.15.3.5.3 NEPA Finding and CEQA Determination

The Fully Underground LRT Alternative would not have adverse effects on safety and security within the project area. The Fully Underground LRT Alternative would not have significant effects on safety and security with implementation of proposed mitigation measures.

4.15.4 Mitigation Measures

Given that the No Build Alternative and the TSM Alternative would not result in any safety impacts, implementation of mitigation is not required for these alternatives.

All proposed mitigation measures regarding safety and security would be developed in conformance with Metro's Rail Transit Design Criteria and Standards, *Fire/Life Safety Criteria, Volume IX*. Final safety and security mitigation recommendations would be based on the results of and part of the Threat and Vulnerability Assessment that will be conducted for the selected locally preferred alternative.

These security measures may include:

- A CCTV system
- Emergency push-button call system for patrons
- Intrusion detection system
- Dedicated security patrol protocols and procedures
- Employing "Crime Prevention through Environmental Design" principles during design phase.

Additionally, the presence of transit workers in underground stations further dissuades criminal activity.

The following potential mitigation measures and design features are grouped by those that would apply to construction-related effects, to at-grade portions, and to underground portions of an alignment.

4.15.4.1 Construction Mitigation Measures

While construction-related safety and security concerns would not be significant, the following mitigation measures represent best management practices that help prevent safety and security issues from arising.

- Provide alternate walkways for pedestrians around construction staging sites in accordance with American with Disability Act (ADA) requirements.
- Sign and properly mark all pedestrian detour locations around staging sites in accordance with the Manual on Uniform Traffic Control Devices "work zone" guidance, and other applicable local and state requirements.

- Coordinate work plans and traffic control measures with emergency responders to prevent impacts to emergency response times.

- Develop a Construction Mitigation Program (Program) during final design and implement the Program during construction. The Program would guide Metro in communicating to the community and obtaining input from residents and businesses affected during construction. This would include communicating traffic control measures, schedule of activities, and duration of operations.

4.15.4.2 Operational Mitigation Measures - At-Grade Conditions

- To reduce potential risk of collisions between LRVs and automobiles on the street portion of the proposed At-Grade Emphasis LRT Alternative, Metro would coordinate with the CPUC, City of Los Angeles and the Los Angeles County traffic control departments, Bureau of Engineering, and the LAFD and LACFD, as well as comply with the Federal Highway Administration's Manual on Uniform Traffic Control Devices for signing and pavement marking treatments.

- All stations would be lighted to avoid shadows and all pedestrian pathways leading to/from sidewalks and parking facilities would be well illuminated. In addition, lighting would provide excellent visibility for train operators to react to possible conflicts, especially to pedestrians crossing the track.

- Proposed station designs would not include design elements that obstruct visibility or observation nor provide discrete locations favorable to crime; pedestrian access to at-grade stations would be at ground-level with clear sight lines.

- Sidewalk widths and placements would be appropriately designed to accommodate a wide variety of users. In areas directly adjacent to the rail stations:

  - Sidewalk widths would be designed with the widest dimensions feasible in conformance with the Los Angeles/Metro's adopted "Land Use/Transportation Policy," and with widths exceeding 10 feet.

  - Minimum widths would not be less than those allowed by the State of California Title 24 access requirements or the ADA design recommendations.

  - Pedestrian movements and flows would take priority over other transportation improvements, including automobile access.

  - Physical improvements would ensure that all stations are fully accessible as defined in the ADA.

- A grade-separated pedestrian bridge across Alameda Street, just north of the existing Little Tokyo/Arts District Station, could be constructed to separate pedestrian movements from LRT vehicles and motorized vehicle movements under the At-Grade Emphasis LRT Alternative.

- A grade-separated pedestrian bridge across Alameda Street, just south of the existing Little Tokyo/Arts District Station, could be constructed to separate pedestrian movements from LRT and motorized vehicle movements under the Underground Emphasis LRT Alternative. Also a grade-separated pedestrian bridge across the Metro Gold Line tracks, just south of the existing Little Tokyo/Arts District Station and east of Alameda Street, could be constructed to separate pedestrian movements from LRT and motorized vehicle movements for the Underground Emphasis LRT Alternative.

- A grade-separated pedestrian bridge would be constructed across Kosciuszko Street near the proposed 2nd Street/Hope Street station. The proposed pedestrian bridge would reduce potential pedestrian/LRT/vehicle conflicts by providing a separated facility for pedestrians trying to reach the station, especially from the high pedestrian generator Walt Disney Concert Hall (mitigation measure would apply to all three build alternatives).

- Adequate pedestrian queuing and refuge areas and wide crosswalks would be provided in areas immediately around proposed stations to facilitate pedestrian mobility.

4.15.4.3 Operational Mitigation Measures - Underground Conditions

- The Metro Fire/Life Safety Committee has developed standard safety-related design criteria to ensure safe and adequate LRT operations in and around LRT underground stations. These include:

  - Fire alarm protection within the station area
  - A minimum of two fire emergency routes from each proposed station
  - Emergency ventilation and lighting
  - Communication systems between adjoining fire agencies
  - A methane detection system for each proposed station

- Building construction for underground stations would not be less than Type I Construction as defined in the Uniform Building Code (UBC). Type I Construction is a category of building construction that sets forth design requirements that provides for safety features such as ventilation, additional egress routes, lighting, etc. Proposed stations having more than two levels below-grade or more than 80 feet to the lowest occupied level from grade would require protected level separation or other protection features to provide safe egress to the exits.

4.15.4.4 Operational Mitigation Measures - At-Grade and Underground Conditions

- For portions of the alignment where pedestrians and/or motor vehicles must cross the tracks, Metro would prepare grade crossing applications in coordination with the CPUC and local public agencies, such as LADOT, Bureau of Engineering, and LAFD and LACFD.

- All proposed LRT stations and related parking facilities would be equipped with monitoring equipment, which would primarily consist of video surveillance equipment to monitor strategic areas of the LRT stations and walkways, and/or be monitored by Metro security personnel on a regular basis.

- Metro would implement a security plan for LRT operations to include both in-car and station surveillance by Metro security or other local jurisdiction security personnel.
- Metro would coordinate and consult with the LAFD, LAPD, and LACSD to develop safety and security plans for the proposed alignment, parking facilities, and station areas.
- LRVs would be provided with front and rear safety fenders to increase LRV safety and minimize or prevent the potential for pedestrians to contact the vehicle coupler and/or fall under the LRV.
- Fire separations would be provided and maintained in public occupancy areas. Station public occupancy would be separated from station ancillary occupancy by a minimum 2-hour fire-rated wall. The only exception is that a maximum of two station agents, supervisors, or information booths may be located within station public occupancy areas when constructed of approved noncombustible materials and limited in floor area to 100 square feet.
- The diverse needs of different types of traveling public, including senior citizens, disabled citizens, and low income citizens, would be addressed through a formal educational and outreach campaign. The campaign would target this diverse community to educate them on proper system use and benefits of LRT ridership.

4.16 Growth-Inducing

This section summarizes the potential population, housing, and employment growth that may directly or indirectly occur due to the project. Although the Regional Connector Transit Corridor project does not include housing units, population could nevertheless increase due to the potential for transit-oriented development. This potential growth is analyzed at local and regional levels. Information in this section is based on the Growth-Inducing Impacts Technical Memorandum prepared for the project and contained in Appendix DD, *Growth-Inducing Impacts* of this DEIS/DEIR.

4.16.1 Regulatory Framework

NEPA requires projects to examine the indirect consequences or secondary impacts that may occur as a result of a proposed federal activity or action. NEPA guidelines require an evaluation of reasonably anticipated growth against the projections developed by a federally-designated MPA. The SCAG is the federally-designated MPO for Los Angeles County and it has developed regional growth management plans that contain growth projections.

A growth inducing impact is considered to be significant under CEQA if the proposed project has the potential to induce substantial population growth in an area, either directly through new homes or business or indirectly by creating new infrastructure that could support new homes or businesses.

More information regarding these laws and policies is available in Appendix DD.

4.16.2 Affected Environment

4.16.2.1 Regional Population, Housing, and Employment Growth

As shown in Table 4.16-1, the existing population for the region is more than 18 million persons. The region is estimated to have a population of more than 24 million persons (an increase of approximately 26 percent over existing), 7.7 million households, and 10.2 million persons employed by 2035.

Table 4.16-1. Regional Population, Households, and Employment from 2008-2035

County	2008 Population	2035 Population	2008 Households	2035 Households	2008 Employment	2035 Employment
Imperial	186,041	320,448	51,987	102,878	66,703	132,551
Los Angeles	10,449,883	12,338,620	3,298,886	4,003,501	4,498,598	5,041,172
Orange	3,210,499	3,653,990	1,015,502	1,118,490	1,698,090	1,981,901
Riverside	2,112,571	3,596,680	675,135	1,183,097	728,067	1,413,522
San Bernardino	2,095,180	3,133,801	612,123	972,561	766,044	1,254,749
Ventura	841,675	1,013,733	268,967	330,189	361,942	463,227
SCAG Region	**18,054,174**	**24,057,292**	**5,922,600**	**7,710,716**	**8,118,444**	**10,287,122**

4.16.2.2 Local Population, Housing, and Employment Growth

Table 4.16-2 shows population growth projections at the local level. The population within the project area is estimated to increase by approximately 3,200 persons by 2035, with an annual average increase of less than 1 percent (0.51). This would be a greater growth rate than either the CLACG subregion or the City of Los Angeles.

Table 4.16-3 shows the expected household growth for the project area, City of Los Angeles, and CLACG subregion. The City of Los Angeles is estimated to increase by 274,285 households and would be comprised of approximately 21 percent of the region's total households. The project area is estimated to increase by 2,552 households, which would be a minimal share of the City of Los Angeles's total, and would occur at a similar rate (0.77 percent) compared to the City (0.76 percent) and the CLACG subregion (0.75 percent).

Table 4.16-4 includes employment growth for the project area, City of Los Angeles, and CLACG subregion. The table shows that the project area is expected to gain approximately 12,630 new jobs by 2035. This would be an annual growth rate of approximately 0.26 percent. The annual rate of growth for the project area would be similar to that of the City of Los Angeles, but lower than the CLACG subregion rate.

More information regarding existing population, housing, and employment data and projected growth within the region is available in Appendix DD, Growth-Inducing Impacts of this DEIS/DEIR.

Table 4.16-2. Local Area Population Growth 2008-2035

Area	2008	2035	2008-2035 Population Change	2008-2035 Annual Average % Change
CLACG	4,099,008	4,509,435	410,427	0.37
City of Los Angeles	4,016,324	4,415,773	399,449	0.37
Project Area[1]	19,912	23,123	3,211	0.51

Source: Southern California Association of Governments 2008 Final Adopted Integrated Growth Forecast, May 2008.
[1] The project area is comprised of the following census tracts: 2060.30, 2060.40, 2062, 2073, 2074, 2075, 2077.10.

Table 4.16-3. Local Area Household Growth 2008-2035

Area	2008	2035	2008-2035 Household Change	2008-2035 Annual Average % Change
CLACG	1,361,906	1,638,822	276,916	0.75
City of Los Angeles	1,342,291	1,616,576	274,285	0.76
Project Area	9,654	12,306	2,552	0.77

Source: Southern California Association of Governments 2008 Final Adopted Integrated Growth Forecast, May 2008.

Table 4.16-4. Local Area Employment Growth 2008-2035

Area	2008	2035	2000-2008 Employment Change	2008-2035 Annual Average % Change
CLACG	1,839,988	2,037,473	197,485	0.40
City of Los Angeles	1,879,666	1,994,137	114,471	0.23
Project Area	169,328	181,962	12,634	0.26

Source: Southern California Association of Governments 2008 Final Adopted Integrated Growth Forecast, May 2008.

4.16.3 Environmental Impacts/Environmental Consequences

Growth-inducing impacts would be considered significant if the proposed project has the potential to induce either directly (for example, by proposing new homes and businesses) or indirectly (for example, extending roads or other infrastructure) substantial population growth in an area.

The following sections summarize the evaluation of potential growth-inducing impacts for each alternative. Table 4.16-5 summarizes the results of the analysis.

Table 4.16-5. Summary of Potential Growth-Inducing Impacts

Alternative	Direct Effects	Indirect Effects	Mitigation Measures
No Build	None	None	None
TSM	None	None	None
At-Grade LRT	None	None	None
Underground LRT	None	None	None
Fully Underground LRT	None	None	None

4.16.3.1 No Build Alternative

The No Build Alternative would not result in new homes or businesses and therefore, would not directly induce growth. Current development trends in the project area indicate that development would occur without the proposed project. As such, the No Build Alternative would not indirectly induce growth. Since the No Build Alternative would not directly or indirectly cause growth-inducing impacts, cumulative impacts would not occur under this alternative.

4.16.3.1.1 NEPA Finding and CEQA Determination

There would be no construction in the project area associated with additional transit infrastructure investment or housing as a result of the No Build Alternative. The No Build Alternative would not have direct or indirect growth-inducing impacts.

Based on CEQA thresholds of significance, the No Build Alternative would not have a significant impact associated with growth inducement because it would not include construction of any housing or infrastructure.

4.16.3.2 TSM Alternative

Only minor transportation improvements would occur under the TSM Alternative. The TSM Alternative would not add any new housing or significantly expand transportation infrastructure. Therefore, the TSM Alternative would not directly induce growth.

The TSM Alternative would not provide opportunities for secondary development. Therefore, the TSM Alternative would not indirectly induce growth.

Since the TSM Alternative would not directly or indirectly cause growth-inducing impacts, there would not be cumulative impacts from this alternative.

4.16.3.2.1 NEPA Finding and CEQA Determination

The TSM Alternative would not have direct or indirect growth-inducing impacts as the alternative would not include the addition of any new housing or expanded infrastructure.

4.16.3.3 At-Grade Emphasis LRT Alternative

4.16.3.3.1 Direct Impacts

An important objective of the proposed project is to meet existing transportation demand and accommodate potential increased demand due to regional growth. The proposed project would provide a linkage in the regional transportation network, thereby increasing overall system efficiency. The At-Grade Emphasis LRT Alternative does not include a housing element that would directly increase population or employment and it would not substantially change land use and development patterns at the regional scale. Therefore, this alternative would not directly induce population growth.

At the regional level, the proposed project would reduce the need to make several transfers to get from one destination to another, resulting in increased efficiency of travel between the San Gabriel Valley and the Westside or Long Beach. The areas along these routes are fully urbanized so it would be unlikely that the increased regional connectivity would induce housing construction.

4.16.3.3.2 Indirect Impacts

At the corridor level, the Regional Connector project, combined with supportive public policies, plans, and favorable real estate conditions, could attract transit-supportive development, including employment opportunities, higher-density residential development, and new services and amenities. The pattern of land development could be affected by a greater concentration and intensity of land use activities along the proposed route and particularly along the station areas, making secondary land use impacts most notable close to stations.

Experience gained from existing Metro projects such as the Purple and Red Lines suggests that developers in the Los Angeles area are interested in creating transit- and pedestrian-oriented mixed-use development, and that these types of developments can be very successful. The experience in other cities with similar transit infrastructure also supports this idea. However, policies supportive of the desired type of development must usually be in place.

Even with no change in public policy, some changes in land use may potentially occur as a result of the proposed project; however, these changes would largely represent a redistribution of growth rather than an increase. Downtown Los Angeles and Little Tokyo are currently densely developed. The transit corridor stations could attract transit-supportive land uses to these areas. These uses could be developed in existing or new buildings on vacant lots close to the stations.

The proposed project likely enhance the attractiveness of the corridor for living or conducting business. The project could improve transit accessibility for people desiring to come to destinations within the project area and for area residents or others bound for other regional locations.

Employment opportunities may increase in the project area, and these opportunities would be enhanced by the light rail project. The proposed project would provide new jobs, particularly during construction, and new access to local employment opportunities for all communities within or connected to the project corridor. Short-term construction-related jobs created by the proposed project and long-term employment opportunities created by improved access would benefit the entire community.

Under the At-Grade Emphasis LRT Alternative, the indirect impacts on neighborhoods would generally be positive. Station areas could become centers of neighborhood activity and investment and, therefore, could boost neighborhood social cohesion and improve economic conditions for commercial buildings within the corridor and, in particular, those adjacent to the stations. The Regional Connector could also encourage additional growth of existing street level retail uses in both downtown and Little Tokyo. This new accessibility could also act as a catalyst for using underutilized space in commercial buildings.

The At-Grade Emphasis LRT Alternative would not result in direct business displacement and, therefore, would not undermine the economic base of these communities. Commercial properties near stations would have a reasonable potential to increase in value - a potential secondary effect.

A low potential exists for the project to cause secondary adverse impacts to historic properties. This could occur through redevelopment at or near station areas that are adjacent to historic properties. Such development may potentially introduce new buildings at a scale and appearance that would be out of character with the historic properties, or may result in the demolition of historic buildings to accommodate new development. On the other hand, underutilized historic buildings in the corridor may increase in desirability due to their proximity to the proposed project. This could be considered a beneficial secondary impact if development is undertaken with the goal of complementing the historic setting of these resources.

Potential indirect growth-inducing effects may result from the micro-scale growth or development near proposed stations. These potential effects, described in more detail in Appendix DD, would be due to implementation of local and state land use policies or local planning objectives, which may encourage transit-oriented development, station area planning, or housing density bonuses adjacent to transit corridors.

The At-Grade Emphasis LRT Alternative would not remove any barriers to growth, or otherwise directly or indirectly induce growth. The At-Grade Emphasis LRT Alternative would likely influence patterns of growth along the transit corridor, most notably in the proposed station areas. The most likely outcome would be an acceleration or redistribution of currently planned growth.

4.16.3.3.3 NEPA Finding and CEQA Determination

The At-Grade Emphasis LRT Alternative would not have growth-inducing effects on the project area.

4.16.3.4 Underground Emphasis LRT Alternative

Like the At-Grade Emphasis LRT Alternative, the Underground Emphasis LRT Alternative would not include any housing and therefore, would not directly induce growth. The discussion of direct impacts in Section 4.16.3.3.1 is applicable to the Underground Emphasis LRT Alternative

The potential indirect impacts associated with the Underground Emphasis LRT Alternative would be similar to those under the At-Grade Emphasis LRT Alternative. The Underground Emphasis LRT Alternative would likely complement patterns of growth along the transit corridor, most notably in the proposed station areas. The most likely outcome would be an acceleration and/or redistribution of currently planned growth. This potential would be less than significant and would not meet the evaluation criteria for an indirect growth-inducing impact. The Underground Emphasis LRT Alternative would not indirectly induce growth. The discussion of indirect impacts in Section 4.16.3.3.2 is applicable to the Underground Emphasis LRT Alternative

4.16.3.4.1 NEPA Finding and CEQA Determination

The Underground Emphasis LRT Alternative would not have direct or indirect growth-inducing impacts on the project area.

4.16.3.5 Fully Underground LRT Alternative

Like the At-Grade Emphasis LRT Alternative, the Fully Underground LRT Alternative would not include any housing and therefore, would not directly induce growth. The discussion of direct impacts in Section 4.16.3.3.1 is applicable to the Fully Underground LRT Alternative

Potential indirect impacts associated with the Fully Underground LRT Alternative would be similar to those under the Underground Emphasis LRT Alternative. The Fully Underground LRT Alternative would likely complement patterns of growth along the transit corridor, most notably in the proposed station areas. The most likely outcome would be an acceleration and/or redistribution of currently planned growth near the eastern end of the alignment. This potential effect would not be significant. The Fully Underground LRT Alternative would not indirectly induce growth. The discussion of indirect impacts in Section 4.16.3.3.2 is applicable to the Fully Underground LRT Alternative.

4.16.3.5.1 NEPA Finding and CEQA Determination

The Fully Underground LRT Alternative would not have direct or indirect growth-inducing impacts.

4.16.4 Mitigation Measures

None of the alternatives would directly or indirectly induce growth. Therefore, mitigation measures would not be required for this project.

4.17 Environmental Justice

This section summarizes the potential impacts described in other sections of Chapter 4 and identifies potentially disproportionate environmental justice impacts (i.e., impacts which could affect environmental justice populations more than others). Additional detail is provided in the Environmental Justice Technical Memorandum, which is incorporated into this DEIS/DEIR as Appendix EE.

4.17.1 Regulatory Framework

Executive *Order (E.O.) 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, requires federal agencies to seek environmental justice by "identifying and addressing social and economic effects of… programs, policies, and activities on minority and low-income populations in the United States" (Federal Register, Volume 59, Number 32). It requires fair treatment and meaningful involvement of all people, and that no group of people, including a racial, ethnic, or socioeconomic group, should bear a disproportionate share of negative environmental consequences resulting from federal projects. In response, USDOT issued the *Order to Address Environmental Justice in Minority Population and Low-Income Populations* (Federal Register Volume 62, Number 72), which sets guidelines to ensure that all federally-funded transportation-related programs, policies, or activities that have the potential to adversely affect human health or the environment involve a planning and programming process that explicitly considers effects on minority and low income populations. Executive Order 13155 requires federally-funded programs to develop and implement a system to provide meaningful access for limited-English proficiency populations. As a result, NEPA requires projects that receive federal funding to analyze environmental justice concerns.

CEQA does not refer specifically to the topic of environmental justice nor does it have specific thresholds of significance for environmental justice. CEQA focuses primarily on identifying and disclosing potential significant impacts to the physical environment. CEQA does, however, place a particular emphasis on identifying potential effects on affordable housing stating that an adverse impact may occur if a project displaces affordable housing. Since affordable housing is by definition inhabited by low income people, the displacement of affordable housing can be seen as an indicator of environmental justice impacts. However, the Regional Connector Project would have no impact on affordable housing. Therefore this environmental justice analysis focuses on E.O. 12898 and NEPA.

In summary, the environmental justice impact analysis is guided by the following regulations:

- Executive Order 12898
- Executive Order 13166
- Civil Rights Act of 1964
- USDOT Order to Address Environmental Justice in Minority Populations and Low-Income Populations
- Age Discrimination Act of 1975

4.17.2 Affected Environment

Though the proposed Regional Connector project would be located in downtown Los Angeles, benefits of the project would be felt across the Los Angeles region. Therefore, the affected environment includes the entire region. The project area contains the communities of Little Tokyo, the Arts District, Boyle Heights, Bunker Hill, Historic Core, Financial District, Toy District, and South Park.

The most visible and concentrated minority community in the project area is Little Tokyo. Due to the project location and the location of the most disruptive components of construction, the brunt of construction impacts associated with the Regional Connector build alternatives would occur in the Little Tokyo community.

To address issues raised by the Little Tokyo community during and after scoping for this DEIS/DEIR, Metro assisted the community in establishing the Little Tokyo Working Group (LTWG). At the group's request, Metro also provided funding for a consultant to assist the community in understanding the potential project impacts in order to develop mitigation that would be meaningful to the community. More detail about the working group may be found in Section 4.17.3.5, Fully Underground LRT Alternative impacts, and in Section 4.17.5, Potential Mitigations Identified by the LTWG.

The project area is surrounded by predominantly minority and low-income neighborhoods such as South Los Angeles, Pico-Union, Westlake-MacArthur Park, Chavez Ravine, Lincoln Heights, and Chinatown. No direct impacts as construction and operations would not occur in these surrounding areas. The haul routes would not traverse these communities as these other communities are cutoff from Downtown LA and the project work area by the 101, 10, and 110 freeways and the LA River. Street closure impacts would be local. They may affect bus lines that go into these areas, but re-routing is a mitigation measure that would reduce significance of impacts.

This analysis treated potential environmental justice impacts to Little Tokyo with special attention given its historical and cultural importance. Furthermore, construction activities would impact Little Tokyo under all build alternatives. Little Tokyo is an identified minority community in the project area, and has historic character and symbolic importance to Japanese Americans. Additional demographic information about the project area and details about outreach activities conducted in Little Tokyo are available in Appendix EE and summarized here.

The year 2000 census data does not reflect the demographic and land use shifts that have occurred in downtown Los Angeles during the last ten years. Census data indicates that residents in each downtown tract are mostly low income and racial minorities, though not ethnically homogenous. Field analysis undertaken for the Regional Connector project revealed that the downtown population is becoming more affluent and the percentage of minorities is decreasing. Field analysis methods included walking the corridor and taking note of new development. Over the last ten years, there have been many lofts created either by converting historic buildings, construction new buildings, or converting apartment buildings to condominiums.

According to the Downtown Demographic Study (2008) done by the Downtown Central Business Improvement District (attached), the Ethnic composition changed from 17 percent White in 2000 to 54 percent white in 2008, 35 percent Hispanic in 2000 to 17 percent Hispanic, and from 19 percent African American in 2000 to 8 percent in 2008. Overall, percent minority changed from 83 percent in 2000 to 46 percent in 2008. Median Household income increased from $15,637 in 2000 to $96,200 in 2008. Therefore, the overall shift has been from low-income and minority to high-income and white, with the exception of Little Tokyo.

Like the rest of the project area, Little Tokyo contains a mix of income levels and ethnicities. However, it is one of only three remaining Japantowns in the United States, and is a historic cultural center of national importance. Prior to World War II, Little Tokyo was the largest Japanese American community in the country. It has since decreased in size and most of the Japanese American population has migrated to the suburbs, but Little Tokyo remains a historic and cultural focal point for Japanese Americans both in Los Angeles and throughout the United States. It houses important cultural institutions, such as the Japanese American National Museum, and a portion of the neighborhood is designated as a historic district on the National Register of Historic Places. Impacts to Little Tokyo would affect not only local residents, but also the cultural footings of Japanese Americans nationwide. Comments received during scoping emphasized this unique national significance. As such, the environmental justice analysis focuses heavily on impacts that could disproportionately affect Little Tokyo.

4.17.3 Environmental Impacts/Environmental Consequences

This section discusses the environmental topics where disproportionate impacts would occur. Due to the project location and the location of the most disruptive components of construction, the brunt of construction impacts associated with the Regional Connector build alternatives would be borne by the Little Tokyo community. Therefore, this community would be disproportionately impacted by construction activities. Appendix EE contains a more detailed discussion of all the environmental impacts from the perspective of environmental justice, including those that would not be disproportionate. Environmental justice impacts for all alternatives are summarized in Table 4.17-1.

4.17.3.1 No Build Alternative

Under the No Build Alternative, transit infrastructure investment would be limited to improvements planned in the 2009 Metro LRTP. By 2035, several new Metro rail lines would exist and bus services would have been reorganized and expanded to connect with these rail lines. The transit network within the project area would otherwise be largely the same as it is now. The No Build Alternative would have disproportionate effects on low income and minority populations with respect to transit service equity. Compared to the build alternatives, transit accessibility and mobility would not improve.

4.17.3.1.1 Construction Impacts

No transit project would be constructed as part of the No Build Alternative. No direct, indirect, or cumulative disproportionate adverse impacts from construction would occur.

4.17.3.1.2 Operational Impacts

Transit Service Equity

The No Build Alternative would maintain the current level of bus and rail transit access in the project area. The No Build alternative would not increase connectivity to regional public transit; therefore, low-income and minority populations in the project area may not have equitable access to jobs and services. This is particularly true of populations in Little Tokyo, which is served by fewer bus and rail lines than many other parts of the project area. Traffic congestion in the project area would be anticipated to increase. Current transit services would be impacted by this congestion. Mobility of the transit-dependent population could be constricted. Therefore, the No Build Alternative would result in direct, indirect, and cumulative disproportionate adverse impacts to transit service equity.

Topics With No Disproportionate Impacts

The No Build Alternative would have effects on traffic congestion, air quality and energy but these effects would extend across the region and would not disproportionately fall upon the Little Tokyo community or other minority or low income neighborhoods. Although some congestion relief would occur under the No Build Alternative with transit improvements planned in the Metro 2009 LRTP, traffic congestion is expected to increase in the project area. Air quality across the region would be adversely affected by increased congestion. Increased Vehicle Miles Traveled (VMT) would result in increased automobile fuel consumption throughout the project area and region. All communities, regardless of minority status or income, would be affected by these potential impacts to traffic congestion, air quality, and energy.

The No Build Alternative would not involve new infrastructure and therefore would not substantially change conditions with respect to parking; land use; visual resources or aesthetics; noise and vibration; water quality; climate change; ecosystems and biological resources; geotechnical/ subsurface/ seismic/ hazardous materials; historic, archaeological, or paleontological resources; parklands and community facilities; economic vitality and employment opportunities; and safety and security. The No Build Alternative would not involve any right-of-way purchases and so would not involve any displacements or relocations.

The No Build Alternative would not affect communities and neighborhoods because it would not involve street closures or result in disproportionate adverse impacts pertaining to community cohesion, access, or exclusion.

The topics mentioned in this section would either affect the project area equally or there would not be adverse effects, therefore, there would not be disproportionate impacts on minority communities. As such, the No Build Alternative would not have direct, indirect, or cumulative disproportionate adverse impacts with respect to these topics.

Table 4-17.1. Summary of Adverse Environmental Justice Impacts

Topic	No Build	TSM	At-Grade Emphasis LRT	Underground Emphasis LRT	Fully Underground LRT
Transit Service Equity	Disproportionate	Disproportionate	Not Disproportionate	Not Disproportionate	Not Disproportionate
Traffic	Not Disproportionate	Not Disproportionate	Not Disproportionate After Mitigation	Disproportionate	Not Disproportionate
Parking	Not Disproportionate	Not Disproportionate After Mitigation	Not Disproportionate After Mitigation	Not Disproportionate After Mitigation	Not Disproportionate After Mitigation
Land Use	Not Disproportionate	Not Disproportionate	Not Disproportionate	Not Disproportionate	Not Disproportionate
Displacement	Not Disproportionate	Not Disproportionate	Not Disproportionate	Not Disproportionate After Mitigation	Not Disproportionate After Mitigation
Community, Neighborhood	Not Disproportionate	Not Disproportionate	Not Disproportionate After Mitigation	Disproportionate	Not Disproportionate After Mitigation
Visual	Not Disproportionate	Not Disproportionate	Disproportionate	Disproportionate	Not Disproportionate After Mitigation
Air Quality	Not Disproportionate	Not Disproportionate	Not Disproportionate	Not Disproportionate	Not Disproportionate
Noise	Not Disproportionate	Not Disproportionate	Not Disproportionate	Not Disproportionate After Mitigation	Not Disproportionate
Ecosystems	Not Disproportionate	Not Disproportionate	Not Disproportionate	Not Disproportionate	Not Disproportionate
Geotechnical	Not Disproportionate	Not Disproportionate	Not Disproportionate	Not Disproportionate	Not Disproportionate
Water	Not Disproportionate	Not Disproportionate	Not Disproportionate	Not Disproportionate	Not Disproportionate
Energy	Not Disproportionate	Not Disproportionate	Not Disproportionate	Not Disproportionate	Not Disproportionate

Table 4-17.1. Summary of Adverse Environmental Justice Impacts (continued)

Topic	No Build	TSM	At-Grade Emphasis LRT	Underground Emphasis LRT	Fully Underground LRT
Climate Change	Not Disproportionate	Not Disproportionate	Not Disproportionate	Not Disproportionate	Not Disproportionate
Historic	Not Disproportionate	Not Disproportionate	Not Disproportionate	Not Disproportionate	Not Disproportionate
Parklands, Community Facilities	Not Disproportionate	Not Disproportionate	Not Disproportionate After Mitigation	Not Disproportionate After Mitigation	Not Disproportionate After Mitigation
Economic, Fiscal	Not Disproportionate	Not Disproportionate	Not Disproportionate After Mitigation	Not Disproportionate After Mitigation	Not Disproportionate
Safety, Security	Not Disproportionate	Not Disproportionate	Not Disproportionate	Not Disproportionate	Not Disproportionate

Source: TAHA, 2010

4.17.3.1.3 NEPA Finding

The No Build Alternative would result in disproportionate adverse impacts to transit service equity for minority and low-income communities due to deteriorating traffic congestion and less convenient, longer transit trips.

4.17.3.1.4 CEQA Determination

CEQA does not have thresholds of significance specific to environmental justice.

4.17.3.2 TSM Alternative

The TSM Alternative would link the 7th Street/Metro Center Station and Union Station with two new express shuttle bus lines. These buses would run frequently, especially during peak hours. Additionally, like the No Build Alternative, other, unrelated transit projects would be constructed in the region.

Table 4.17-1 summarizes the potentially disproportionate construction and operational impacts anticipated under the TSM Alternative. The TSM Alternative would have disproportionate adverse effects on low income and minority populations with respect to transit service equity and parking.

4.17.3.2.1 Construction Impacts

Construction under the TSM Alternative would be minimal (new bus stops and signage). Typical construction methods for the minor work needed for bus stop installation would be used. Bus stops would use the existing right-of-way. Extended street closures would be unnecessary, so mobility would not be limited. No direct, indirect, or cumulative disproportionate adverse construction-related impacts are anticipated.

4.17.3.2.2 Operational Impacts

Transit Service Equity

The TSM Alternative would maintain local bus and rail transit in the project area and add new shuttle bus lines that would serve Little Tokyo and low-income communities in the project area. The TSM alternative would not increase connectivity to regional mass transit as much as other build alternatives; therefore, low-income and minority populations in the project area may not have equitable access to jobs and services. Traffic congestion in Little Tokyo is anticipated to increase. Current transit services would be impacted by this congestion. Mobility of transit-dependent populations could be constricted. Therefore, the TSM Alternative would result in direct, indirect, and cumulative disproportionate adverse impacts with respect to transit service equity.

Parking

The TSM Alternative would result in the permanent loss of up to 24 on-street parking spaces. Parking spaces would be lost from installation of new bus stops on 2nd Street between Hill Street and Central Avenue. Up to twelve of the lost spaces would be in Little Tokyo where the community has expressed concern over parking loss. Sufficient parking would remain in Little Tokyo, but this could be seen as a disproportionate adverse impact. Mitigation measures in Section 4.17.4 have been proposed to address potential parking impacts.

Topics With No Disproportionate Impacts

The TSM Alternative would have effects on traffic congestion and circulation, and air quality but these effects would extend across the region and would not disproportionately fall upon the Little Tokyo community or other minority or low income neighborhoods. To a limited extent, the enhanced connection across the project area provided by the TSM Alternative would increase transit ridership on connecting rail lines and reduce vehicle trips into the downtown area. This would provide some modest beneficial effects on traffic congestion and air quality. Adverse air quality impacts associated with additional pollutants emitted by new buses would be spread over the entire region.

Traffic circulation impacts are measured by changes to intersection performance. Only two of the eight intersections adversely affected in the AM peak hour and one of the nine intersections adversely impacted in the PM peak hour would be located in Little Tokyo. There may be increased delays for vehicular traffic if new buses are given signal priority, but this would also occur evenly throughout the project area.

The TSM Alternative would not involve new infrastructure beyond new bus stops that would be similar to existing ones and they would not block building frontages. There are already numerous transit lines in the project area and adding two new lines and new bus stops would not substantially change conditions with respect to land use; visual resources or aesthetics; noise and vibration; water quality; ecosystems and biological resources; geotechnical/ subsurface/ seismic/ hazardous materials; historic, archaeological, or paleontological resources; and parklands and community facilities. The TSM Alternative would not involve any displacements or relocations.

The TSM Alternative would not affect communities and neighborhoods because it would not involve street closures or result in disproportionate adverse impacts pertaining to community cohesion, access, or exclusion. Construction of new bus stops and signage would not impact the viability of neighborhoods.

The TSM Alternative could potentially change street crossing times in Little Tokyo and impact safety for elderly pedestrians. However, these effects would be spread throughout the entire project area. In addition, Metro would coordinate with LADOT regarding the signalization of shuttle service in Little Tokyo. Metro would conduct a pedestrian education program in Little Tokyo focusing on transit safety for the new shuttles. Disproportionate adverse impacts to safety and security are not anticipated.

The TSM Alternative could have beneficial effects with respect to energy, climate change, and economic vitality and employment opportunities. The increase in transit would reduce VMT and energy consumption. The new buses would run on compressed natural gas (CNG) which would result in a one percent increase in energy consumption, but overall the TSM Alternative is expected to result in a decrease in energy consumption. Emissions from the new buses would have a regional, not a local effect on climate change. The TSM Alternative would be consistent with SB 375 because it would increase regional transit capacity and decrease emissions from passenger vehicles. The increase in transit would also increase access to Little Tokyo and provide beneficial effects on economic vitality and employment opportunities.

The topics mentioned in this section would either affect the project area equally or have no adverse effects, therefore, there would not be disproportionate impacts on minority communities. As such, the TSM Alternative would not have direct, indirect, or cumulative disproportionate adverse impacts with respect to these topics.

4.17.3.2.2 NEPA Finding

The TSM Alternative would result in disproportionate impacts to transit service equity for minority and low-income communities due to deteriorating traffic congestion. It would also have a disproportionate impact for parking, which would not be disproportionate after mitigation.

4.17.3.2.3 CEQA Determination

CEQA does not have thresholds of significance specific to environmental justice.

4.17.3.3 At-Grade Emphasis LRT Alternative

The At-Grade Emphasis LRT Alternative would connect 7th Street/Metro Center Station and the Metro Gold Line with a new light rail connection that would be approximately half underground and half at-grade. This alternative would not reduce existing bus service in the project area.

Table 4.17-1 summarizes potentially disproportionate construction and operational impacts anticipated under the At-Grade Emphasis LRT Alternative. The At-Grade Emphasis LRT Alternative would have disproportionate effects on low income and minority populations with respect to several impact categories. However, with mitigation these effects would not be adverse, except for the visual impacts of the potential pedestrian bridge at Temple and Alameda Streets.

4.17.3.3.1 Construction Impacts

From an environmental justice standpoint, the greatest impacts would occur during construction. The following subsections describe the adverse impacts that would take place during construction of the At-Grade Emphasis LRT Alternative. Disproportionate impacts could occur with respect to traffic circulation; parking; community and neighborhoods; visual and aesthetic resources; community facilities; and economic vitality.

Traffic Circulation

Construction of the At-Grade Emphasis LRT Alternative would result in temporary closure of several streets in the project area. In particular, construction of the Alameda Street underpass at Temple Street could result in disproportionate adverse impacts to Little Tokyo and the Japanese American National Museum. Alameda Street is a major arterial that provides access to Little Tokyo and it could be closed for extended periods of time for construction of the underpass.

In addition, 2nd Street would be temporarily closed from Bunker Hill to the western border of Little Tokyo. Traffic would likely divert to 1st Street, which is already congested in Little Tokyo. Although construction impacts are short-term and intermittent, they would result in disproportionate adverse impacts.

Parking

Construction of the At-Grade Emphasis LRT Alternative would temporarily displace on-street parking. Construction could restrict access to parking lots like the one at the southwest corner of the intersection of Alameda and Temple Streets. Access to this parking lot would be further restricted once Alameda Street is closed for underpass construction. Restricting access to the parking lot and curb parking would have disproportionate adverse impacts to Little Tokyo and the Japanese American National Museum. Construction impacts are short-term and intermittent, but they would result in disproportionate adverse impacts.

Community and Neighborhoods

Construction of the At-Grade Emphasis LRT Alternative would temporarily restrict, but not eliminate, access to the Japanese American National Museum. Access to the museum would be decreased during construction of the Alameda Street underpass and the potential pedestrian bridge. Loading spaces along Alameda Street would be temporarily displaced, and congestion would increase on 1st Street when 2nd Street is closed. Overall, access to the building would be maintained. Construction impacts are short-term and intermittent, but they would result in disproportionate adverse impacts.

Construction of the At-Grade Emphasis LRT Alternative would result in temporary closure of several streets near Little Tokyo. Though temporary, these closures could restrict access to businesses in Little Tokyo. Impacts to businesses would affect the entire community.

In particular, construction of the Alameda Street underpass and potential pedestrian bridge could result in disproportionate adverse impacts to Little Tokyo and the Japanese American National Museum. A closure of Alameda Street here could last from 24 to 36 months and access to Little Tokyo from Alameda Street would be limited during this time. Alameda Street is one of the main arterials providing access to Little Tokyo. Construction impacts are short-term and intermittent, but they would result in disproportionate adverse impacts.

Visual and Aesthetic Resources

Most construction activities required for this alternative would occur outside Little Tokyo. However, several large components would occur near Little Tokyo, including the Alameda Street underpass and a potential pedestrian bridge. This construction could result in disproportionate adverse visual impacts to Little Tokyo and the Japanese American National Museum. Construction equipment and work areas in this area would be larger than most laydown areas in the alignment. Construction impacts are short-term and intermittent, but they would result in disproportionate adverse impacts.

Parklands and Other Community Facilities

During construction of the At-Grade Emphasis LRT Alternative, street closures could restrict access to facilities adjacent to construction sites, such as the Little Tokyo Branch Public Library, MOCA, JANM, and the Go for Broke Monument, in addition to other facilities throughout the project area. Automobile and pedestrian detours would be needed. Annual festivals in the downtown area could also be temporarily affected. Emergency service response times could also be affected by the temporary street closures and detours. Construction impacts would be temporary and short-term, but they would be disproportionate.

Economic and Fiscal

Construction of the At-Grade Emphasis LRT Alternative would result in temporary closure of several streets in the project area. Construction of the Alameda Street underpass could result in disproportionate adverse impacts to Little Tokyo and the Japanese American National Museum. A closure of Alameda Street here could last from 24 to 36 months and access to Little Tokyo from Alameda Street would be limited during this time. Alameda Street is one of the main arterials providing access to Little Tokyo.

2nd Street would be closed for construction from Bunker Hill to the western border of Little Tokyo. Traffic would likely divert to 1st Street, which is already heavily congested in Little Tokyo. Construction impacts could adversely affect the economic viability of some businesses in Little Tokyo. Construction impacts are short-term and intermittent, but they would result in disproportionate adverse impacts.

Topics With No Disproportionate Construction Impacts

Underground construction can encounter contaminated groundwater or affect archaeological and paleontological resources. Construction impacts from the At-Grade Emphasis LRT Alternative related to geotechnical/ subsurface/ seismic/ hazardous materials would also be most likely to occur along the underground portions of the alignment. The underground portions of the alignment are located in the Bunker Hill and Financial District communities rather than the Little Tokyo area. Excavation for the underpass at Temple and Alameda Streets would not require excavation of more than a few feet, therefore construction effects related to excavations would not occur disproportionately.

Many construction-related effects would occur equally along the entire alignment and would not disproportionately impact Little Tokyo. These effects include transit service equity; air quality; noise and vibration; ecosystems and biological resources; energy; climate change; and safety and security. There would be no construction-related effects on land use or historic buildings. In addition, no temporary construction easements or displacements would be required in the Little Tokyo community.

4.17.3.3.2 Operational Impacts

Parking

The At-Grade Emphasis LRT Alternative would result in the permanent loss of up to 51 on-street parking spaces, 29 on-street loading spaces, and 77 pay-to-park spaces. Of these, 33 pay-to-park spaces, 23 on-street parking spaces, and five on-street loading spaces are in Little Tokyo. Both on- and off-street parking is limited in Little Tokyo. The Little Tokyo community has expressed concern over potential loss of parking.

The removal of parking spaces could adversely impact businesses in the project area. Business revenue could drop if vehicular access to businesses is reduced. New transit would provide increased pedestrian access to businesses, which may offset some adverse impacts.

Transit projects compensate for loss of parking because they reduce vehicle traffic and the demand for parking. This alternative would increase non-automobile, transit access to the project area. Therefore, the proposed At-Grade Emphasis LRT Alternative would partially offset potential adverse impacts to parking. Still, disproportionate direct, indirect, and cumulative impacts to parking are expected.

Community and Neighborhoods

This alternative would not adversely impact the cohesion or identity of Little Tokyo. However, this alternative would displace several on-street parking spaces in Little Tokyo. Increased access to and mobility within the project area would be a beneficial impact to the project area. This increased access through transit would offset some loss of parking.

The Alameda Street underpass at Temple Street would provide enough frontage road to continue to permit deliveries to JANM along Alameda Street. Bus loading areas on Alameda Street in front of the museum would be removed. Other bus loading spaces would be available adjacent to the museum on 1st Street. Additional bus loading spaces could be created.

A loss of parking under the At-Grade Emphasis LRT Alternative could result in indirect disproportionate impacts because the majority of displaced parking would be in Little Tokyo. Increased transit access in the project area may partially offset the loss of parking, but Little Tokyo would be adversely impacted. Local businesses that rely on paid parking lots and on-street parking could be adversely impacted. The community of Little Tokyo has expressed concern over parking loss and the corresponding effect on businesses. Therefore, indirect disproportionate adverse impacts to the Little Tokyo community are anticipated.

Approximately 12 new land development construction projects are anticipated in the project area between now and 2014. An additional 54 new land development construction projects are anticipated between 2014 and 2019. Twelve major renovation projects are anticipated between now and 2014, and eight are expected between 2014 and 2019. Several projects would occur in Little Tokyo or the close vicinity and would remove public paid-parking lots. Thus, parking loss under the At-Grade Emphasis LRT Alternative would contribute cumulatively to parking loss in Little Tokyo. Loss of parking would result in cumulative disproportionate adverse impacts.

Visual Resources and Aesthetics

The At-Grade Emphasis LRT Alternative would run underground through the Financial District and at-grade in Bunker Hill, Civic Center, and on the periphery of Little Tokyo. New visual elements like pedestrian bridges, catenary poles and overhead wires, and stations would be created in the project area. Two major visual elements of the At-Grade Emphasis LRT Alternative, the Alameda Street underpass at Temple Street and the potential pedestrian bridge at Temple and Alameda Streets, would be located adjacent to Little Tokyo. This would result in a disproportionate adverse visual impact.

Parklands and Other Community Facilities

The At-Grade Emphasis LRT Alternative would eliminate uncontrolled, mid-block left turns. This could impede access to community facilities on 2nd Street, Los Angeles Street, and Main Street. Disproportionate adverse impacts to community facilities could occur but would be partially offset by the increased access provided by the LRT.

Safety and Security

The At-Grade Emphasis LRT Alternative could result in adverse impacts to pedestrian safety and security. This alternative could increase potential conflicts between pedestrians or vehicles and trains. Near Little Tokyo, particularly as the alignment crosses Alameda Street at Temple Street, there could be potential pedestrian train conflicts involving the elderly population. These safety and security issues are applicable to light rail regardless of the socioeconomic or ethnic status of the surrounding community.

In the Little Tokyo area, Metro would potentially build a pedestrian bridge, across Alameda Street, near the Little Tokyo/Arts District Station. This bridge would separate pedestrian movements from LRT and motorized vehicle movements. If the community opts against construction of the pedestrian bridge, Metro would use other urban design methods to enhance pedestrian safety. This would include creating pedestrian queuing and refuge areas around proposed stations. Adding wide crosswalks would also enhance pedestrian mobility and safety. No disproportionate safety and security impacts are expected.

Topics With No Disproportionate Operational Impacts

The At-Grade Emphasis LRT Alternative would have effects on traffic circulation. Traffic circulation impacts are measured by changes to intersection performance. Only four of the 17 intersections adversely affected in the AM peak hour and four of the 26 intersections adversely impacted in the PM peak hour would be located in Little Tokyo. Traffic impacts would occur throughout the entire project area and would not result in disproportionate impacts.

Operation of the At-Grade Emphasis LRT Alternative within the Little Tokyo area would not result in impacts with respect to land use; water quality; ecosystems and biological resources; geotechnical/ subsurface/ seismic/ hazardous materials; and historic, archaeological, or paleontological resources. The At-Grade Emphasis LRT Alternative would not involve any displacements or relocations or affect sensitive noise receptors in the Little Tokyo area. Underground portions of the alignment are not located in the Little Tokyo area and the underpass at Temple and Alameda Streets would not require excavation of more than a few feet, so effects related to underground alignments would not occur disproportionately in the Little Tokyo area.

The At-Grade Emphasis LRT Alternative could have beneficial effects with respect to transit service equity; air quality; energy, climate change, and economic vitality and employment opportunities. While this alternative would not create a new station in Little Tokyo, it would connect to the Metro Gold Line, which currently serves Little Tokyo and it would expand the number of destinations reachable from the Little Tokyo/Arts District station without transfers. This alternative would have direct, beneficial impacts to transit equity. The increase in transit would reduce VMT providing beneficial effects on air quality and energy consumption. The At-Grade Emphasis LRT Alternative would be consistent with SB 375 because it would increase regional transit capacity and decrease emissions from passenger vehicles. The increase in transit would also increase access to Little Tokyo and provide beneficial effects on economic vitality and employment opportunities.

The topics mentioned in this section would either affect the project area equally or have no adverse effects, therefore, there would not be disproportionate impacts on minority communities. As such, the At-Grade Emphasis LRT Alternative would not have direct, indirect, or cumulative disproportionate adverse impacts with respect to these topics.

4.17.3.3.3 NEPA Finding

The following adverse impacts of the At-Grade Emphasis LRT Alternative could weigh disproportionately on relevant communities under this alternative:

- Parking loss in Little Tokyo
- Decreased access to public facilities during operations
- Construction-related, decreased traffic circulation, parking, access to community facilities, and changed visual resources
- Construction-related, decreased economic and fiscal viability
- Visual impacts of the potential pedestrian overpass at Temple and Alameda Streets

Disproportionate adverse impacts would not remain after mitigation, except the visual impacts of the potential pedestrian overpass at Temple and Alameda Streets, which would be unavoidable.

4.17.3.3.4 CEQA Determination

CEQA does not have thresholds of significance specific to environmental justice.

4.17.3.4 Underground Emphasis LRT Alternative

The Underground Emphasis LRT Alternative would connect 7th Street/Metro Center Station and the Metro Gold Line with a new light rail connection that would be mostly underground. This alternative would not reduce existing bus service in the project area.

Table 4.17-1 summarizes potentially disproportionate construction impacts anticipated under the Underground Emphasis LRT Alternative. This Alternative would have disproportionate effects in several impact categories, as described in the following subsections.

4.17.3.4.1 Construction Impacts

From an environmental justice standpoint, the greatest impacts would occur during construction. The following subsections describe the impacts that would occur during construction of the Underground Emphasis LRT Alternative.

Traffic Circulation

Construction of the Underground Emphasis LRT Alternative would result in temporary closure of several streets in the project area. In particular, construction of the Alameda Street underpass at 1st Street could result in disproportionate adverse impacts to Little Tokyo and the Japanese American National Museum. Unlike other street closures, closure of Alameda Street could be long-term, unless cut-and-cover methods are used to construct the underpass. Alameda Street is a major arterial providing access to Little Tokyo. In addition, 2nd Street would be temporarily closed between Alameda Street and Central Avenue. Traffic would likely divert to 1st Street, which is already congested in Little Tokyo. Although construction impacts are short-term and intermittent, they would result in disproportionate adverse impacts.

Parking

Construction of the Underground Emphasis LRT Alternative would result in temporary displacement of on-street parking. Construction could restrict access to parking lots like the one at the southeast corner of the intersection of Alameda and 1st Streets. Access to this parking lot would be further restricted once Alameda Street is closed for underpass construction. Restricting access to the parking lot and curb parking would have disproportionate adverse impacts to Little Tokyo and the Japanese American National Museum. Construction impacts are short-term and intermittent, but they would result in disproportionate adverse impacts.

Community and Neighborhoods/Community Facilities

Construction of the Underground Emphasis LRT Alternative would temporarily restrict access to the Japanese American National Museum. Loading spaces along Alameda Street would be temporarily displaced, and congestion would increase on 1st Street when 2nd Street is closed. School bus loading zones along 1st Street could be affected by construction-related traffic. While access to the museum would be maintained, access would be decreased during construction of the Alameda Street underpass and potential pedestrian bridge. Construction of the Underground Emphasis LRT Alternative would result in temporary closure of several streets near Little Tokyo. Though temporary, these closures could restrict access to businesses in Little Tokyo. Impacts to businesses would affect the entire community. In particular, construction of the Alameda Street underpass could result in disproportionate adverse impacts to Little Tokyo and the Japanese American National Museum. A closure of Alameda Street here could last from 24 to 36 months, and access to Little Tokyo from Alameda Street would be limited during this time. Alameda Street is one of the main arterials providing access to Little Tokyo. Construction impacts are short-term and intermittent, but they would result in disproportionate adverse impacts.

Visual Resources

Several large components of construction would occur near Little Tokyo including the Alameda Street underpass and potential pedestrian bridge. This construction could result in disproportionate adverse impacts to Little Tokyo and the Japanese American National Museum. Construction equipment and work areas in this area would be larger than most laydown areas in the alignment. Construction impacts are short-term and intermittent, but they would result in disproportionate adverse impacts.

Parklands and Other Community Facilities

During construction of the Underground Emphasis LRT Alternative, street closures could restrict access to facilities adjacent to construction sites, such as the Little Tokyo Branch Public Library and JANM, in addition to other facilities throughout the project area. Automobile and pedestrian detours would be needed. Annual festivals in the downtown area could also be temporarily affected. Emergency service response times could also be affected by the temporary street closures and detours. These construction activities would affect the entire proposed alignment. Cut-and-cover construction in the Financial District and Bunker Hill areas would require surface excavation along the entire LRT route. However, TBM construction would be used in Little Tokyo on 2nd Street, so access restrictions on 2nd Street would be limited to staging areas.

Construction of the proposed 2nd Street station -Los Angeles Street Option could impede access to the Little Tokyo Library Branch. Overall, access to the library branch would be maintained. Construction impacts are short-term and intermittent, but they would result in disproportionate adverse impacts.

Economic and Fiscal

Construction of the Underground Emphasis LRT Alternative would result in temporary closure of several streets in the project area. Construction of the Alameda Street underpass could result in disproportionate adverse impacts to Little Tokyo and the Japanese American National Museum. A closure of Alameda Street here could last from 24 to 36 months, and access to Little Tokyo from Alameda Street would be limited during this time. Alameda Street is one of the main arterials providing access to Little Tokyo. Construction impacts could adversely affect the economic viability of some businesses in Little Tokyo. Construction impacts are short-term and intermittent, but they would result in disproportionate adverse impacts.

Topics With No Disproportionate Construction Impacts

Adverse construction-related impacts from the Underground Emphasis LRT Alternative could occur with respect to geotechnical/ subsurface/ seismic/ hazardous materials; water quality; and archaeological and paleontological resources. Underground construction can encounter contaminated groundwater or affect archaeological, paleontological, and other geologic resources. Since the entire alignment would be underground, except for a short segment in Little Tokyo, no disproportionate construction impacts would occur.

Many construction-related effects would occur equally along the entire alignment and would not disproportionately impact Little Tokyo. These effects include transit service equity, air quality; noise and vibration; ecosystems and biological resources; energy; climate change; and safety and security. There would be no construction-related effects on historic buildings since design measures would be implemented to protect historic resources. Construction would require the use of some parcels in Little Tokyo, but these temporary uses would not be incompatible with surrounding land uses and the effects would not be disproportionate.

4.17.3.4.2 Operational Impacts

Traffic Congestion

Traffic at a few intersections would be adversely impacted by operations of the Underground Emphasis LRT Alternative. In the AM peak hours, two of the three intersections that would experience new traffic delays are located in the vicinity of Little Tokyo. In the PM peak hours, four of the seven intersections that would experience new traffic delays would be located in and around Little Tokyo. Traffic impacts are anticipated throughout the project area, but the majority would affect the Little Tokyo area. Therefore, disproportionate adverse impacts on environmental justice communities with respect to traffic congestion are anticipated.

Parking

The Underground Emphasis LRT Alternative would permanently remove 148 to 281 pay-to-park parking spaces, 17 on-street parking spaces, and three on-street loading spaces. Of these spaces, 139 (49 to 94 percent of the total parking loss) pay-to-park spaces, ten on-street parking spaces, and the three on-street loading spaces are located in Little Tokyo. Parking opportunities in Little Tokyo are already limited. The Little Tokyo community has expressed the importance of parking to their community. This alternative would partially offset the loss of parking due to increased transit use.

Removal of off-street parking spaces would indirectly impact businesses in Little Tokyo. Business revenue could decrease if vehicular access to businesses is reduced. New transit would provide increased pedestrian access to businesses and may offset some adverse impacts from decreased vehicular access.

Transit projects compensate for loss of parking because they reduce vehicle traffic and the demand for parking. This alternative would increase non-automobile, transit access to the project area. Therefore, this alternative would partially offset potential adverse impacts to parking. Still, disproportionate direct, indirect, and cumulative impacts to parking are expected.

Displacement and Relocation

The Underground Emphasis LRT Alternative would require seven partial takes, 12 full takes, 13 temporary construction easements, and 11 permanent underground easements. This alternative would require these properties for TPSS site locations, construction staging, right-of-way, below grade tunneling, and stations. In Little Tokyo, seven full takes would be required. Takes of these properties would displace three businesses and approximately 90 jobs. This is a greater impact due to displacement than would be experienced in the rest of the project area. Thus, there would be a disproportionate adverse impact associated with displacement.

Displacement of businesses and loss of the commercial space in Little Tokyo would have indirect, disproportionate, adverse impacts to the community. Little Tokyo is a redevelopment area. The CRA/LA focuses on redevelopment of commercial areas for economic development. The reduction in physical commercial space could reduce the availability of redevelopment area. Therefore, potential for increased economic development in a primarily low-income community could be reduced. However, this effect could be offset by future growth encouraged by the new light rail service.

Community and Neighborhoods

Construction of the Underground Emphasis LRT Alternative would displace approximately 13 businesses. Approximately 130 jobs would be displaced, of which about 70 percent would be in Little Tokyo (approximately 90 jobs). Given that Little Tokyo is fully developed, the jobs would have to be relocated in another community. Thus, Little Tokyo would necessarily lose jobs and businesses. Displacement of properties would reduce the stock of commercial space in Little Tokyo. However, transit-oriented development could occur on properties where businesses were displaced. This development could generate additional commercial space and jobs.

The loss of parking under this alternative could result in indirect disproportionate effects by decreasing business viability. The Little Tokyo community has expressed concern that a loss of parking could hurt businesses crucial to the area's cultural identity. The Underground Emphasis LRT Alternative could partially offset losses in parking by increasing transit access. However, local businesses that rely on paid parking lots and on-street parking could be adversely impacted. Indirect, disproportionate, adverse impacts to minority communities are anticipated.

The Alameda Street underpass at 1st Street would provide enough frontage road to continue to permit deliveries to JANM along Alameda Street. Bus loading areas on Alameda Street in front of the museum would be removed. Other bus loading spaces would be available adjacent to the museum on 1st Street. Additional bus loading spaces could be created.

Approximately 12 new construction projects are anticipated in the project area by 2014. Fifty-four new construction projects are planned between 2014 and 2019. Twelve major renovation projects are anticipated by 2014, and eight are anticipated between 2014 and 2019. Several of these projects would occur in Little Tokyo or its close vicinity and would remove public paid-parking lots. As such, parking loss that would occur under the Underground Emphasis LRT Alternative would contribute cumulatively to parking loss in Little Tokyo. Loss of parking is anticipated to have cumulative, disproportionate, adverse impacts.

The Little Tokyo community has also indicated that 1st and Alameda is a key intersection in the neighborhood, and that the proposed underpass and at-grade junction could affect community cohesion. Also, the permanent conversion of the commercial block bounded by 1st Street, Central Avenue, 2nd Street, and Alameda Street could pose a permanent community impact. These impacts would be disproportionate and adverse.

Visual and Aesthetic Resources

The majority of the Underground Emphasis LRT Alternative alignment would run below ground. This would minimize impacts to visual resources. Surface elements of the alignment would include station entrances, portals, and potential pedestrian bridges. A portal and potential pedestrian bridge would be located in Little Tokyo. Portal construction in Little Tokyo would remove the majority of structures in the block bounded by Alameda Street, 1st Street, 2nd Street, and Central Avenue. Depending on its final design, the pedestrian bridge could adversely impact the aesthetic character of the area. Disproportionate, adverse impacts to visual resources are anticipated.

Noise and Vibration

The operation of the Underground Emphasis LRT Alternative would have moderate noise impacts on one sensitive receptor, Savoy, which is a condominium complex in Little Tokyo. This would result in a disproportionate adverse operational noise impact.

No direct, indirect, or cumulative disproportionate adverse impacts associated with operational vibration are anticipated.

Safety and Security

The Underground Emphasis LRT Alternative could result in adverse impacts to pedestrian safety and security. A conflict could exist between pedestrians or vehicles and trains. The at-grade portion of the alignment under this alternative would run through Little Tokyo. A portal would be constructed adjacent to residences, museums, and commercial uses with high pedestrian and vehicle traffic. Residents around the portal would see increased pedestrian and vehicle activity around the egress/ingress area of the proposed alignment.

Underground stations could raise security concerns, particularly at night. These safety and security issues are applicable to light rail in general. They exist regardless of the socioeconomic or ethnic status of the surrounding community.

In the Little Tokyo area, Metro would potentially build a pedestrian bridge, across Alameda Street, near the Little Tokyo/Arts District Station. This bridge would separate pedestrian movements from LRT and motorized vehicle movements. If the community opts against construction of the pedestrian bridge, Metro would use other urban design methods to enhance pedestrian safety. This would include creating pedestrian queuing and refuge areas around proposed stations. Adding wide crosswalks would also enhance pedestrian mobility and safety. No disproportionate safety and security impacts are expected.

Topics With No Disproportionate Operational Impacts

Operation of the Underground Emphasis LRT Alternative within the Little Tokyo area would not result in impacts with respect to land use; water quality; ecosystems and biological resources; geotechnical/ subsurface/ seismic/ hazardous materials; parklands and other community facilities; and historic, archaeological, or paleontological resources. Underground alignments may be subject to intrusion of subsurface gases or contaminated groundwater, but mitigation measures have been developed to address these impacts. In addition, these potential impacts would occur throughout the entire alignment and would not occur disproportionately in the Little Tokyo area.

The Underground Emphasis LRT Alternative could have beneficial effects with respect to transit service equity and economic vitality and employment opportunities. The Alternative would increase transit mobility throughout the region by reducing the number of transfers on the rail system and introducing new stations in the downtown area. A potential new station at 2nd/Los Angeles Streets would benefit businesses in Little Tokyo. Another option would be to place the station at 2nd/Broadway instead, which is two blocks farther from Little Tokyo. The Underground Emphasis LRT Alternative would improve transit service in Little Tokyo and increase this area's connectivity to the region. This alternative would have direct, beneficial impacts to transit equity.

Businesses on the block bounded by Central Avenue, 1st Street, 2nd Street, and Alameda Street would be removed, though the ones directly facing Central Avenue (with the possible exception of Starbucks and Café Cuba) may be able to remain. This would reduce the amount of commercial space and jobs in Little Tokyo. Little Tokyo is fully developed, and it is unlikely that all of the displaced businesses would relocate to another location in Little Tokyo. However, Little Tokyo is a redevelopment area. As such, there are economic incentives for commercial redevelopment. No direct, indirect, or cumulative disproportionate, adverse impacts to economic vitality or employment opportunities are expected.

The Underground Emphasis LRT Alternative could also have beneficial effects with respect to; air quality, energy, and climate change. The increase in transit would reduce VMT providing beneficial effects on air quality and energy consumption. The Underground Emphasis LRT Alternative would be consistent with SB 375 because it would increase regional transit capacity and decrease emissions from passenger vehicles.

The topics mentioned in this section would either affect the project area equally or would have no adverse effects, therefore, there would not be disproportionate impacts on minority communities. As such, the Underground Emphasis LRT Alternative would not have direct, indirect, or cumulative disproportionate adverse impacts with respect to these topics.

4.17.3.4.3 NEPA Finding

The following adverse impacts of the Underground Emphasis LRT Alternative could weigh disproportionately on relevant communities under this alternative:

- Parking loss and permanently increased traffic congestion in Little Tokyo
- Decreased access to public facilities during operations
- Construction-related, decreased traffic circulation, parking, access to community facilities, and changed visual resources
- Community cohesion impacts of the proposed underpass and at-grade junction at 1st and Alameda Streets, and the permanent conversion of the block bounded by 1st Street, Central Avenue, 2nd Street, and Alameda Street to transit facility use
- Visual and aesthetic impacts of the potential pedestrian overpass at 1st and Alameda Streets, which may be perceived as adverse depending upon design
- Construction-related, decreased economic and fiscal viability
- Displacement of businesses in Little Tokyo
- Operational noise at the Savoy residential building in Little Tokyo

Disproportionate adverse impacts would not remain after mitigation, except:

- Visual and aesthetic impacts of the potential pedestrian overpass at 1st and Alameda Streets, which may be perceived as adverse depending upon design
- Traffic circulation impacts near 1st and Alameda Streets
- Community cohesion impacts of the proposed underpass and at-grade junction at 1st and Alameda Streets, and the permanent conversion of the block bounded by 1st Street, Central Avenue, 2nd Street, and Alameda Street to transit facility use.

4.17.3.4.9 CEQA Determination

CEQA does not have thresholds of significance specific to environmental justice.

4.17.3.5 Fully Underground LRT Alternative

The Fully Underground LRT Alternative would connect 7th Street/Metro Center Station and the Metro Gold Line with a new light rail connection that would be entirely underground. The alignment would follow Flower and 2nd Streets, and rise to connect to the existing Metro Gold Line tracks in the vicinity of 1st and Alameda Streets. This alternative would not reduce existing bus service in the project area.

The Fully Underground LRT Alternative was developed in collaboration with the Little Tokyo community to address concerns related to the other build alternatives. It became feasible after successful collaboration with the developers of the proposed Nikkei Center project and the Los Angeles Hompa Hongwanji Temple.

Based on feedback from the community during and after scoping Metro was concerned about the potential environmental justice issues identified by the Little Tokyo community. A special working group (Little Tokyo Working Group) was convened to work with Metro to address community concerns. Additionally, at the community's request, Metro provided funding for a consultant to assist the community in understanding and interpreting the environmental analysis in order to develop effective mitigation that would be meaningful to the community. The Little Tokyo community supports the Fully Underground Alternative that emerged from this intensive outreach. Appendix EE includes a letter expressing support for this alternative. Included in Section 4.17.5 are some of the potential mitigations suggested by the LTWG.

Specific community concerns about the Underground Emphasis LRT Alternative included the addition of large at-grade and above-ground infrastructure (the underpass, rail junction, and pedestrian bridge) at the intersection at 1st and Alameda Streets, and the potential for this structure to divide the community. The Fully Underground LRT Alternative addresses this concern by moving the junction underground and leaving the intersection of 1st and Alameda Streets in its present configuration.

The community also expressed concern over the Underground Emphasis LRT Alternative's permanent conversion of the block bounded by 2nd Street, Central Avenue, 1st Street, and Alameda Street to transit infrastructure use (a portal). The Fully Underground LRT Alternative addresses this concern by placing a station on the block instead of a portal, and future development above the station would be possible. The portal structures would instead be built on the east side of Alameda Street.

The Fully Underground LRT Alternative would have fewer potential disproportionate impacts than the other build alternatives for both construction and operation. Parking impacts (Section 4.17.3.4.1) during construction would be the same as described for the Underground Emphasis LRT Alternative. However, during operation, there would be no disproportionate impacts related to parking on the Little Tokyo community.

Table 4.17-1 shows the disproportionate construction and operational impacts anticipated under the Fully Underground LRT Alternative . This Alternative would have disproportionate effects with respect to several impact categories. However, mitigation would offset these effects.

4.17.3.5.1 Construction Impacts

From an environmental justice standpoint, the greatest impacts would occur during construction. Potentially disproportionate adverse construction impacts of the Fully Underground LRT Alternative would be identical to those of the Underground Emphasis LRT Alternative, except as described below.

Traffic Circulation

Construction of the Fully Underground LRT Alternative would result in temporary closure of several streets in the project area. In particular, construction of the underground junction beneath 1st and Alameda Streets could result in disproportionate adverse impacts to Little Tokyo and the Japanese American National Museum. In addition, 2nd Street would be temporarily closed between Alameda Street and Central Avenue. Traffic would likely divert to 1st Street, which is already congested in Little Tokyo. Unlike the Underground Emphasis LRT Alternative, the Fully Underground LRT Alternative would not require long-term continuous closure of the 1st and Alameda intersection, since the excavation at this area could be conducted using the cut-and-cover method. Although construction impacts are short-term and intermittent, they would result in disproportionate adverse impacts.

Parking

Construction of the Fully Underground LRT Alternative would temporarily displace on-street parking and could restrict access to parking lots. Access to the parking lot at the southeast corner of the intersection of 1st Street and Central Avenue could be particularly restricted. The construction-related parking restrictions under the Fully Underground LRT Alternative would be less severe than under the Underground Emphasis LRT Alternative in the vicinity of 1st and Alameda Streets. Restricting access to the parking lot and curb parking would have disproportionate adverse impacts to Little Tokyo and the Japanese American National Museum. Construction impacts are short-term and intermittent, but they would result in disproportionate, potentially adverse impacts. These impacts could be addressed with mitigation.

Community and Neighborhoods

Construction of the Fully Underground LRT Alternative would temporarily restrict access to the Japanese American National Museum. Access to the museum would be decreased during construction of the underground junction beneath 1st and Alameda Streets. Closures in the vicinity of 1st and Alameda Streets would be more intermittent than they would be for the Underground Emphasis LRT Alternative. Loading spaces along Alameda Street would be temporarily displaced, and congestion would increase on 1st Street when 2nd Street is closed. School bus loading zones along 1st Street could be affected by construction-related traffic. Overall, access to the museum building would be maintained.

Construction of the Fully Underground LRT Alternative would result in temporary closure of several streets near Little Tokyo. Though temporary, these closures could restrict access to businesses in Little Tokyo. Impacts to businesses would affect the entire community.

Construction of the Fully Underground LRT Alternative would temporarily restrict access to the Los Angeles Hompa Hongwanji Temple. Specifically, access to the building would be restricted intermittently on 1st Street. However, building access on Vignes Street would be maintained. Construction impacts are short-term and intermittent, but they would result in disproportionate adverse impacts to community facilities. Mitigation would help address these impacts.

Visual Resources

Several large components of construction would occur near Little Tokyo including the underground junction beneath 1st and Alameda Streets and the two portals. This construction could result in disproportionate adverse impacts to Little Tokyo and the Japanese American National Museum. Construction equipment and work areas in this area would be larger than most laydown areas elsewhere along the alignment. Construction impacts are short-term and intermittent, but they would result in disproportionate adverse impacts.

Parklands and Other Community Facilities

During construction of the Underground Emphasis LRT Alternative, street closures could restrict access to facilities adjacent to construction sites, such as JANM, in addition to other facilities throughout the project area. Automobile and pedestrian detours would be needed. Annual festivals in the downtown area could also be temporarily affected. Emergency service response times could also be affected by the temporary street closures and detours. These construction activities would affect the entire proposed alignment. Cut-and-cover construction in the Financial District and Bunker Hill areas would require surface excavation along the entire LRT route. However, TBM construction would be used in Little Tokyo on 2nd Street, so access restrictions on 2nd Street would be limited to staging areas.

Unlike the Underground Emphasis LRT Alternative, no cut-and-cover construction would be needed at 2nd and Los Angeles Streets, so access to the Little Tokyo Branch Public Library would be largely unaltered during construction. Still, disproportionate impacts would occur during construction.

Economic and Fiscal

Construction of the Fully Underground LRT Alternative would result in temporary closure of several streets in the project area. Unlike the Underground Emphasis LRT Alternative, long-term closure of the intersection of 1st and Alameda Streets would not be needed, and fewer adverse effects on the economic viability of businesses in Little Tokyo would occur. Construction at 1st and Alameda Streets would be performed using the cut-and-cover method, which would also be used in the Financial District and Bunker Hill areas. As such, economic and fiscal construction impacts would not affect Little Tokyo disproportionately.

4.17.3.5.2 Operational Impacts

Potentially disproportionate adverse operational impacts of the Fully Underground LRT Alternative would be identical to those of the Underground Emphasis LRT Alternative, except as described below. The following subsections describe the potential direct, indirect, and cumulative operational impacts of the Fully Underground LRT Alternative.

Traffic Congestion

Under the Fully Underground LRT Alternative, the intersection of Alameda and 1st Streets would remain unchanged. The proposed alignment would be separated from automobile and pedestrian traffic. Trains would not have to cross 1st Street when travelling to or from the Little Tokyo/Arts District Station. The traffic signal cycle at this intersection would be improved.

Under this alternative, traffic congestion would be reduced in Little Tokyo. Reduced congestion would benefit elderly and transit-dependent populations. Beneficial impacts to traffic congestion are anticipated in Little Tokyo and the project area.

Parking

The Fully Underground LRT Alternative would permanently remove 148 to 281 pay-to-park parking spaces and 13 on-street parking spaces. Of these spaces, up to 139 pay-to-park spaces and no on-street parking spaces are located in Little Tokyo. Parking opportunities in Little Tokyo are already limited. The Little Tokyo community has expressed the importance of parking to their community. This alternative would partially offset the loss of parking due to increased transit use. Overall, less parking would be removed in Little Tokyo for the Fully Underground LRT Alternative than for the Underground Emphasis LRT Alternative.

Removal of off-street parking spaces would indirectly impact businesses in Little Tokyo. Business revenue could decrease if vehicular access to businesses is reduced. New transit would provide increased pedestrian access to businesses and may offset some adverse impacts from decreased vehicular access. This alternative would increase non-automobile, transit access to the project area. Therefore, this alternative would partially offset potential adverse impacts to parking. Still, disproportionate direct, indirect, and cumulative impacts to parking are expected.

Displacement and Relocation

The Fully Underground LRT Alternative would require seven partial takes, 16 full takes, six temporary construction easements, and five permanent underground easements. This alternative would require these properties for TPSS site locations, construction staging, right-of-way, below grade tunneling, and stations. In Little Tokyo, 11 full takes would be required. This is a greater impact due to displacement than would be experienced in the rest of the project area. Thus, there would be a disproportionate adverse impact associated with displacement.

Displacement of businesses and loss of the commercial space in Little Tokyo would have indirect, disproportionate, adverse impacts to the community. Little Tokyo is a redevelopment area. The CRA/LA focuses on redevelopment of commercial areas for economic development. The reduction in physical commercial space could reduce the availability of redevelopment area. Therefore, potential for increased economic development in a primarily low-income community could be reduced. However, this effect could be offset by future growth encouraged by the new light rail service.

Community and Neighborhoods

Construction of the Fully Underground LRT Alternative would displace approximately 13 businesses. Approximately 130 jobs would be displaced of which about 70 percent would be lost in Little Tokyo (approximately 90 jobs). Given that Little Tokyo is fully developed, the jobs would have to be relocated in another community. Thus, Little Tokyo would necessarily lose jobs and businesses. Displacement of properties would reduce the stock of commercial space in Little Tokyo. However, transit-oriented development could occur on properties where businesses were displaced. This development could generate additional commercial space and jobs.

The loss of parking under this alternative could result in indirect disproportionate effects by decreasing business viability. The Little Tokyo community has expressed concern that a loss of parking could hurt businesses crucial to the area's cultural identity. The Fully Underground LRT Alternative could partially offset losses in parking by increasing transit access. However, local businesses that rely on paid parking lots and on-street parking could be adversely impacted. Indirect, disproportionate, adverse impacts to minority communities are anticipated.

Approximately 12 new construction projects are anticipated in the project area by 2014. Fifty-four new construction projects are planned between 2014 and 2019. Twelve major renovation projects are anticipated by 2014, and eight are anticipated between 2014 and 2019. Several of these projects would occur in Little Tokyo or its close vicinity and would involve the removal of public paid-parking lots. As such, parking loss that would occur under the Fully Underground LRT Alternative would contribute cumulatively to parking loss in Little Tokyo. Loss of parking is anticipated to have cumulative, disproportionate, adverse impacts.

The Little Tokyo community has also indicated that 1st and Alameda is a key intersection in the neighborhood, and expressed concern that the proposed underpass and at-grade junction for the Underground Emphasis LRT Alternative could affect community cohesion. Also, the permanent conversion of the commercial block bounded by 1st Street, Central Avenue, 2nd Street, and Alameda Street could pose a permanent community impact. The Fully Underground LRT Alternative addressed these concerns by eliminating the proposed underpass and at-grade junction, and replacing the portal on the commercial block with an underground station that would allow a future development to be built on top.

Visual and Aesthetic Resources

The Fully Underground LRT Alternative would entirely underground. Unlike the other build alternatives, no underpass or Alameda Street pedestrian bridge would be constructed; both of which were identified by the community as visually intrusive. However, the majority of the structures on the block bounded by Alameda Street, 1st Street, 2nd Street, and Central Avenue would be demolished. This would impact the visual character of Little Tokyo. Therefore, direct and indirect, disproportionate, adverse impacts to visual resources are anticipated.

The Fully Underground LRT Alternative's 2nd/Central Avenue Station would include a ventilation shaft on the southwest corner of 1st and Alameda Streets that may extend up to one story above street level. This would not affect views of any historic buildings, and would not pose an adverse impact. Urban design measures would incorporate the ventilation structure into the existing street environment in a compatible way. No other ventilation shafts proposed for any of the build alternative would extend above street level.

Air Quality

As with the other build alternatives, the Fully Underground LRT Alternative would reduce regional VMT and result in a beneficial effect to air quality. This alternative would result in the largest reduction in VMT and the greatest benefit to air quality of any of the alternatives. No direct, indirect, or cumulative disproportionate impacts with respect to air quality are anticipated.

Noise and Vibration

Unlike the other build alternatives, operation of the Fully Underground LRT Alternative would not have noise or vibration impacts on any sensitive receptors in the project area, including Little Tokyo. Therefore, no direct, indirect, or cumulative disproportionate, adverse impacts from operational noise or vibration are anticipated.

Geotechnical/Subsurface/Seismic/Hazardous Materials

As with other build alternatives, this alternative involves the potential for intrusion of subsurface gases in the underground portions of the alignment. Mitigation measures have been developed to address these impacts. The entire proposed Fully Underground LRT Alternative alignment would be underground, so the potential for this impact would be distributed evenly throughout the project area. No direct, indirect, or cumulative disproportionate adverse impacts associated with geotechnical/ subsurface/ seismic/ hazardous materials are anticipated.

Water Quality

As with the other build alternatives, the Fully Underground LRT Alternative would not result in additional water runoff that could impact water quality in the project area. No direct, indirect, or cumulative disproportionate adverse impacts to water quality are anticipated.

Energy

As with the other build alternatives, the Fully Underground LRT Alternative would reduce regional VMT and result in a beneficial impact to the project area. New rail operations would increase energy consumption in the LADWP service area by less than one percent. Therefore, beneficial impacts to energy consumption are anticipated.

Climate Change

Under the Fully Underground LRT Alternative, GHG emissions in 2035 would decrease compared to the No Build Alternative and increase compared to existing 2009 emissions due to regional growth between 2009 and 2035 unrelated to the project. These effects would occur on a regional scale and would not disproportionately affect Little Tokyo. Also the Fully Underground LRT Alternative would be consistent with SB 375 by increasing regional transportation capacity and decreasing emissions from passenger vehicles. No direct, indirect, or cumulative disproportionate adverse impacts associated with climate change are anticipated.

Historic, Archaeological, and Paleontological Resources

The Fully Underground LRT Alternative would not adversely impact historic, archaeological, or paleontological resources. No direct, indirect, or cumulative disproportionate, adverse impacts to historic, archaeological or paleontological resources are anticipated.

Parklands or Other Community Facilities

The Fully Underground LRT Alternative would not displace or degrade the quality of parkland or recreational facilities. The Alternative would not impede access to any community facility. Therefore, no direct, indirect, or cumulative disproportionate, adverse impacts to parklands or other community facilities are anticipated.

Economic and Fiscal

The Fully Underground LRT Alternative would enhance transportation access to Little Tokyo with a new underground station at 2nd/Central Avenue. The existing Little Tokyo/Arts District Station would be removed from service once the Regional Connector opens. However, the new 2nd/Central Avenue station would have more frequent direct trains to more destinations throughout Los Angeles County. This represents improved transportation benefits for Little Tokyo, which could bring more business to the community. Businesses on the block bounded by Central Avenue, 1st Street, 2nd Street, and Alameda Street would be removed. This would reduce the amount of commercial space and jobs in Little Tokyo. Little Tokyo is fully developed, and it is unlikely that all of the displaced businesses would relocate to another location in Little Tokyo. However, Little Tokyo is a redevelopment zone, and the additional transit infrastructure would encourage economic growth in the area. Altogether, no disproportionate adverse impacts are expected.

Safety and Security

The Fully Underground LRT Alternative would run entirely underground, unlike the other build alternatives. There would be no grade crossings, so the potential for conflict between pedestrians or vehicles and trains would be low. Underground stations could raise security concerns, particularly at night. These safety and security issues are applicable to light rail in general. They exist regardless of the socioeconomic or ethnic status of the surrounding community. No disproportionate direct, indirect, or cumulative adverse impacts to safety and security are anticipated.

4.17.3.5.1 NEPA Finding

The following adverse impacts of the Fully Underground LRT Alternative could weigh disproportionately on relevant communities under this alternative:

- Construction-related parking loss in Little Tokyo
- Displacement of businesses in Little Tokyo
- Decreased community cohesion in Little Tokyo due to loss of commercial space
- Construction-related traffic congestion, decreased parking and access to community facilities
- Visual changes in the community due to the removal of structures from the block bounded by 1st Street, Alameda Street, 2nd Street, and Central Avenue

No disproportionate impacts would remain after mitigation.

4.17.3.5.2 CEQA Determination

CEQA does not have thresholds of significance specific to environmental justice.

4.17.4 Mitigation Measures

4.17.4.1 No Build Alternative

Mitigation measures do not exist that would minimize disproportionate impacts to transit equity for minority and low-income communities under the No Build Alternative, apart from construction of one of the proposed build alternatives. Other disproportionate, adverse impacts to minorities and low-income communities are not anticipated under the No Build Alternative.

4.17.4.2 TSM Alternative

4.17.4.2.1 Transit Service Equity

Mitigation measures do not exist that would minimize disproportionate impacts to transit equity for minority and low-income communities under the TSM Alternative, apart from construction of one of the proposed build alternatives.

4.17.4.2.2 Parking

Prior to construction, Metro would conduct a parking needs assessment in Little Tokyo. This assessment would gauge the supply of and demand for business and residential parking in Little Tokyo. If demand exceeds supply, Metro would provide replacement parking for spaces lost as a result of the project. Metro would consider replacing lost parking spots for the duration of construction and operation of the project.

If parking supply exceeds demand, Metro would work with Little Tokyo and surrounding communities to show visitors and residents where parking is available. This effort could include adding signage. After implementation of these mitigation measures, impacts to parking would not be disproportionately adverse.

4.17.4.3 At-Grade Emphasis LRT Alternative

4.17.4.3.1 Construction Impacts

Traffic Circulation

Access to bus stops would be maintained, and signage would indicate changes in access where necessary. Where bus stops would be closed, bus routes would be altered accordingly, and signage would indicate these changes. Metro would work with the community to create signage showing detour routes. This would help drivers and pedestrians maintain access to Little Tokyo businesses. After implementation of these mitigation measures, construction impacts would not be disproportionately adverse.

Parking

Parking spaces temporarily displaced by construction would be either temporarily replaced nearby in the Nikkei Center lot or signage would be created indicating locations of nearby parking structures and parking lots. Access to the Little Tokyo Library Branch and the Japanese American National Museum, would be maintained during construction of the At-Grade

Emphasis LRT Alternative. After mitigation, parking impacts during construction would not be disproportionate.

Community and Neighborhoods

Mitigation measures for community and neighborhood impacts during construction would include:

- Road and sidewalk detours around construction areas
- Maintenance of alternate access to community facilities
- Community outreach and early notification regarding street and sidewalk closures and detours
- Scheduling of construction truck trips at times when least disruptive to the community when possible
- Provision of crossing guards at construction sites
- Provision of barriers and security personnel at construction sites
- Assistance for businesses to maintain visibility during construction

These mitigation measures would offset any disproportionate community and neighborhood impacts to Little Tokyo during construction.

Visual Resources

Metro may build a pedestrian bridge under this alternative. Construction of the pedestrian bridge would be done in a way that is minimally obtrusive. However, construction of a bridge structure would be a unique visual disruption in Little Tokyo. Thus, temporary visual impacts from bridge construction may be significant and unavoidable. Having larger construction staging areas in Little Tokyo than in other parts of the project area may also be unavoidable, given the complexity of the LRT infrastructure to be built in Little Tokyo.

Parklands and Other Community Facilities

Construction of parts of the new alignment would remove uncontrolled mid-block left turns. Metro would maintain adequate access to businesses and community facilities near the alignment. Metro would coordinate with LADOT to create signage that would indicate new ways to access businesses affected by construction. After implementation of these mitigation measures, direct impacts on access to community facilities would not be disproportionately adverse.

Economic and Fiscal

Mitigation measures for economic and fiscal impacts would include compensation to owners for property acquisitions consistent with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 or the California Relocation Act, measures to assist business owners significantly impacted by construction (temporary parking, marketing programs, and other measures as appropriate), and replacement parking locations. No disproportionate economic and fiscal impacts may remain after mitigation.

4.17.4.3.2 Operational Impacts

Parking and Community and Neighborhoods

Prior to construction, Metro would conduct a parking needs assessment in Little Tokyo. This assessment would gauge the supply of and demand for business and residential parking in Little Tokyo. If demand exceeds supply, Metro would provide replacement parking for spaces lost as a result of the project. Metro would consider replacing lost parking spots for the duration of construction and operation of the project.

If parking supply exceeds demand, Metro would work with Little Tokyo and surrounding communities to show visitors and residents where parking is available. This effort could include adding signage. After implementation of these mitigation measures, impacts to parking would not be disproportionately adverse.

Visual and Aesthetic Impacts

Metro could build a pedestrian bridge under this alternative. The pedestrian bridge would be constructed to be minimally obtrusive. However, a bridge structure would be a unique visual element in Little Tokyo. Thus, visual impacts from the bridge may be significant and unavoidable.

Parklands and Other Community Facilities

Metro would coordinate with LADOT to create signage that would indicate new ways to access businesses affected by new turning restrictions necessitated by the At-Grade Emphasis LRT Alternative. After implementation of these mitigation measures, direct impacts on access to community facilities would not be disproportionately adverse.

4.17.4.4 Underground Emphasis LRT Alternative

4.17.4.4.1 Construction Impacts

The same mitigation identified for construction impacts under the At-Grade Emphasis LRT Alternative in Section 4.17.4.3.1 would also apply to the Underground Emphasis LRT Alternative. After implementation of these mitigation measures, construction impacts would not be disproportionately adverse.

4.17.4.4.2 Operational Impacts

Traffic Congestion

Mitigation measures would address potential impacts to intersection operations during the operation of this alternative, as shown in the Transportation Chapter (Chapter 3.0). After mitigation measures are implemented, impacts to traffic congestion would remain at intersections in Little Tokyo. These disproportionate, adverse impacts would be significant and unavoidable.

Parking

The same mitigation identified for parking impacts under the At-Grade Emphasis LRT Alternative in Section 4.17.4.3.2 would also apply to the Underground Emphasis LRT Alternative. After implementation of these mitigation measures, impacts to parking would not be disproportionately adverse.

Displacement and Relocation

Some acquisitions and relocations would be unavoidable with this alternative. Metro would comply with the Uniform Relocation Assistance and Real Property Acquisition Regulations for Federal and Federally Assisted Programs adopted by the USDOT. All real property acquired by Metro would be appraised to determine its fair market value. Metro would provide affected property holders just compensation not less than the approved appraisal value. Metro would give advanced notice to each displaced renter, business, or nonprofit organization. This notice would provide information about eligibility for aid and assistance. After mitigation, no disproportionate adverse impacts would remain.

Community and Neighborhoods

Regarding parking loss, refer to mitigation measures identified for the At-Grade Emphasis LRT Alternative in Section 4.17.4.3.2. After implementation of these mitigation measures, impacts to parking loss in Little Tokyo would not be disproportionately adverse.

This alternative could result in long-term displacement of commercial space. Displaced commercial space in Little Tokyo could be replaced with high quality commercial development opportunities consistent with Little Tokyo's community identity. This could include a development above the portal near 2nd Street and Central Avenue, or a possible future development at the Nikkei Center. New development would create at least as many jobs as had been displaced. After implementation of this mitigation measure, indirect impacts associated with loss of commercial space in Little Tokyo would not be disproportionately adverse. The Alameda Street undercrossing and associated frontage roads would provide space for delivery activities at the JANM during operation of this alternative.

Full mitigation of the community cohesion impacts of the proposed underpass and at-grade rail junction would not be possible. The new light rail service may encourage new growth that would offset the permanent conversion of the block bounded by 1st Street, Central Avenue, 2nd Street, and Alameda Street to transit facility use, but it would not necessarily occur at this central location. Disproportionate impacts would remain after mitigation.

Visual Resources

To minimize impacts associated with visual resources in Little Tokyo, Metro would design a portal trench. The portal trench would minimize the amount of track and tunnel visible to pedestrians, residences across Alameda Street and Central Avenue, and visitors to the Japanese American National Museum.

Metro could build a pedestrian bridge under this alternative. The pedestrian bridge would be constructed to be minimally obtrusive. However, a bridge structure would be a unique visual element in Little Tokyo. Thus, visual impacts from the bridge may be significant and unavoidable.

The Little Tokyo community is a redevelopment area. Metro would work with the CRA/LA to create joint development opportunities for the block bounded by Alameda Street, 1st Street, 2nd Street, and Central Avenue. This would offset the visual impact of the structures on this block being removed, and result in no disproportionate impacts remaining after mitigation.

Noise and Vibration

Under this alternative, a moderate noise impact from operation was predicted at the Savoy Condominiums on Alameda and 1st Streets. The noise impact would be due to track switches near the intersection of 1st and Alameda Streets. However, a spring-rail or movable frog switch could be used at this location to reduce potential noise by covering the gap in the central part of the switch. This measure would reduce switch noise to a FTA criteria level of no impact, eliminating the disproportionate noise impact in Little Tokyo.

4.17.4.5 Fully Underground LRT Alternative

4.17.4.5.1 Construction Impacts

The same construction mitigation measures for traffic congestion, parking, community and neighborhoods, visual resources, and parklands and other community facilities identified for the At-Grade Emphasis LRT Alternative in Section 4.17.4.3.1 would apply to the Fully Underground LRT Alternative. Since the Fully Underground LRT Alternative would have no disproportionate economic and fiscal impacts during construction, the economic and fiscal mitigation measures in Section 4.17.4.3.1 would not be needed.

4.17.4.5.2 Operational Impacts

Parking

The same mitigation identified for parking impacts under the At-Grade Emphasis LRT Alternative in Section 4.17.4.3.2 would also apply to the Fully Underground LRT Alternative. After implementation of these mitigation measures, impacts to parking would not be disproportionately adverse.

Displacement and Relocation

The same operational displacement and relocation mitigation measures identified for the Underground Emphasis LRT Alternative in Section 4.17.4.4.2 would apply to the Fully Underground LRT Alternative. After implementation of these mitigation measures, no disproportionate operational impacts would remain.

Community and Neighborhoods

Regarding parking loss, refer to mitigation measures identified for the At-Grade Emphasis LRT Alternative in Section 4.17.4.3.2. After implementation of these mitigation measures, impacts to parking loss in Little Tokyo would not be disproportionately adverse.

This alternative could result in long-term displacement of commercial space. Displaced commercial space in Little Tokyo could be replaced with high quality commercial development opportunities consistent with Little Tokyo's community identity. This could include a development above the portal near 2nd Street and Central Avenue, or a possible future development at the Nikkei Center. New development would create at least as many jobs as had been displaced. After implementation of this mitigation measure, indirect impacts associated with loss of commercial space in Little Tokyo would not be disproportionately adverse. The Alameda Street undercrossing and associated frontage roads would provide space for delivery activities at the JANM during operation of this alternative.

Visual Resources

The Little Tokyo community is a redevelopment area. Metro would work with the CRA/LA to create joint development opportunities for the block bounded by Alameda Street, 1st Street, 2nd Street, and Central Avenue. This would offset the visual impact of the structures on this block being removed, and result in no disproportionate impacts remaining after mitigation.

4.17.5 Mitigation Measures Suggested by the Little Tokyo Working Group

In response to the significant concerns of the Little Tokyo community about potential effects of Regional Connector project construction, Metro assisted in forming a community working group to address these concerns by developing mitigation measures that would be meaningful to the Little Tokyo community. Assisted by a consultant funded through Metro, the LTWG developed the following list of potential candidate mitigations for the Fully Underground LRT Alternative for inclusion in this DEIS/DEIR.

It is important to note that Metro and FTA have not evaluated or accepted these mitigations developed by the LTWG. During preparation of the Final EIS/EIR all potential mitigation measures will be evaluated to determine efficacy, cost, community acceptance, and relevance to specific impacts. Metro will be working closely with the LTWG and all affected components of the community to develop an effective mitigation program acceptable to the community, Metro, and FTA.

These LTWG proposed mitigations are included in this Draft EIS/EIR to foster public discussion as part of the process of determining the ultimate mitigation program. Metro will continue to work with the LTWG and the entire community to confirm and develop specific mitigations during preparation of the Final EIS/EIR. Additional discussion of the LTWG may be found in Chapter 7.0, Public and Agency Outreach.

Key recommendations as proposed by the LTWG include:

- Initiate tunnel boring activities from 2nd and Flower/Hope to reduce impacts on small businesses, residents, and cultural institutions in Little Tokyo.

- Expand the safety net for Little Tokyo businesses that will be affected during construction by having Metro provide additional financial and other resources to the community and/or businesses to provide more targeted marketing.

- Provide the Little Tokyo community with a substantial role in the decision-making on redevelopment of the Office Depot block.

- Incorporate the formal involvement for the Little Tokyo community in the on-going monitoring of mitigations through the Mitigation Monitoring Plan.

Parklands and Other Community Facilities:

- The loss of three bus loading zones on Alameda for JANM should be mitigated with identification of nearby loading spaces.

- The loss of off-street parking used for JANM and MOCA should be mitigated with nearby parking spaces.

Economic and Fiscal Impacts:

- Any unmet demand for parking spaces eliminated from the Office Depot block shall be replaced with spaces within one block of the land uses that rely on those spaces, or through a combination of the following strategies:

  - Implement a universal valet program sponsored by Metro
  - Metro works with City of Los Angeles to reduce impact of government vehicles parking on 2nd Street
  - Create diagonal parking on Central Avenue between 1st and 3rd Street
  - Using Mangrove property for temporary parking during construction
  - Support legislation to curb non-legitimate use of disabled parking spaces
  - Work with LADOT, parking operators, and businesses to develop advanced parking reservation system
  - Open City parking lots for short-term use on evenings and weekends
  - Work with City to create financial incentive to prioritize parking for Little Tokyo customers, residents, and businesses

- Surface level construction activities shall be curtailed during major Little Tokyo festivals and outdoor events to ensure that noise, air quality, traffic, and parking issues do not adversely affect these economically vital events.

- In addition to its own marketing campaigns to publicize local businesses and parking availability during construction, Metro shall provide resources to the community and/or businesses to further provide targeted marketing. This supplemental marketing from stakeholders who understand the community will help minimize financial impacts to businesses during construction.

- Metro will work with the Little Tokyo Business Association to help offset the neighborhood impacts associated with reduced revenue from the Business Improvement District funds once the Office Depot block is demolished.

- Metro shall work with the Little Tokyo community businesses to ensure no adverse impacts to business operations prior to relocation of or protection of in-place utilities.

Community and Neighborhood Impacts:

- Surface level construction activities shall be curtailed during major Little Tokyo festivals and outdoor events to ensure that noise, air quality, traffic, and parking issues do not adversely affect these economically vital events.

- Any unmet demand for parking spaces eliminated from the Office Depot block shall be replaced with spaces within one block of the land uses that rely on those spaces, or through a combination of the following strategies:

  - Implement a universal valet program sponsored by Metro
  - Metro works with City of Los Angeles to reduce impact of government vehicles parking on 2nd Street
  - Create diagonal parking on Central Avenue between 1st and 3rd Street
  - Using Mangrove property for temporary parking during construction
  - Support legislation to curb non-legitimate use of disabled parking spaces
  - Work with LADOT, parking operators, and businesses to develop advanced parking reservation system
  - Open City parking lots for short-term use on evenings and weekends
  - Work with City to create financial incentive to prioritize parking for Little Tokyo customers, residents, and businesses

- Construction barriers in Little Tokyo could advertise access for parking, local stores, and cultural events during construction.

- Provide funding and resources available to the community and/or businesses to improve marketing and other strategies to help offset any reductions in business patronage.

- Depending on the potential location and scope of the system’s ventilation equipment, orient the exhaust away from downwind receptors.

- Metro will work with the Little Tokyo Business Association to help offset the neighborhood impacts associated with reduced revenue from the Business Improvement District funds once the Office Depot block is demolished.

- Require Little Tokyo's formal, substantive participation in Metro's future joint development pursuits at the Office Depot site to ensure this gateway location reflects community and cultural values.

- Metro shall work with the Little Tokyo community businesses to ensure no adverse impacts to business operations prior to relocation of or protection of in-place utilities.

Transportation Impacts:

- Given the severe reduction in capacity on Alameda during construction, initiate tunnel boring activities from 2nd and Flower/Hope to mitigate truck volumes from tunnel boring-related haul trucks that might use Alameda to access the US-101 freeway.

- Any unmet demand for parking spaces eliminated from the Office Depot block shall be replaced with spaces within one block of the land uses that rely on those spaces, or through a combination of the following strategies:

  - Implement a universal valet program sponsored by Metro
  - Metro works with City of Los Angeles to reduce impact of government vehicles parking on 2nd Street
  - Create diagonal parking on Central Avenue between 1st and 3rd Street
  - Using Mangrove property for temporary parking during construction
  - Support legislation to curb non-legitimate use of disabled parking spaces
  - Work with LADOT, parking operators, and businesses to develop advanced parking reservation system
  - Open City parking lots for short-term use on evenings and weekends
  - Work with City to create financial incentive to prioritize parking for Little Tokyo customers, residents, and businesses

- Surface level construction activities shall be curtailed during major Little Tokyo festivals and outdoor events to ensure that traffic and parking issues do not adversely affect these economically vital events.

- Metro shall consult with the Little Tokyo community during the development of Worksite Traffic Control Plans and parking mitigation plans to minimize impacts to businesses, residents, and other stakeholders.

- In addition to its own marketing campaigns to publicize local businesses and parking availability during construction, Metro shall provide resources to the community and/or businesses to further provide targeted marketing and directional signage to temporary parking facilities.

- The loss of three bus loading zones on Alameda for JANM should be mitigated with identification of nearby loading spaces within a block of the museum.
- Construction barriers in Little Tokyo could advertise access for parking during construction.
- Metro shall provide advertising on its transit buses publicizing construction plans and alternatives to travel and park in Little Tokyo during the construction period.
- Haul routes should avoid Alameda between 3rd Street and the U.S. 101, where possible.

Environmental Justice Impacts:

- Any unmet demand for parking spaces eliminated from the Office Depot block shall be replaced with spaces within one block of the land uses that rely on those spaces, or through a combination of the following strategies:
  - Implement a universal valet program sponsored by Metro
  - Metro works with City of Los Angeles to reduce impact of government vehicles parking on 2nd Street
  - Create diagonal parking on Central Avenue between 1st and 3rd Street
  - Using Mangrove property for temporary parking during construction
  - Support legislation to curb non-legitimate use of disabled parking spaces
  - Work with LADOT, parking operators, and businesses to develop advanced parking reservation system
  - Open City parking lots for short-term use on evenings and weekends
  - Work with City to create financial incentive to prioritize parking for Little Tokyo customers, residents, and businesses

Safety and Security Impacts:

- Require that safety and security information at stations be published in Japanese, Korean, and Spanish. This includes both written and verbal announcements in the station.
- Require that materials for the formal education campaign be published in Japanese, Korean, and Spanish.
- Involve Little Tokyo Public Safety Association in the development of safety and security plans.
- Require that mitigation measures designed to address safety and security concerns are operational on opening day.

- Metro will work with the Little Tokyo Business Association to help offset the neighborhood safety impacts associated with reduced security services from the Business Improvement District funds once the Office Depot block is demolished.

Noise and Vibration Impacts:

- Given the proximity of residences and noise-sensitive facilities in Little Tokyo, initiate tunnel boring activities from 2nd and Flower/Hope to further mitigate noise from tunnel boring-related activities, including haul trucks.

- Depending on the potential location and scope of the system's ventilation equipment, orient the exhaust away from downwind receptors to minimize noise from ventilation as well as underground train horns and related operational sounds.

Air Quality Impacts:

- Given the proximity of residences and noise-sensitive facilities in Little Tokyo, initiate tunnel boring activities from 2nd and Flower/Hope to further mitigate air quality impacts from tunnel boring-related activities, including haul trucks.

- Depending on the potential location and scope of the system's ventilation equipment, orient the exhaust away from downwind receptors.

- Require use of current vintage engines for off-road construction equipment that are compatible with any NOx and PM retrofit technologies (e.g., particulate filters, catalytic oxidizers).

- Reduce daily construction activities at construction sites if localized LST thresholds will be exceeded following implementation of mitigation measures.

- The LTCC will suggest additional appropriate construction-related mitigation measures to be submitted once more documentation on the impact analysis and proposed mitigation measures are provided. This could include, but not be limited to:

  - Source-based mitigation, such as best practices for mitigating tailpipe emissions from off-road vehicles, fugitive emissions from earthmoving activities, and entrained road dust from on-road haul trucks.

  - Receptor-based mitigation, such as installation of High Efficiency Particulate Air filters on HVAC equipment at downwind receptors during construction activities.

  - Financial compensation for outdoor-based events or businesses that will be adversely affected by construction-related emissions of NOx and PM.

Visual and Aesthetic Impacts

- Construction fencing could incorporate art and other culturally relevant graphics to the extent possible.

- Require Little Tokyo's formal, substantive participation in Metro's future joint development pursuits at the Office Depot site to ensure this gateway location reflects community and cultural values.

Land Use Impacts:

- Require Little Tokyo's formal, substantive participation in Metro's future joint development pursuits at the Office Depot site to ensure this gateway location reflects community and cultural values.
- Depending on the potential location and scope of the system's ventilation equipment, orient the exhaust away from downwind receptors.

Geotechnical/Subsurface/Seismic/Hazardous Materials Impacts:

- Potential impacts to adjacent buildings with underground facilities that are close to stations or tunnel should be clarified during Preliminary Engineering. Design of underground facilities will be modified to avoid potential subsurface impacts to these adjacent facilities.

Cumulative Impacts:

- Require Little Tokyo's formal, substantive participation in Metro's future joint development pursuits at the Office Depot site to ensure this gateway location reflects community and cultural values.

Ecosystems/Biological Resources Impacts:

- New trees planted at station locations shall be regularly monitored by Metro to ensure healthy growth and development.
- Metro shall provide the LTCC with direct input into the development of landscape plans for the Little Tokyo station through the Preliminary Engineering and Final Design processes.

During a follow-up public workshop held by the LTWG several more potential candidate mitigations were informally presented by other community members. In the interest of full disclosure and continuing the community dialogue these are presented in this Draft EIS/EIR. However these mitigations have not been evaluated or accepted by Metro and some may not prove feasible. The process of evaluating potential mitigation measures will continue during preparation of the Final EIS.

- Metro shall provide financial compensation to local businesses in Little Tokyo for economic disruptions directly resulting from construction of the Regional Connector. The process for establishing eligibility, quantifying compensation, and related details will be established jointly between Metro and Little Tokyo stakeholders.
- A Business Interruption Committee shall be established in Little Tokyo and include businesses, tenants, and property owners, along with government agencies having

jurisdiction to make policy to resolve issues arising from adverse business interruptions during all phases of construction.

- The redevelopment of the Office Depot block shall include at least 150 additional parking spaces for use by the general public.
- More information needs to be shared with the community. Many businesses and residents are still not aware of the proposed Regional Connector.
- Information needs to be made available in Korean to businesses and residents.
- On flyers, mention that there will be both Japanese and Korean translators at meetings.

4.18 Construction Impacts

This section summarizes the potential construction impacts of the proposed alternatives. These impacts are drawn from the construction impact findings of the other environmental sections in Chapter 4 and the technical appendices. The construction methods that would be employed for each of the alternatives are described in Chapter 2. The information in this section is described in more detail in the Construction Impacts Technical Memorandum, which is incorporated into this DEIS/DEIR as Appendix FF.

4.18.1 Regulatory Framework

NEPA requires an assessment of construction impacts from proposed projects. The following federal regulations also apply to the evaluation of construction impacts for the Regional Connector Transit Corridor project:

- Federal Clean Air Act (CAA)
- National Ambient Air Quality Standards (NAAQS)
- National Pollutant Discharge Elimination System (NPDES)
- Resource Conservation and Recovery Act of 1976 (RCRA)
- Toxic Substances Control Act of 1976 (TSCA)
- Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)

In addition, the State of California augments the requirements of federal regulations in the areas of air and water quality. This supplements the CAA with the more stringent CCAA. Also, the State's Regional Water Quality Control Board (RWQCB) oversees water quality. CEQA does not provide specific construction thresholds for many of the environmental topics analyzed in this DEIS/DEIR, so the general thresholds are used to analyze impacts for those topics in this section.

At the local level, construction-related air quality regulation imposed by the South Coast Air Quality Management District (SCAQMD) and construction noise ordinances in the Los Angeles Municipal Code (LAMC) would apply to the Regional Connector project.

More information about NEPA, CEQA, and local guidance for each environmental topic is available in the respective sections of Chapter 4 and technical appendices.

4.18.2 Affected Environment

This section describes the affected environment as it relates to construction activities for the proposed alternatives. Construction activities and the locations along each proposed alignment where different techniques would be used are described in Section 2.4 and in Appendix K.

4.18.2.1 General Construction Scenarios

4.18.2.1.1 TSM Alternative

Construction activities for the TSM Alternative would include installation of new bus stops and associated structures. These activities would require minimal construction equipment and would occur in the existing street and sidewalk right-of-way. The surrounding transportation infrastructure would be maintained. Construction activities would last approximately four months.

4.18.2.1.2 Build Alternatives

Typical construction activities for the build alternatives are described in Chapter 2, Section 2.4. The construction duration for the build alternatives would be approximately four years. However, construction activities at any one location may be shorter. In the vicinity of cut and cover construction, surface streets would be impacted intermittently over a period of 24 to 48 months. Construction could begin simultaneously at several locations along the selected route to minimize the overall construction times. Facilities requiring the lengthiest construction work, such as tunnels, underground stations, and grade separation segments, could potentially be started first so that the entire alignment is completed at approximately the same time.

Construction of the proposed alternatives would involve conventional techniques and equipment typically used on similar projects in the Southern California region. Methods would include cut and cover excavation for certain segments of tunnels, crossovers, portals, stations and ancillary facilities and Tunnel Boring Machine (TBM) excavation for portions of the Underground Emphasis LRT Alternative and the Fully Underground LRT Alternatives beneath 2nd Street. The 2nd/Hope Street station would be constructed using either the open cut or the Sequential Excavation Method (SEM), and off-street portions of the underground alignments would be constructed using the open cut method. Also, the proposed portal on 1st Street for the Fully Underground LRT Alternative would be constructed using either the open cut or cut and cover method. More information on these construction methods is provided in Section 2.4 and Appendix K.

The equipment that would be used during construction may include rail-mounted vehicles, earth moving vehicles, cranes, concrete mixers, flatbed trucks, sand and gravel delivery trucks, dump trucks, and TBMs. These construction vehicles may temporarily impede traffic mobility in areas of construction and, therefore, traffic detours, designated truck routes, and off-peak hauling schedules could be required during construction. Traffic management and traffic control measures would be coordinated with the City of Los Angeles Department of Transportation (LADOT).

Construction would follow all applicable local, state, and federal laws for building and safety. The Metro Fire Life Safety Committee, composed of members from the City and County of Los Angeles Fire Departments and Metro specialists, would approve all construction methods. Working hours could be varied to meet special circumstances. Standard construction methods and best management practices would be used for traffic, noise, vibration, and dust control, consistent with all applicable laws.

To provide an understanding of the likely steps involved, the anticipated construction activities are described below. This potential construction sequence does not represent the order in which construction activities would be performed. Actual construction would be a complex process with many activities taking place simultaneously. Some of the construction methods and sequences would be left to the discretion of the construction contractor.

4.18.2.2 Utility Relocation and Street Closures

Prior to beginning construction it would be necessary to relocate, modify, or protect in place all utilities and below-grade structures that would conflict with excavations for street level track work and excavation (cut and cover sections, tunneling, and station structures). Shallow utilities that would interfere with guideway excavation work, such as maintenance holes or pull boxes, would require relocation. These utilities would be modified and moved away from the construction area.

Travel lanes would need to be temporarily occupied during utility relocation for approximately two to three blocks at a time. Closures could potentially occur in stages and alternate between opposite sides of the street. Depending on the extent of utility relocation work, construction could last up to four months on each two-block segment. Some of the major utilities (greater than 18 to 24 inches in diameter), such as the storm drains on 2nd and on Flower Streets, may require more complex construction sequences and schedules for relocations and supports. Other preconstruction activities, such as soldier piling or installation of geotechnical instrumentation, may require temporary partial street closures and the use of drilling equipment and excavators.

4.18.2.3 Staging Areas and Haul Routes

Various locations would be used for construction staging. Typically a temporary easement would be acquired to reserve portions of the sidewalk and street, and sometimes private property for construction staging. Site clearance and demolition of existing structures at the construction staging areas would be necessary before major construction begins. Construction staging activities are described in Section 2.4.1 and in Appendix K.

Excavated soils and excess material would be transported off-site to approved disposal sites. To facilitate the removal of excavated materials, haul routes to disposal sites would be predetermined by agreement with local authorities prior to construction. Testing of materials would be required prior to transportation. Depending on the test results of the soils, disposal options could include the following sites:

California Hazardous (metals) Class I facilities:

- Waste Management Inc., Kettleman City, CA
- Clean Harbors Environmental Services, Buttonwillow, CA
- Veolia Environmental Services, Azusa, CA
- US Ecology Nevada, Inc., Beatty, NV

Non-hazardous, Total Petroleum hydrocarbon-containing wastes:

- Thermal Processing Systems Treatment, Adelanto, CA

Non-hazardous soil:

- Philadelphia Recycling, Mira Loma, CA
- Municipal landfills
- Other locations identified by the contractor

Routes would follow streets and highways that form the safest, shortest route with the fewest adverse effects on traffic, residences, and businesses. In addition, the transportation of excavated materials would occur during off-peak hours. The potential staging areas identified for each alternative are presented in Chapter 2.

Haul routes would be along major arterial streets. These could include Aliso Street, Temple Street, Commercial Street, 1st Street, 2nd Street, 3rd Street, 4th Street, 5th Street, 6th Street, Wilshire Blvd, 7th Street, Figueroa Street, Flower Street, Hope Street, Grand Avenue, Olive Street, Hill Street, Broadway, Spring Street, Los Angeles Street, San Pedro Street, Central Avenue, and Alameda Street. Due to the large number of industrial and warehouse land uses in the project area, all of these streets currently carry large truck traffic. Precise routes will be confirmed prior to construction.

4.18.2.4 At-Grade LRT Construction Methods

4.18.2.4.1 Surface Track Work

Areas of the proposed alignments where at-grade track work would occur are outlined in Chapter 2. Typical construction activities involved in surface track work are described in Section 2.4.2. Construction would be performed within the parking and travel lanes identified to be permanently removed as part of the project and potentially in parallel lanes, which would be impacted temporarily. Typical drilling of the shafts for catenary pole and track installation is relatively shallow.

Construction durations for each two-block segment are estimated to be two to four months. Periodic lane closures, typically on just one side of the work zone, would be required for delivery of materials and other construction activities such as concrete pours.

During construction within a two-block segment, cross streets and alleyways may be temporarily closed. Major cross streets would require partial closure, usually half of the street at a time, for the construction of surface stations and the light rail trackbed. Depending on allowable working hours, full blocks may require closure during excavation, preparation of subgrade, drilling for soldier pile installation, and track foundation placement. Closures would be staggered to facilitate traffic control. Where streets are not fully closed, two-way traffic could be allowed on half of the street.

4.18.2.4.2 At-Grade Stations

The at-grade station platforms on Main Street and Los Angeles Street could be constructed at the same time as other segments of the alternative, although the construction contractor may elect to construct them sequentially. Materials would be delivered to staging areas and station sites via the shortest, safest route agreed upon by local authorities. The at-grade station platforms would be constructed using standard building materials that are durable and resistant to vandalism, such as concrete, steel, aluminum, and heavy plastic. The station would consist of two single-direction platforms located along the eastern curbs of Main and Los Angeles Streets.

4.18.2.5 Underground Construction Methods

4.18.2.5.1 Cut and Cover Construction

For the build alternatives, cut and cover construction would be utilized in various portions of the proposed alignments, as outlined in Chapter 2. These areas include underground cut-and-cover and trackway construction on Flower Street between 7th Street and 3rd Street, underground stations, crossovers, portals, and entry areas for a TBM.

Cut and cover construction is one of various traditional construction methods for underground facilities. Open cut construction method is similar to cut and cover, but does not include temporary decking. Typical activities involved in cut and cover construction are described in Section 2.4.3 and Appendix K. Cut and cover entails a construction shoring system, excavating down from the ground surface, placing a temporary deck over the excavated area, constructing the underground facilities beneath the deck, and then backfilling and restoring the surface once the facilities are completed (Figure 4.18-1). Temporary concrete decking can be placed over the cut immediately following the first part of excavation (at about 12 to 15 feet below ground surface) to allow traffic to pass above. Once the deck is in place, excavation and internal bracing would continue to the required depth. Once the desired construction is completed inside the excavated area, the deck would be removed, the excavation would be backfilled, and the surface would be restored permanently.

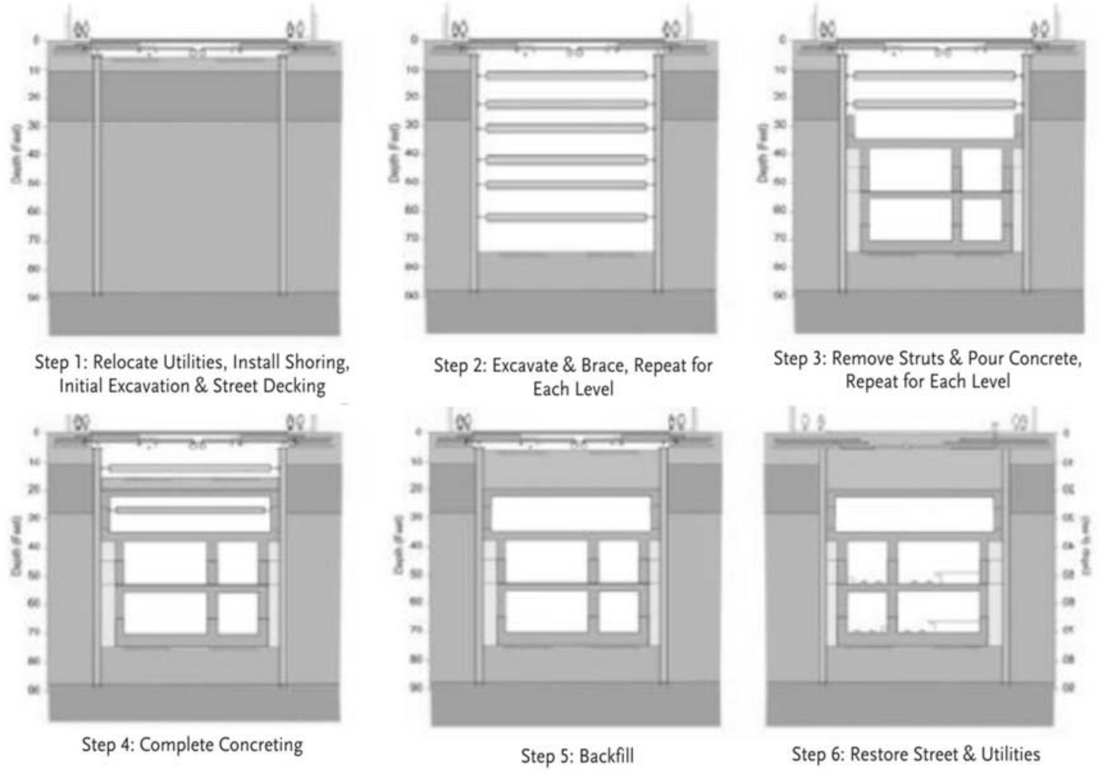


Figure 4.18-1. Cut and Cover Construction Method

Dewatering may be required at underground station locations and tunnel sites to temporarily lower the groundwater level below the excavation depth or to an impermeable layer. Dewatering facilitates installation of shoring systems, improves soil stability, and allows excavation in dry conditions. To dewater an area, groundwater would be pumped from wells installed around the perimeter of the excavation.

Based on experience with the cut and cover construction of the two underground stations on the Metro Gold Line to East Los Angeles, after the shoring system was in place, decking installation occurred in only several weekends with non-stop activity from Friday at 5 pm to Monday morning at 6 am with community and local agency approval. Similar progressive staging could be performed for the Regional Connector project. Portal construction would employ construction methods similar to those used for station excavations and retaining walls, but the portal could remain permanently open and no decking would be required during construction. However, decking may be used during construction of the portal facilities on 1st and 2nd Streets for the Fully Underground LRT Alternative.

The trackway planned under Flower Street between 7th and 3rd Streets, and all underground stations and crossovers would be built with the cut and cover technique. A potential exception is the 2nd/Hope Street station where open cut and SEM construction methods are being considered for the Underground Emphasis LRT Alternative and Fully Underground LRT Alternative due to the station's depth and off-street location. Open cut construction would also be used for the 2nd Street/Central Avenue station for the Fully Underground LRT Alternative. Underground station construction could last up to 48 months at each underground station location.

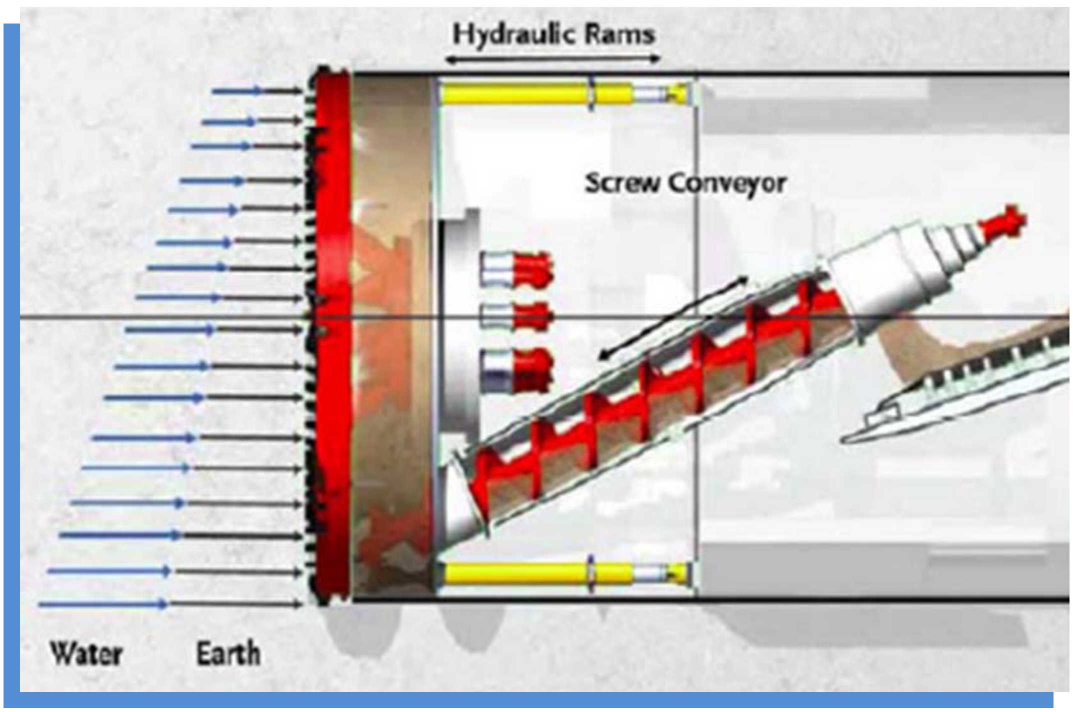
Based on the anticipated volume of excavation for the cut and cover tunnel and stations, it is estimated that an average of 20 to 30 dump truck trips per day would be required to haul and dispose of the excavated soils. Table 4.18-1 shows the anticipated volume of truck trips needed for construction of the At-Grade Emphasis LRT Alternative.

Table 4.18-1. Construction Activity Summary for the At-Grade Emphasis LRT Alternative

Activity	Duration (months)	Truck Trips per Day
Pre-Construction	4-6	5
Site Preparation	6-12	10
Flower Street Cut and Cover Tunnel	24-48	20-30
Flower/6th/5th Cut and Cover Station	24-48	20-30
Portal on Flower South of 3rd	12-18	20-30
Portal northeast of Flower and 3rd	TBD	20-30
2nd/Hope Street Open Cut Station	24-28	20-30
New Portal into 2nd Street Tunnel	TBD	TBD
Surface Trackwork	12-18	5-10
Main and Los Angeles At-Grade Stations	12-18	5-10
Temple and Alameda Junction	24-36	15-20

4.18.2.5.2 Tunnel Construction and Tunnel Boring Machine (TBM)

Portions of the Underground Emphasis LRT Alternative and Fully Underground LRT Alternative along 2nd Street are anticipated to be bored using a pressurized face TBM(s), as indicated in Chapter 2. Typical activities involved in cut and cover construction are described in Section 2.4.3 and Appendix K. TBMs are large-diameter horizontal drills that continuously excavate circular tunnel sections. Compared to the cut and cover method, tunnel boring is far less disruptive to surface traffic and adjacent land uses. The excavated materials would be removed through the tunnel using hopper type rail cars or a conveyor system. As the TBM advances, it would support both the ground in front of it and the hole it creates using a shield and pre-cast concrete tunnel liners (Figure 4.18-2). This method creates a tunnel with little disruption at the surface, and is especially suitable for creating a circular opening at depths that would not be practical for cut and cover construction. Concrete tunnel liner segments would have rubber gaskets between them where necessary to prevent water from entering the tunnel, allowing excavation to proceed below the groundwater level.



Source: CDM 2009

Figure 4.18-2. Tunnel Boring Machine (TBM) Method

TBMs require a launching shaft to start the tunneling operation. One option for a launching shaft for the TBM would be planned at 2nd and Hope Streets and travel east toward 2nd and Alameda Streets. The TBM could also be launched near the east end of the project, on 2nd Street between Central Avenue and Alameda Street. The TBM would then be dismantled and retrieved through a vertical shaft created by cut and cover method adjacent to the 2nd/Hope Street Station. It would then be transported back to the launching shaft, and reassembled to repeat its journey for the second twin tunnel. An alternative tunnel boring approach is possible that would use a single, larger diameter tunnel instead of two smaller tunnels. A single large TBM could be used to bore one tunnel big enough to contain both tracks and possibly the station platforms. Further studies will determine if such an approach would be feasible for the Regional Connector. Launching two TBMs simultaneously is an option as well.

The pre-cast concrete liners would be fabricated off-site and delivered by truck. Segment delivery would require six to ten truck trips per day for the duration of tunneling, assuming an average excavation rate of 30 to 50 feet per day for a single tunnel. Should simultaneous tunneling occur, 12 to 20 truck trips would be required for segment delivery. Table 4.18-2 shows the number of truck trips that would be needed to support TBM activities for the Underground Emphasis LRT Alternative and the Fully Underground LRT Alternative. The At-Grade Emphasis LRT Alternative would not involve TBM construction. Tunneling operation would typically be continuous, occurring seven days a week with two 10-hour shifts per day.

4.18.2.5.3 Sequential Excavation Method (SEM)

SEM construction involves excavating incrementally in small areas and supporting with steel supports beyond the opening and sprayed concrete as shown in Figure 4.18-3 and described in Section 2.4.4 and Appendix K. While TBMs can only excavate a fixed circular shape, SEM can be used to construct a tunnel with a horseshoe or sub-rounded shape. This construction technique would be considered in special instances where the planned depth, shape, or length of the tunnel may render it not cost effective using other methods.

Because of the depth of the 2nd/Hope Street station for the Underground Emphasis LRT and Fully Underground LRT Alternative, SEM construction is being considered as an alternative to the open cut method. Application of SEM would have less surface disruption than the cut and cover method since the excavation would be performed mostly underground and accessed via a vertical shaft.

4.18.2.6 Additional Construction Activities

4.18.2.6.1 Construction of Underground Station and Portal Structures

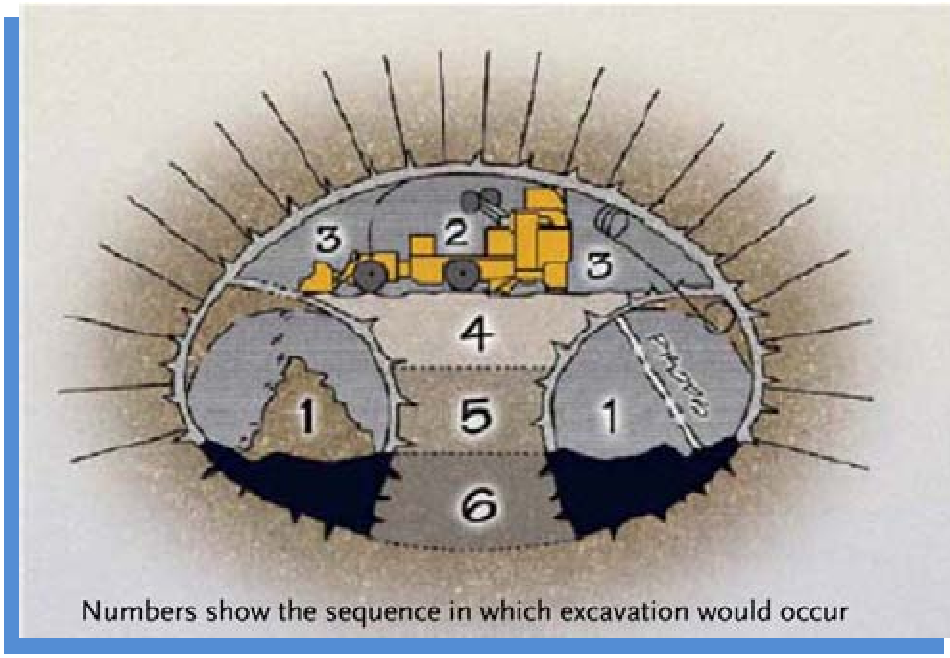
Underground stations would be constructed in the following steps: excavation of the station box, followed by the pouring of the foundation base slab, followed by the installation of exterior walls and any interior column elements. Portal structures would use similar construction methods involving placement of concrete inverts, walls, and walkways. Station entrance locations would likely be used as access points to underground stations during the construction process. Exterior entrances would be constructed after the station structure has been completed.

4.18.2.6.2 Foundations and 2nd Street Tunnel Connection

Under the At-Grade Emphasis LRT Alternative, the connection to the existing 2nd Street Tunnel would require installation of a temporary shoring system, construction of retaining walls to support soil removal, reinforcement of the tunnel structure, and installation of supporting elements at the location of the new openings. This would not be required for the Underground Emphasis LRT Alternative or the Fully Underground LRT Alterative.

Table 4.18-2. Tunneling Activity Truck Trips for the Underground Emphasis LRT Alternative and Fully Underground LRT Alternative

Activity	Duration (months)	Truck Trips per Day
Pre-Construction	4-6	5
Site Preparation	12-18	10-20
Flower Street Cut and Cover Tunnel	24-48	20-30
Flower/5th/4th Street Cut and Cover Station	24-48	15-20
Cut and Cover Approach to 2nd/Hope Street Station	24-48	15-20
2nd/Hope Street Station (SEM)	24-48	10-15
2nd/Hope Street Station (Open Cut)	24-48	20-30
2nd Street TBM Tunnel	24-48	35-70
2nd Street Cut and Cover Station (Broadway Option)	24-48	15-20
2nd Street Cut and Cover Station (Los Angeles Street Option – Underground Emphasis LRT Alternative only)	24-48	15-20
1st and Alameda Portal (Underground Emphasis LRT Alternative only)	12-24	5-10
TBM Launch Site	2-4	5-10
1st and Alameda At-Grade Junction (Underground Emphasis LRT Alternative only)	24-36	15-20
Cut and Cover Tunnel from TBM to 2nd/Central Avenue Station (Fully Underground LRT Alternative only)	12-24	15-20
2nd/Central Avenue Open Cut Station (Fully Underground LRT Alternative only)	18-36	20-30
Open Cut/Cut and Cover from 2nd/Central Avenue to East Portal (Fully Underground LRT Alternative only)	12-24	15-20
Open Cut/Cut and Cover from 2nd/Central Avenue to North Portal (Fully Underground LRT Alternative only)	12-24	15-20
Improvements near 1st and Alameda Streets (Fully Underground LRT Alternative only)	12-24	15-20



Source: CDM 2009.

Figure 4.18-3. Sequential Excavation Method (SEM)

4.18.2.6.3 Alameda Street Grade Separations

The Alameda Street grade separation would be constructed at the intersection of Alameda and Temple Streets for the At-Grade Emphasis LRT Alternative and at Alameda and 1st Streets for the Underground Emphasis LRT Alternative. No underpass or pedestrian bridge would be required for the Fully Underground LRT Alternative. The underpass would allow through traffic on Alameda Street to pass beneath Temple Street (At-Grade Emphasis LRT Alternative) or 1st Street (Underground Emphasis LRT Alternative) and the new rail junctions.

Underpass construction would involve installation of an appropriate shoring system followed by excavation to the required depth of the underpass. Lane closures and traffic rerouting would be required during construction. Currently, an existing modular wall system provides support for the existing rails at the Temple Street and 1st Street intersections. Lowering Alameda Street in these areas would require either underpinning the existing wall or constructing a new, higher replacement wall.

In addition, pedestrian bridges could potentially be constructed above the Alameda Street underpass that would span the respective intersections for the At-Grade Emphasis LRT Alternative and the Underground Emphasis Alternative. A pedestrian bridge could also possibly be constructed from the 2nd/Hope Street station to Upper Grand Avenue for all of the build alternatives. Bridge construction would involve heavy construction equipment, including cranes for erection of the structure.

4.18.2.6.4 Operating Systems Installation

Operating systems for all of the build alternatives would include traction power, an overhead catenary system (OCS), a communications system, and a signal system. An OCS consists of poles connected to drilled shaft foundations with overhead wires to supply power to the trains. Within the tunnel segments, the OCS would be connected to the top of the tunnels. The system would include Traction Power Substations (TPSS) to provide direct power to the trains. TPSS facilities would include ground systems and prefabricated units, which are placed on foundation slabs by crane and connected to the system. Construction equipment would include high rail vehicles for installation of the wires from the guideway area. While wires are being strung at cross streets, temporary street closures of a few hours at suitable times are anticipated. TPSS equipment would need to be installed adjacent to the alignment along at-grade segments, or within station boxes along underground segments.

4.18.2.6.5 Ventilation Shafts and Emergency Exits

The underground segments would include a number of ventilation and emergency exit areas in the vicinity of the underground stations. The stations would house emergency ventilation fan shafts, as well as separate emergency exit shafts at both ends of the stations. Ventilation fans would be installed to extract smoke from tunnels and stairs for evacuation in the event of an emergency, such as a fire in the underground areas. The exact location of these facilities would be determined during the final design. These shafts would be built as extensions of the station excavations using cut and cover construction methods. In some cases, ventilation shafts can extend above ground level, but this is anticipated only at the Fully Underground LRT Alternative's 2nd/Central Avenue station.

4.18.3 Environmental Impacts/Environmental Consequences

Potential construction impacts would be temporary, short-term effects during construction. Long-term operational impacts are discussed in their respective environmental topic sections in Chapter 4 and the technical appendices.

The following sections summarize the evaluation of potential construction impacts for each alternative. Table 4.18-3 summarizes the results of the analysis.

4.18.3.1 No Build and TSM Alternatives

The No Build Alternative would not involve any new construction as part of the Regional Connector project. The TSM alternative would involve installation of new bus shelters and associated safety features to accommodate two new shuttle bus routes between 7th Street/Metro Center Station and Union Station. This construction would be very short term (days) and would not result in any adverse impacts.

4.18.3.1.1 NEPA Finding

Neither the No Build Alternative nor the TSM Alternative would result in any adverse construction related impacts. Therefore, no mitigation measures would be required.

Table 4.18-3. Summary of Potential Construction Impacts

Alternative	Potential Impacts	Mitigation Measures	Unavoidable Impacts Remaining
No Build	None	None	None
TSM	None	None	None
At-Grade LRT	Adverse and significant effects	Mitigation measures proposed	Traffic circulation, parking, paleontological resources
Underground LRT	Adverse and significant effects	Mitigation measures proposed	Traffic circulation, parking, paleontological resources
Fully Underground LRT	Adverse and significant effects	Mitigation measures proposed	Traffic circulation, parking, paleontological resources

4.18.3.1.2 CEQA Determination

Based on the CEQA thresholds of significance, neither the No Build Alternative nor the TSM Alternative would have significant construction impacts. Therefore, no mitigation measures would be required.

4.18.3.2 At-Grade Emphasis LRT Alternative

The potentially significant adverse construction impacts for the At-Grade Emphasis LRT Alternative are described in this section. Other environmental topics and less than significant potential impacts are further discussed in Appendix FF, Construction Impacts.

4.18.3.2.1 Traffic Circulation and Parking

Construction of the At-Grade Emphasis LRT Alternative would require the loss of on-street parking and reduction in travel lanes in certain locations. In most instances, these would be temporary conditions during the construction phase.

In areas designated for cut and cover construction, the top two to three feet of the roadway would be removed and decking would be installed over an approximate three- to four-month period. Construction of the stations would continue underground while traffic operates normally on the decking. This procedure would require temporary off-peak, nighttime or weekend street closures to install the decking. The closure schedules would be coordinated to minimize impacts to residences, businesses, and traffic flow. During these times, traffic would be rerouted to adjacent streets via clearly marked detours.

Utility relocations, construction of the trackway, stations, and the proposed Alameda Street underpass at Temple Street would require the temporary closure of lanes on Flower Street, Hope Street in the vicinity of General Thaddeus Kosciuszko Way, Main Street, Los Angeles Street, Temple Street, 2nd Street, and Alameda Street. The track construction and permanent street configuration along 2nd Street would result in the elimination of eastbound vehicular travel on the segment of roadway between Hill and Main Streets as well as the permanent closure of one eastbound travel lane between Main and Los Angeles Streets. For the westbound direction of 2nd

Street, a one lane permanent closure has been identified between Hill and Los Angeles Streets. Travel times for vehicles traveling along the westbound direction of 2nd Street are expected to increase and eastbound vehicular through traffic would likely shift to 4th and 1st Streets. This shift would result in increased delays at several intersections between Hill Street and Los Angeles Street. Vehicular travel times and intersection operations along these roadways would potentially be impacted.

Construction of the proposed Alameda Street underpass at Temple Street would also result in the temporary reduction of roadway capacity for extended periods of time. In order to maintain two through travel lanes in each direction during construction activities, the two-way left turn median in the mid-block area and the exclusive right and left turn lanes at the intersection approaches would be temporarily eliminated over the two to three year period estimated to construct the underpass. The north and south intersection lane configurations would consist of a shared through and right turn lane and a shared through and left turn lane for the segment of Alameda Street between Aliso and 1st Streets.

The existing signal phasing may be changed to split phasing in order to minimize conflicts between left turns and opposing through movements. This would minimize the formation of queues that could result from a vehicle waiting for a gap in the opposing traffic to complete a left turn movement. Consequently, travel times along this segment of Alameda Street are expected to increase due to the potential for additional traffic congestion. Also, operating conditions for the Alameda Street intersections between Aliso and 1st Streets are expected to experience increased delays.

Construction of the At-Grade Emphasis LRT Alternative would require use of heavy-duty trucks to transport equipment and excavated soil. The addition of these truck trips to the existing street network has the potential to adversely affect traffic and parking. Haul and delivery truck routes would affect residents and commuters along the alignment. Soil hauling, rail and catenary deliveries, and general construction traffic would impact traffic flow patterns as well. Roadway surface restoration may be needed in areas that experience frequent project-related truck trips. These would be temporary conditions during the construction phase.

Existing on-street parking spaces and loading stalls would be temporarily removed during construction. This would potentially impact parking space and loading areas on the east and west sides of Flower Street, the loading areas on the east side of Main and Los Angeles Streets, and the parking spaces on the south side of Temple Street. In addition, the realigned intersection of Hope Street in the vicinity of General Thaddeus Kosciuszko Way may temporarily remove several parking spaces along both the east and west sides of the roadway segment. The track construction and permanent street configuration along 2nd Street would result in the temporary removal of several parking and loading stalls. Adjacent to the Alameda Street underpass, the JANM tour bus loading zone on the west side of the street would be temporarily relocated for the duration of the construction period.

As noted earlier, the construction along 2nd Street would shift some of the through traffic movements on to 1st Street, which is designated as a Class III bicycle route. Consequently, the flow of bicycle traffic could be hampered due to increased auto traffic volumes on 1st Street. The additional automobile traffic would result in increased turning movements, potentially reducing bicycle operating speeds or resulting in a greater risk of bicycle-automobile conflict, since Class III routes do not have bicycle-designated lanes.

The construction of the underpass on Alameda Street may result in localized shifts in traffic to adjacent streets such as Central Avenue, which is also designated as a Class III bicycle route. Similarly, the increase in traffic volumes could potentially impact the flow of bicycle traffic.

Track construction, permanent street configuration changes along 2nd Street, and the construction of an underpass on Alameda Street may also require temporary sidewalk detours. Temporary sidewalk detours during the construction of this alternative would impact pedestrian flow.

Restoration of these parking, pedestrian and bicycle circulation, and travel lanes to their permanent configurations would occur prior to operations. Although short-term, potentially adverse impacts are anticipated during construction of this alternative. Combined with the effects of other projects in the downtown area, potential cumulative adverse impacts could occur.

4.18.3.2.2 Displacements and Relocation

During construction of the At-Grade Emphasis LRT Alternative, staging of construction equipment and materials would require temporary construction easements that would impact two parcels. The portions of these parcels that would be utilized would be plazas and open areas. Access to businesses and buildings would be maintained. Some sidewalk detours would be necessary. Mitigation would minimize the adverse impacts associated with this type of displacement during construction. In addition, once construction is completed, the sites would be restored to their permanent conditions.

4.18.3.2.3 Community and Neighborhoods

Mobility would be reduced in the Civic Center, the Historic Core, and Little Tokyo areas due to street closures associated with construction activities including track work, cut and cover excavation, and structural support work. Disruption of traffic patterns would require detours for persons accessing nearby residences and businesses. In Little Tokyo, disruption to traffic along Alameda and Temple Streets would directly affect cultural institutions such as JANM, the Go For Broke Monument, and the Museum of Contemporary Art (MOCA) and other businesses during the excavation and construction of the Alameda Street underpass and the potential pedestrian bridge. This could impact the economic vitality of some businesses, particularly in Little Tokyo, where the community has expressed concern about construction activities. Prolonged disruption to businesses could affect community cohesion. Without mitigation, potential adverse construction impacts associated with community and neighborhoods are anticipated under the At-Grade Emphasis LRT Alternative.

4.18.3.2.4 Visual and Aesthetic Resources

During construction of the At-Grade Emphasis LRT Alternative, several construction staging areas would be utilized. Construction areas would be protected by barriers. The placement of concrete barriers and fencing would be visible from multi-family residences and other sensitive uses adjacent to the alignment, particularly the Bunker Hill Towers, the Higgins Building, Hikari, and Savoy. Viewers would see construction equipment, construction-related activities, and stockpiles of dirt and debris, and the urban streetscape would be temporarily altered. Screening of construction staging areas would minimize aesthetic impacts at street level. The project would be constructed in a heavily urbanized environment where construction activities are not uncommon, and the construction of the project would not noticeably reduce visual quality or alter viewing context. In Little Tokyo, large construction equipment would be required for the excavation and construction of the Alameda Street underpass and of the potential pedestrian bridge. This impact would be temporary and would be considered less than significant. Overall, less-than-significant impacts associated with views and visual character are anticipated due to construction activities.

Temporary lighting may be necessary for nighttime construction, which minimizes disruption to daytime traffic and business activities and at night for security of staging sites. However, nighttime construction activities would be limited to non-residential areas and nighttime illumination of staging areas would be directed towards the site and away from sensitive uses. Therefore, less-than-significant impacts are anticipated.

4.18.3.2.5 Air Quality

An analysis of construction-related emissions was completed in accordance with SCAQMD requirements. The estimate included emissions from off-road construction equipment, fugitive dust, construction worker commuting, and haul truck emissions. Use of electric construction equipment could be encouraged where feasible. Daily regional construction emissions are anticipated to exceed SCAQMD regional significance thresholds for VOC, NO_x, CO, and $PM_{2.5}$ and would result in a potential adverse effect without mitigation.

In addition to evaluating emissions on a regional level, construction emissions were also compared to SCAQMD's localized significance thresholds. The methodology includes using look-up tables for NO_x, CO, PM_{10}, and $PM_{2.5}$. The tables show the maximum allowable emission levels given the project location, acreage, and distance to the nearest receptor. It was assumed that most project construction sites would be approximately one acre in size and located within 25 meters of a receptor. Cut and cover construction along Flower Street would generate the maximum localized construction emissions and would result in maximum daily localized emissions of approximately 300 pounds per day (ppd) of NO_x, 150 ppd of CO, 14 ppd of $PM_{2.5}$ and 15 ppd of PM_{10}. Daily construction emissions are anticipated to exceed SCAQMD localized significance thresholds for NO_x, PM_{10}, and $PM_{2.5}$, and would result in a potentially adverse localized air quality effect.

Daily regional and localized construction emissions are anticipated to exceed SCAQMD regional significance thresholds and would result in a potentially adverse cumulative effect without mitigation.

4.18.3.2.6 Noise and Vibration

Construction of the At-Grade Emphasis LRT Alternative would potentially generate noise and vibration from excavators, bulldozers, trenchers, drill rigs, cranes, and heavy-duty trucks used to transport construction equipment. The construction activities and locations with the greatest potential for noise impacts are: the Flower Street cut and cover tunnel, Flower/6th/5th Street station cut and cover construction, 2nd/Hope Street station open cut construction, and construction of the junction and underpass at Temple and Alameda Streets. These four activities have the greatest potential for noise impacts due to the extended duration of work and proximity to noise-sensitive land uses. Potential adverse effects from construction noise are anticipated if mitigation measures are not implemented.

Vibration from large bulldozers and drill rigs could exceed the FTA annoyance criteria for sensitive receptors identified in the Noise and Vibration Technical Memorandum (Appendix S). However, perceptible vibration from construction equipment would be short-term and intermittent. Therefore, perceptible vibration from the construction equipment is considered an "infrequent event," less than 30 events a day as defined by FTA. Occupants would not be subject to vibration levels above the FTA annoyance criteria. It should be noted that large bulldozers and drill rigs would operate intermittently and would not be used during every day of construction. Without the implementation of mitigation measures, potentially adverse effects from vibration could occur.

4.18.3.2.7 Geotechnical/Subsurface/Seismic/Hazardous Materials

The At-Grade Emphasis LRT Alternative proposed alignment does not cross any known faults. However, portions of the proposed alignment occur in areas mapped with the potential for liquefaction based on soil stability. Areas susceptible to liquefaction are located along Flower Street between Wilshire Boulevard and 2nd Street, and along 2nd Street between Hill and San Pedro Streets. The eastern edge of the alignment near the intersection of 1st and Temple Streets is within the mapped Inundation Hazard Area. In addition, the proposed 2nd/Hope Street station is within the Hillside Ordinance area (Bunker Hill).

During construction of underground stations, portal structures, and the Alameda Street underpass, there is the potential for adverse impacts related to ground settlement and differential settlement on adjacent structures including historical buildings. Further evaluation and survey would be performed during final design to establish building types and existing conditions, and to develop criteria to limit potential movement to acceptable threshold values. Protection of buildings could involve design of adequately rigid excavation support systems, underpinnings, and ground improvements to minimize settlement to tolerable limits. A preconstruction survey of the adjacent structures and all historical buildings in the vicinity would be conducted to establish a baseline for measuring potential construction-induced damage. Construction monitoring would be required to ensure that ground movement does not exceed threshold values. With mitigation, less-than-significant impacts would be anticipated.

Construction of surface track work, stations, and portals would likely require removal of protective vegetation or pavement that would increase the potential for soil erosion. With mitigation, potential adverse construction impacts associated with subsurface soils would be less than significant.

4.18.3.2.8 Water Quality

There is known and suspected soil and groundwater contamination along the proposed At-Grade Emphasis LRT Alternative alignment. Construction activities have the potential to increase erosion and sedimentation around proposed construction and staging areas. Grading activities associated with construction could potentially result in a temporary increase in the amount of suspended solids running off construction sites. In a storm event, construction site runoff could result in sheet erosion of exposed soil. Groundwater may be encountered during trenching or tunneling, and would require dewatering. Dewatering activity would result in the potential release of contaminated water due to the presence of relatively shallow groundwater (located at depths ranging from 14 to 36 feet) that is contaminated with pollutants common to urban development. All dewatering activity would occur with a NDPES permit. Testing would occur prior to construction and on-site treatment and discharge in accordance with applicable standards or transport to a treatment or disposal facility would be required. Without mitigation, potential adverse construction impacts associated with water quality would be anticipated under the At-Grade Emphasis LRT Alternative.

4.18.3.2.9 Historic Built Environment Resources

An adverse effect would occur to the 2nd Street Tunnel according to the criteria for adverse effect to a historic property (36 CFR 800.5(a)(1)) due to the demolition of a portion of the NRHP eligible 2nd Street Tunnel and the subsequent change in use. The changes would directly alter a characteristic of the historic property in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association.

At least seven other NRHP and/or CRHR eligible properties could be potentially affected by cut and cover construction, differential settlement, and construction noise and vibration associated with construction of the At-Grade Emphasis LRT Alternative. The implementation of design measures would protect and stabilize the ground near historic properties as noted in Section 4.18.4.2.9. These measures would avoid adverse effects to all of these properties. If properly implemented, short term construction activities would not directly alter a characteristic of the historic property in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association.

4.18.3.2.10 Archeological Resources

The At-Grade Emphasis LRT Alternative has the potential to alter, remove, or destroy archaeological resources within the APE. A historic brick alignment may be affected during ground disturbance from construction of a proposed pedestrian bridge at the intersection of Temple and Alameda Streets. The site appears to be not eligible for National Register or California Register listing. However, previously unrecorded parts of the site that retain substantial integrity may be present. This alternative also has the potential to affect previously unrecorded archaeological resources during ground disturbance from constructing new underground tunnel segments on Flower Street, new stations, and an automobile underpass and pedestrian overpass on Alameda Street at Temple Street. Such damage to archaeological resources would represent a significant effect that could be mitigated. Implementing mitigation measures described in Section 4.18.4.2.9 would reduce this effect to a less-than-significant level.

4.18.3.2.11 Paleontological Resources

The At-Grade Emphasis LRT Alternative has the potential to adversely impact paleontological resources at the surface and at depth within the project area as a result of ground disturbance related to construction of new underground tunnel segments and at new proposed stations. Any ground disturbances in areas of high sensitivity (see Section 4.12.3) would have the potential to impact paleontological resources at the surface and at depth. Ground disturbance in areas of sensitivity ranging from low to high have the potential to impact paleontological resources at a depth of 5 feet or greater below the ground surface. In areas where proper mitigation measures in Section 4.18.4.2.10 can be implemented, potential impacts can be reduced to a less than significant level.

4.18.3.2.12 Ecosystems and Biological Resources

During construction of the At-Grade Emphasis LRT Alternative, some mature trees located along the proposed alignment could be removed. As these mature trees may provide potential nesting and roosting habitat for bird species, including raptors, removal or disturbance of this vegetation during the nesting season could directly impact this habitat and any bird species that are present. There are currently approximately 250 mature trees in the area that could potentially be affected by construction, and some of these trees could be removed or disturbed. Approximately 60 of the trees are native California sycamore trees, a protected species. Potential mitigation measures are described in Section 4.18.4 and include compliance with the Native Tree Protection Ordinance. Compliance with the Native Tree Protection Ordinance, including replacement of this protected species at a 2:1 ratio, would reduce this potential impact to a less than significant level.

4.18.3.2.13 Parklands and Other Community Facilities

During construction of the At-Grade Emphasis LRT Alternative, access to the parking structure beneath Maguire Gardens and pedestrian access to the gardens and the City Hall Park could potentially be reduced, but not eliminated, due to street closures and construction activities. Discrete locations along the alignment that could experience modified pedestrian and vehicle access during construction and operation include the new Los Angeles Police Department (LAPD) headquarters, the State of California Department of Transportation (Caltrans) building, City Hall, City Hall East, the U.S. Federal Government Building (Roybal Center), the Los Angeles Ambulatory Care Center, the fire station on Temple Street, and the Little Tokyo Branch Public Library. Disruption of traffic patterns would restrict access to certain community resources such as the MOCA, JANM, and the Go for Broke Monument. This would have the potential to affect annual festivals and events held in the downtown area during the construction period. Response times for emergency services could also be impacted due to street closures and detours. Without mitigation, potential adverse construction impacts associated with parklands and other community facilities are anticipated under the At-Grade Emphasis LRT Alternative.

Although construction impacts are direct by nature, the construction of the At-Grade Emphasis LRT Alternative alignment could potentially discourage patrons of community facilities and parks to visit them due to restricted access and temporary parking restrictions. Without mitigation, potential adverse impacts are anticipated.

4.18.3.2.14 Economic and Fiscal Impacts

Construction of the At-Grade Emphasis LRT Alternative would directly impact several businesses located along the alignment due to lane closures, sidewalk detours and restricted street parking during track installation and cut and cover activities. These businesses primarily rely on vehicular and pedestrian traffic for revenue generation. Appendix BB, Economic and Fiscal Impacts, lists businesses along the proposed alignment that would likely be affected by the track installation and street closures during construction. In addition, temporary closures or restricted access to Alameda Street during construction of the underpass and potential pedestrian bridge would impact a heavily utilized truck route and restrict freeway access to Little Tokyo. Cultural institutions, such as MOCA and JANM, could potentially be impacted directly and other businesses indirectly.

Investment in transportation, including direct investment in the form of capital construction and operation costs, provides economic benefits in several basic ways: the creation of direct and indirect jobs, and spending by suppliers whose goods and services are used in the project. These benefits are discussed in Section 4.14 and Appendix BB. The benefits of the additional transit infrastructure in the long-term would outweigh the temporary significant impacts in the project area.

4.18.3.2.15 Safety and Security

The contractor would have a safety plan and be responsible for construction site security in conformance with local regulations and standards. Construction activities are not anticipated to affect security in the project area. Typically construction areas are fenced off with restricted access and are well lit. Direct adverse impacts are not anticipated with regards to safety or security.

4.18.3.2.16 NEPA Finding and CEQA Determination

The At-Grade Emphasis LRT Alternative would have adverse construction impacts related to the environmental topics shown in Table 4.18-4. Most of these potential impacts could be reduced to a less than significant level by the mitigation measures proposed in resource-specific sections in Chapter 4. However, there would still be unavoidable adverse impacts with respect to traffic circulation and air quality.

The At-Grade Emphasis LRT Alternative would not have significant construction-related impacts when proposed mitigation measures are implemented. Table 4.18-4 also indicates which of these potential impacts would remain significant after implementation of the mitigation measures discussed in Section 4.18.4.

4.18.3.3 Underground Emphasis LRT Alternative

The potential adverse construction impacts of the Underground Emphasis LRT Alternative would be similar to those of the At-Grade Emphasis LRT Alternative. Only the differences in impacts between the two alternatives are noted in this section.

4.18.3.3.1 Traffic Circulation and Parking

The Alameda Street underpass would be located at Alameda and 1st Streets under the Underground Emphasis LRT Alternative. Other than the difference in location, the construction activities would be the same as described in section 4.18.3.2.1. Travel times along this segment of Alameda Street are expected to increase due to the potential for increased traffic congestion. Also, operating conditions for the Alameda Street intersections between Aliso and 1st Streets are expected to deteriorate.

Construction of the Underground Emphasis LRT Alternative would require the use of heavy-duty trucks to transport equipment and excavated soil. The additional excavated soil necessary to construct the underground segment along 2nd Street would require more haul trucks than the At-

Grade Emphasis LRT Alternative. Haul and delivery truck routes would affect residents and commuters along the proposed alignment. Tunnel spoil hauling, rail and catenary deliveries, and general construction traffic would impact traffic flow as well. Roadway surface restoration may be needed in areas that experience frequent project-related truck trips. These would be temporary conditions during the construction phase.

Table 4.18-4. NEPA Findings and CEQA Determinations for Potential Construction Impacts of the At-Grade Emphasis LRT Alternative

Topic	Potentially Adverse or Significant Impact Before Mitigation?		Potentially Significant Impact After Mitigation?	
	NEPA	CEQA	NEPA	CEQA
Traffic Circulation	Yes	Yes	Yes	Yes
Displacements and Relocation	Yes	Yes	No	No
Air Quality	Yes	Yes	Yes	Yes
Noise and Vibration	Yes	Yes	No	No
Community and Neighborhood Impacts	Yes	No	No	No
Visual and Aesthetic Resources	No	No	No	No
Geotechnical/ Subsurface/ Seismic/ Hazardous Materials	Yes	Yes	No	No
Historic Built Environment/ Archeological Impacts	Yes	Yes	No	No
Paleontology	Yes	Yes	No	No
Water Resources	Yes	Yes	No	No
Economic and Fiscal Impacts	Yes	Yes	No	No
Ecosystems and Biological Resources	Yes	Yes	No	No
Parklands and Other Community Facilities	Yes	Yes	No	No
Safety and Security	No	No	No	No

Lane closures during construction on Flower Street, Hope Street in the vicinity of General Thaddeus Kosciuszko Way, Main Street, 2nd Street, 1st Street, and Alameda Street would result in the temporary removal of existing on-street parking spaces and loading stalls. This would impact parking spaces and loading areas on the both sides of Flower Street, on 2nd Street between Spring and Alameda Streets, on Central Avenue and Alameda Street between 1st and 2nd Streets, and on 1st Street between San Pedro and Hewitt Streets. In addition, the realigned intersection of Hope Street in the vicinity of General Thaddeus Kosciuszko Way may temporarily remove several parking spaces along both the east and west sides of the roadway segment. In the vicinity of the Alameda Street underpass, the JANM tour bus loading zone on the west side of the street would be temporarily removed and relocated for the duration of the construction period. Overall, parking impacts during construction would not be considered adverse.

Cut and cover station construction along segments of Flower Street and construction of the underpass on Alameda Street may require temporary sidewalk detours, which could potentially impede pedestrian flow. However, pedestrian flow on 2nd Street would be better under this alternative than the At-Grade Emphasis LRT Alternative.

In addition, the construction of the underpass on Alameda Street may result in localized shifts in traffic to adjacent streets such as Central Avenue, which is designated as a Class III bicycle route. The flow of bicycle traffic could potentially be impacted due to increased traffic volumes on Central Avenue. The additional automobile traffic would result in increased turning movements, potentially reducing bicycle operating speeds or resulting in a greater risk of bicycle-automobile conflict, since Class III routes do not have bicycle-designated lanes.

Impacts to traffic circulation during construction would be short-term. However, they would contribute to a potential cumulative adverse effect when combined with other projects in the downtown area. Therefore, potential cumulative adverse traffic circulation impacts are anticipated under the Underground Emphasis LRT Alternative.

4.18.3.3.2 Community and Neighborhood Impacts

Mobility would be reduced in the Financial District, Bunker Hill, Civic Center, the Historic Core, and Little Tokyo areas due to street closures associated with construction activities including track installation at 1st and Alameda, cut and cover excavation, and structural support work. Disruption of traffic patterns would restrict, but not eliminate, access to residences and businesses.

In Little Tokyo, disruption to traffic along Alameda and 1st Streets would directly affect cultural institutions such as JANM, the Go for Broke Monument, MOCA, and other businesses during the excavation and construction of the Alameda Street underpass and the potential pedestrian bridge. In addition, the installation of TBMs either in the Little Tokyo or Bunker Hill areas would temporarily disrupt communities, businesses, and residents. Buildings likely to experience disruption include Savoy and Honda Plaza in Little Tokyo, and the Bunker Hill Towers. Without mitigation, potential adverse construction impacts associated with community and neighborhoods would be anticipated under the Underground Emphasis LRT Alternative.

During utility relocation, mobility would be temporarily reduced in the Financial District, Bunker Hill, Civic Center, Historic Core, and Little Tokyo areas. Disruption of traffic patterns would temporarily restrict access to residences and businesses. This could impact the economic vitality of some businesses, particularly in Little Tokyo, where the community has expressed concern about construction activities. Prolonged disruption to businesses could affect community cohesion. Without mitigation, potential adverse indirect construction impacts associated with communities and neighborhoods would be anticipated under the Underground Emphasis LRT Alternative.

4.18.3.3.3 Visual and Aesthetic Impacts

Visual character impacts would be limited to construction staging areas and would occur to a lesser extent than under the At-Grade Emphasis LRT Alternative, since portions of the Underground Emphasis LRT Alternative alignment would be constructed using TBMs.

4.18.3.3.4 Air Quality

The maximum localized construction emissions would occur during cut and cover construction of the tunnel on Flower Street, the Flower/5th/4th Street station, and the 2nd Street station (either option), and would result in maximum daily localized emissions of approximately 300 ppd of NOX, 170 ppd of CO, 10 ppd of PM2.5 and 11 ppd of PM10. The additional soil removal necessary for the underground segment along 2nd Street would also intensify the localized emissions compared to the At-Grade Emphasis LRT Alternative. Use of electric construction equipment could be encouraged where feasible. Daily construction emissions are anticipated to exceed SCAQMD localized significance thresholds for NO_X, and PM_{10}, and $PM_{2.5}$, and would result in a potential adverse localized air quality construction effect. Daily regional and localized construction emissions are anticipated to exceed SCAQMD regional significance thresholds and would also result in a potential adverse cumulative effect without mitigation.

4.18.3.3.5 Noise and Vibration

The Underground Emphasis LRT Alternative would require the same construction equipment as the At-Grade Emphasis LRT Alternative, with the addition of TBMs. TBMs, large bulldozers, and drill rigs would be the main construction vibration sources that could potentially exceed the FTA annoyance criteria for sensitive receptors (Appendix S).

Perceptible vibration from construction equipment would be short-term and intermittent, and considered an "infrequent event," (less than 30 events per day) as defined by FTA. Short-term vibration levels during construction could exceed the FTA annoyance criteria. Building occupants would not be subject to vibration levels above the FTA annoyance criteria. It should be noted that large bulldozers and drill rigs would operate intermittently and would not be used during every day of construction. Without the implementation of mitigation measures, vibration impacts would be potentially significant.

TBM operation occurs underground and produces little to no noise at the surface. The activity at the potential installation and recovery sites account for most of the noise associated with TBM use. These would be the potential locations where excavated material would be treated and removed. Other construction noise along the TBM segment would be produced by haul trucks and equipment needed to perform utility relocations. Noise from these sources would generate a maximum of 85 dBA at 50 feet and would occur less frequently and for a shorter duration than construction of the At-Grade Emphasis LRT Alternative along 2nd Street.

Using the minimum safe distance, the potential worst case vibration category, vibration from construction equipment during utility relocation lane closures would result in a potential adverse effect if it occurred less than 21 feet from buildings. A pre-construction survey of structures within 21 feet of the anticipated zone of construction would be conducted to assess the potential for ground-borne vibration to cause damage, and to establish baseline pre-construction conditions. Without the implementation of mitigation measures, vibration impacts would be potentially significant.

4.18.3.3.6 Geotechnical/Subsurface/Seismic/Hazardous Materials

Geotechnical, subsurface, seismic, and hazardous materials impacts for the Underground Emphasis LRT Alternative would be similar to those of the At-Grade Emphasis LRT Alternative. In addition to those impacts previously discussed, a limited portion of the alignment near 1st and Alameda Streets would be within the mapped Inundation Hazard Area.

4.18.3.3.7 Historic Built Environment Resources

The Underground Emphasis LRT Alternative's effects on the built environment would be roughly similar to those of the At-Grade Emphasis LRT Alternative, except near the 1st and Alameda underpass. The proposed train portal at the intersection of Alameda and 1st Streets would be within the view shed of two historic properties, the Little Tokyo National Historic Landmark Historic District and the NRHP eligible John A. Roebling Sons Co. Building. However, the portal area is not encompassed within the boundary of a historic property, historical resource, or a contributing element to the significance of either property. An asphalt paved parking lot currently occupies the majority of the parcel. No adverse effect would occur to the Little Tokyo National Historic Landmark District or the John A. Roebling Sons Co Building from the construction of the portal.

4.18.3.3.8 Archeological Resources

The Underground Emphasis LRT Alternative would involve substantial ground disturbance, and therefore would have the potential to alter, remove, or destroy archaeological resources within the APE. It has the potential to affect archaeological resources during ground disturbance from constructing a new underground tunnel along its entire route, underground stations, an automobile underpass on Alameda Street between 2nd and Temple Streets, and a potential pedestrian bridge at the intersection of Alameda and 1st Streets.

Potentially affected resources include portions of the Los Angeles Zanja System. Although the precise location and local integrity of the zanjas have not been established, the alternative's 2nd Street alignment would likely cross the system multiple times.

Archaeological sites may extend into the project area and be subject to direct alteration. This would result in a significant effect that could be mitigated. Construction of new stations would almost certainly affect any extant archaeological resources within their footprints. Construction of new tunnel segments through deep tunneling, as opposed to cut-and-cover techniques, could avoid effects to shallow archaeological resources, although the maximum depth of these resources and minimum depth of construction would both need to be established. Implementing the mitigation measures in Section 4.18.4.2.9 would reduce this effect to a less-than-significant level.

4.18.3.3.9 Paleontological Resources

The Underground Emphasis LRT Alternative involves ground disturbance and therefore has the potential to adversely impact paleontological resources within the project area. This disturbance would result from excavations related to construction of a new tunnel, stations, Alameda Street underpass and potential pedestrian bridges. Any ground disturbances in areas of high sensitivity will have the potential to impact paleontological resources at the surface and at depth. Ground disturbance in areas of sensitivity ranging from low to high have the potential to impact paleontological resources at a depth of 5 feet or more below the ground surface. In areas where proper mitigation measures can be implemented (see Section 4.18.4.2.10), potential impacts can be reduced to a less than significant level. In areas where new underground TBM segments would be constructed, mitigation for paleontological resources will not be feasible and are thus unavoidable (see Section 4.18.4.3.1).

4.18.3.3.10 Ecosystems and Biological Resources

The Underground Emphasis LRT Alternative's impacts to ecosystems and biological resources are similar to those of the At-Grade Emphasis LRT Alternative. However, there are currently 170 mature trees in the area that could potentially be affected by construction of the Underground Emphasis LRT Alternative, and some could be removed or disturbed. It is unknown at this time exactly how many trees could be affected. An estimated 40 native California sycamore trees are located in the potential area of impact and could be affected by this alternative.

4.18.3.3.11 NEPA Finding and CEQA Determination

The Underground Emphasis LRT Alternative would have adverse construction impacts related to the environmental topics shown in Table 4.18-5. Most of these potential impacts could be reduced to a less than significant level by the mitigation measures proposed in resource-specific sections in Section 4. However, there would still be unavoidable adverse impacts with respect to traffic circulation, air quality, and paleontological resources.

The Underground Emphasis LRT Alternative would not have significant construction-related impacts when proposed mitigation measures are implemented. Table 4.18-5 also indicates which of these potential impacts would remain significant after implementation of the mitigation measures discussed in Section 4.18.4.

4.18.3.4 Fully Underground LRT Alternative

Potential adverse construction impacts of the Underground Emphasis LRT Alternative would be similar to those of the Underground Emphasis LRT Alternative. Only the differences in impacts between the two alternatives are noted in this section.

Table 4.18-5. NEPA Findings and CEQA Determinations for Potential Construction Impacts of the Underground Emphasis LRT Alternative

Topic	Potentially Significant Impact Before Mitigation?		Potentially Significant Impact After Mitigation?	
	NEPA	CEQA	NEPA	CEQA
Traffic Circulation	Yes	Yes	Yes	Yes
Displacements and Relocation	Yes	Yes	No	No
Air Quality	Yes	Yes	Yes	Yes
Noise and Vibration	Yes	Yes	No	No
Community and Neighborhood Impacts	Yes	No	No	No
Visual and Aesthetic Resources	No	No	No	No
Geotechnical/ Subsurface/ Seismic/ Hazardous Materials	Yes	Yes	No	No
Historic / Archeological Impacts	Yes	Yes	No	No
Paleontology	Yes	Yes	No	Yes
Water Resources	Yes	Yes	No	No
Economic and Fiscal Impacts	Yes	Yes	No	No
Ecosystems and Biological Resources	Yes	Yes	No	No
Parklands and Other Community Facilities	Yes	Yes	No	No
Safety and Security	No	No	No	No

4.18.3.4.1 Traffic Circulation and Parking

For this build alternative, temporary lane changes, parking losses, and changes to pedestrian and bicycle flow due to construction activities would be the same as the Underground Emphasis LRT Alternative west of Central Avenue.

Construction of the proposed Alameda Street portal north of Temple Street would result in the reduction of roadway capacity for extended time periods during construction. Two through travel lanes would be maintained in each direction along Alameda Street from Temple Street northwards, tapering back to three through lanes in each direction near Aliso Street. As a result of this configuration, the two-way left turn median in the mid-block area and the exclusive right and left turn lanes at the southbound intersection approach at Temple Street would be temporarily eliminated over the period needed to construct the portal. The southbound intersection lane configuration at Temple Street would consist of a shared through and right turn lane and a shared through and left turn lane.

The existing signal phasing may be changed to split phasing to minimize conflicts between southbound left turns and the opposing northbound through movements. This would help prevent the formation of queues behind vehicles waiting for a gap in opposing traffic to complete left turn movements. Consequently, travel times for vehicles along this segment of Alameda Street would be expected to increase due to the potential for additional congestion and changed operating conditions at the intersection of Temple and Alameda Streets.

On 1st Street between Alameda and Vignes Streets, one through travel lane in each direction would need to be removed temporarily during construction. This could cause additional congestion. However, the 1st Street bridge is currently operating one-way eastbound with only two lanes, and lengthy delays do not frequently occur.

Parking impacts due to construction activities would be the same as the Underground Emphasis LRT Alternative east of Central Avenue (unless the entire block is required for construction, in which case, additional off-street parking would be lost). The construction of the proposed Alameda Street portal north of Temple Street would result in the displacement of loading areas for extended time periods during construction.

Reduction of roadway capacity for extended time periods during construction activities and the elimination of the sidewalk on the east side of Alameda Street due to the construction of the Alameda Street portal could potentially impact both pedestrian and bicycle flow. Roadway capacity would also be temporarily reduced on 1st Street between Alameda and Vignes Streets.

The operational phase of the Fully Underground LRT Alternative would result in the restoration of the travel lanes and parking, pedestrian, and bicycle facilities to their permanent configurations. Potential short term, adverse impacts are anticipated during construction of this alternative. Impacts to traffic circulation during construction would be short term, but they would contribute to a potential cumulative adverse effect when added to other projects in the downtown area. Therefore, potential cumulative adverse traffic circulation impacts are anticipated under the Fully Underground LRT Alternative.

4.18.3.4.2 Displacements and Relocation

Compared to the Underground Emphasis LRT Alternative, up to five additional full takes, one fewer partial take, and two additional permanent underground easements would be required to construct the Fully Underground LRT Alternative. However, temporary construction easements, used for staging of equipment and materials during construction of the Fully Underground LRT Alternative, would impact three fewer parcels than the Underground Emphasis LRT Alternative (five parcels in total). The portions of these parcels that would be utilized would be plazas and open areas. Access to businesses and existing buildings would be maintained. Sidewalks and detour routes would also be configured as needed. Mitigation would minimize the potential adverse impacts associated with this type of displacement during construction. In addition, once construction is completed, the sites would be restored to their permanent configurations.

4.18.3.4.3 Community and Neighborhood Impacts

Disruption of traffic patterns would restrict, but not eliminate, access to residences and businesses, though to a lesser extent than the other build alternatives. In Little Tokyo, there would be less disruption to traffic along Alameda and 1st Streets than with the Underground Emphasis LRT Alternative because this alternative does not include the excavation and construction of the Alameda Street underpass or construction of the potential pedestrian bridge across Alameda Street. However, the cut and cover construction of the rail junction beneath the intersection of 1st and Alameda Streets could still cause disruption. The installation of TBMs either at Little Tokyo or Bunker Hill could pose temporary disruptions for businesses and residents, particularly Savoy and Honda Plaza in Little Tokyo and the Bunker Hill Towers. Without mitigation, potential adverse construction impacts associated with community and neighborhoods would be anticipated under the Fully Underground LRT Alternative.

During utility relocation, mobility would be reduced in the Civic Center, the Historic Core, and Little Tokyo areas. Disruption of traffic patterns would affect access for residents and businesses, though to a lesser extent than the other two build alternatives. This could impact the economic vitality of some businesses, particularly in Little Tokyo, where the community has expressed concern about construction activities. Prolonged disruption to businesses could affect the cohesion of some communities, including Little Tokyo. Without mitigation, potential adverse indirect construction impacts associated with community and neighborhoods would be anticipated under the Fully Underground LRT Alternative.

4.18.3.4.4 Air Quality

The Fully Underground LRT Alternative would have greater construction emissions than the Underground Emphasis LRT Alternative because of the additional excavation needed for the underground station at 2nd Street and Central Avenue as well as the underground junction beneath Alameda and 1st Streets. Additional truck trips to dispose of excavated material would also be needed. This would result in an increase in NO_x and diesel particulate matter emissions.

In addition to evaluating emissions on a regional level, construction emissions were also compared to SCAQMD's localized significance thresholds. The maximum localized construction emissions would occur during cut and cover construction of the tunnel along Flower Street, cut and cover construction of the Flower/5th/4th Street station, and cut and cover construction of the 2nd Street/Broadway station. The maximum daily localized emissions would be approximately 300 ppd of NO_x, 170 ppd of CO, 11 ppd of $PM_{2.5}$ and 13 ppd of $PM_{10.}$ Daily construction emissions are anticipated to exceed SCAQMD localized significance thresholds for NO_x, and PM_{10}, and $PM_{2.5}$ and would result in a potential adverse localized air quality construction effect.

4.18.3.4.5 Noise and Vibration

Construction of the underground alignment along Alameda and 1st Streets would result in additional areas of noise and vibration beyond those identified for the Underground Emphasis LRT Alternative. Additional exposure to sensitive receptors adjacent to these areas is expected. Construction activities would result in the same levels of noise and vibration described under the Underground Emphasis LRT Alternative. The closer proximity of these activities to sensitive receptors along Alameda and 1st Streets would intensify the level of impacts compared to the Underground Emphasis LRT Alternative.

Construction activities with the greatest potential to cause noise impacts would be: cut and cover construction along Flower Street, cut and cover construction of the Flower/5th/4th Street station, cut and cover construction of the approach to the 2nd/Hope Street station, construction of the 2nd/Hope Street station, cut and cover construction of the 2nd Street /Broadway station, and open cut construction of the 2nd Street/Central Avenue station. These activities would have the greatest potential for noise impacts due to the duration of the proposed work and proximity to noise sensitive land uses.

Under the Fully Underground LRT Alternative, the at-grade junction and underpass on Alameda Street would not be constructed. This would remove a noise source in the Little Tokyo community that would last for a two to three year period under the At-Grade and Underground Emphasis LRT Alternatives. However, noise would still be generated by construction of the underground junction beneath 1st and Alameda Streets and the new portals on 1st Street and near Temple and Alameda Streets. Adverse effects from construction noise would still be expected without the implementation of mitigation measures.

The potential for construction vibration to cause building damage and annoyance impacts would be the same as identified for the Underground Emphasis LRT Alternative. Without the implementation of mitigation measures, vibration impacts would be potentially significant under the Fully Underground LRT Alternative.

4.18.3.4.6 Parklands and Other Community Facilities

Community resources in Little Tokyo (MOCA, Go For Broke Monument, and JANM) would experience fewer impacts associated with restricted access compared to the Underground Emphasis LRT Alternative because the Fully Underground LRT Alternative does not include surface track work, an underpass, or a pedestrian bridge at the intersection of Alameda and 1st Streets. Instead, an underground junction would be built at this location using the cut and cover method, along with portals near Temple and Alameda Streets and on 1st Street east of Alameda Street. Response times for emergency services could also be impacted, but to a lesser extent than the At-Grade Emphasis LRT Alternative. Despite these improvements, potential adverse construction impacts associated with parklands and other community facilities are still anticipated under the Fully Underground LRT Alternative without mitigation.

4.18.3.4.7 Economic and Fiscal Impacts

The economic effects of temporary street closures would not be as severe as with the Underground Emphasis LRT Alternative due to lack of construction activities such as an at-grade junction in the intersection of 1st and Alameda Streets and an Alameda Street underpass and pedestrian bridge. Other elements, such as the underground junction beneath 1st and Alameda Streets and the new portals at Temple and Alameda Streets and on 1st Street east of Alameda Street, would still cause disruption. The potential temporary economic impacts caused by construction of the Fully Underground LRT Alternative would be primarily limited to the vicinity of station and portal sites, and would be similar to the Underground Emphasis LRT Alternative.

4.18.3.4.8 NEPA Finding and CEQA Determination

The Fully Underground LRT Alternative would have adverse construction impacts related to the environmental topics shown in Table 4.18-6. Most of these potential impacts could be reduced to a less than significant level by the mitigation measures proposed in under resource-specific sections in Section 4. However, there would still be unavoidable adverse impacts with respect to traffic circulation, air quality, and paleontological resources.

The Fully Underground LRT Alternative would not have significant construction-related impacts when proposed mitigation measures are implemented. Table 4.18-6 also indicates which of these potential impacts would remain significant after implementation of the mitigation measures discussed in Section 4.18-4.

Table 4.18-6. NEPA Findings and CEQA Determinations for Potential Construction Impacts of the Fully Underground LRT Alternative

Topic	Potentially Significant Impact Before Mitigation?		Potentially Significant Impact After Mitigation?	
	NEPA	CEQA	NEPA	CEQA
Traffic Circulation	Yes	Yes	Yes	Yes
Displacements and Relocation	Yes	Yes	No	No
Air Quality	Yes	Yes	Yes	Yes
Noise and Vibration	Yes	Yes	No	No
Community and Neighborhood Impacts	Yes	No	No	No
Visual and Aesthetic Resources	No	No	No	No
Geotechnical/ Subsurface/ Seismic/ Hazardous Materials	Yes	Yes	No	No
Historic / Archeological Impacts	Yes	Yes	No	No
Paleontology	Yes	Yes	No	Yes
Water Resources	Yes	Yes	No	No
Economic and Fiscal Impacts	Yes	Yes	No	No
Ecosystems and Biological Resources	Yes	Yes	No	No
Parklands and Other Community Facilities	Yes	Yes	No	No
Safety and Security	No	No	No	No

4.18.4 Mitigation Measures

4.18.4.1 No Build and TSM Alternatives

No potentially significant adverse direct, indirect, or cumulative construction impacts are anticipated for the No Build and TSM Alternatives. Therefore, no mitigation measures would be required.

4.18.4.2 At-Grade Emphasis LRT Alternative

4.18.4.2.1 Transportation, Circulation, and Parking

During the final design phase of the project, site and street specific Worksite Traffic Control Plans would be developed in cooperation with the LADOT to accommodate the required traffic, pedestrian, and bicycle movements. The following mitigation measures would offset the anticipated direct and cumulative impacts.

To the extent practical, traffic lanes would be maintained in both directions, particularly during the morning and afternoon peak traffic hours. Access to adjacent businesses, via existing or temporary driveways, would be maintained throughout the construction period. In some cases, specific construction techniques may be utilized by the contractor to minimize construction envelopes. This could include the use of segmental construction, which would help minimize the need for extensive falsework on the ground. Apart from the proposed elimination of eastbound travel between Hill and Main Streets on 2nd Street, at least one traffic lane in each direction, in addition to pedestrian access, would be maintained during construction activities. Alternately, the construction contractor may elect to close 2nd Street entirely during construction between Figueroa and Los Angeles Streets. Designated haul routes for trucks would be identified during the final design phase of the project. These routes would be identified and located so as to minimize noise, vibration, and other possible impacts to adjacent businesses and neighborhoods. Following completion of the project, slight roadway restorations may be needed in areas that experienced frequent project-related truck trips.

A parking mitigation and circulation plan would be developed by the contractor in coordination with Metro and LADOT prior to construction to minimize impacts on curb parking. It may be possible to sequence construction activities so that multiple blocks of on-street parking are not temporarily removed simultaneously. This strategy would maximize the number of on-street parking spaces available near the construction area. Some of the proposed parking mitigation measures associated with permanent parking displacements could be developed early so that they may be utilized during the construction. Metro may also lease parking lots for construction employees, if necessary.

4.18.4.2.2 Displacements and Relocation

Where temporary construction easements are unavoidable, Metro would follow the provisions of the Uniform Act, as amended and implemented pursuant to the Uniform Relocation Assistance and Real Property Acquisition Regulations for Federal and Federally Assisted Programs adopted by the USDOT, dated February 3, 2005. Metro would apply acquisition and relocation policies to comply with the Uniform Act and amendments. All real property acquired by Metro would be appraised to determine its fair market value. Just compensation, which would not be less than the approved appraisal value made to each property owner, would be offered by Metro.

Potential adverse direct impacts associated with temporary construction easements are anticipated due to the construction and operation of the At-Grade Emphasis LRT Alternative. The following potential mitigation measures would offset these impacts:

- Access to the Little Tokyo Library Branch would be maintained at all times during construction of the At-Grade Emphasis LRT Alternative.
- Adequate bus stop relocation and route detours would be implemented where bus stops would be displaced due to street closures. Adequate signage and noticing indicating the relocated bus stop would be placed at strategic locations, as determined by Metro Operations.

4.18.4.2.3 Community and Neighborhood Impacts

Potential adverse direct and indirect impacts associated with community and neighborhoods are anticipated due to construction of the At-Grade Emphasis LRT Alternative. Implementation of the following proposed mitigation measures would offset these impacts:

- Whenever possible, detours would be developed for any roadways or sidewalks that must be closed during construction. Signs would be posted in appropriate languages to alert pedestrians and vehicles of any road or sidewalk detours. Pedestrian detours would be accessible to seniors and disabled persons.
- Early notification would be given to emergency service providers of any road closures or detours.
- A community outreach plan would be developed to notify local communities of construction schedules, and road and sidewalk detours. Metro would coordinate with local communities during preparation of the traffic management plans to minimize potential construction impacts to community resources and special events. Efforts would be made to limit construction activities during special events when possible.
- Metro would develop a construction mitigation plan with community input to directly address specific construction impacts in the Little Tokyo community.

4.18.4.2.4 Visual Resources and Aesthetics

No adverse effects were identified related to construction impacts on scenic or aesthetic resources and so no mitigation measures would be required.

4.18.4.2.5 Air Quality

The direct effects of lane closures and intersection improvements during construction activities would reduce traffic speeds and result in increased emissions, particularly CO emissions, at major points of delay. Detour routes would ensure that traffic does not idle for extended periods of time, thus reducing the potential for localized exceedance of the federal CO standards. Construction-related air quality impacts would be temporary. With the implementation of mitigation measures, the potential adverse direct and cumulative construction effects would be partially offset:

- Water or a stabilizing agent would be applied to exposed surfaces in sufficient quantity to prevent generation of dust plumes.
- Track-out would not extend 25 feet or more from an active operation and track-out would be removed at the conclusion of each workday.
- Contractors would be required to utilize at least one of the measures set forth in South Coast Air Quality Management District Rule 403 section (d)(5) to remove bulk material from tires and vehicle undercarriages before vehicles exit the project site.
- All haul trucks hauling soil, sand, and other loose materials would maintain at least six inches of freeboard in accordance with California Vehicle Code Section 23114.
- All haul trucks hauling soil, sand, and other loose materials would be covered (e.g., with tarps or other enclosures that would reduce fugitive dust emissions).
- Traffic speeds on unpaved roads would be limited to 15 mph.
- Operations on unpaved surfaces would be suspended when winds exceed 25 mph.
- Heavy equipment operations would be suspended during first and second stage smog alerts.
- On-site stockpiles of debris, dirt, or rusty materials would be covered or watered at least two times per day.
- Contractors would use non-electric equipment and non-electric vehicle engines built in 2014 or later.
- Contractors would utilize electricity from power poles rather than temporary diesel or gasoline generators, as feasible.
- Heavy-duty trucks would be prohibited from idling in excess of five minutes, both on- and off-site.
- Construction parking would be configured to minimize traffic interference.
- Construction activity that affects traffic flow on the arterial system would be limited to off-peak hours, as feasible.

4.18.4.2.6 Noise and Vibration

Noise-control measures during construction would be required to minimize adverse effects on existing noise-sensitive land uses. All construction activities would have to comply with local noise ordinances and noise regulations. The measures listed in this section are examples of those that would be incorporated and should be re-evaluated in greater detail during preliminary design because adverse effects to residences cannot be accurately determined without detailed construction plans and schedules.

If survey of nearby structures finds buildings susceptible to vibration damage, a monitoring plan would be developed and committed to during project construction to ensure appropriate measures are taken to avoid any damage to historic buildings due to construction-induced vibration. These measures would also further reduce annoyance from ground borne vibration to sensitive land uses. Once adopted, mitigation measures would be incorporated into site-specific construction plans to minimize adverse noise effects to sensitive receivers along the project corridor. Equipment noise emission limits also would be developed and/or adopted from existing sources. Construction hours would be set, and construction activity noise level emission criteria would be determined and compliance required during construction. Implementation of mitigation measures would offset the anticipated direct noise and vibration construction effects:

- When possible, maintaining distances greater than required would help to avoid potential construction-related vibration damage.
- Where construction vibration may be problematic, Metro would use less vibration-intensive construction equipment or techniques near vibration-sensitive structures or operations to reduce the potential for damage or annoyance from ground borne vibration.
- Heavily laden vehicles would be routed away from vibration-sensitive locations.
- Earthmoving equipment would be routed as far away as possible from vibration-sensitive locations by site layout considerations. Metro would use chemical splitting or hydraulic jack splitting and drilled soldier piles would be used instead of high impact methods.
- Construction activities that produce vibration such as demolition, excavation, earthmoving, and ground impacting would be sequenced such that the vibration sources operate separately and not simultaneously.
- Nighttime construction activities that produce noticeable vibration would be avoided because people are more likely to be home and more sensitive to vibration at night.
- The smallest vibration-producing device possible to accomplish necessary tasks while minimizing excess vibration would be used.
- Non-impact demolition and construction methods would be selected, such as saw or torch cutting and removal for off-site demolition; chemical splitting or hydraulic jack splitting would be used instead of high impact methods.
- Use of pavement breakers and vibratory rollers and packers would be avoided near sensitive uses.
- Temporary sound wall and noise blankets would be installed at off-street construction staging sites where activity on the site would be continuous such as the TBM launch and excavation sites, and at the station sites. These walls would be decorated with local artistry and maintained regularly.

4.18.4.2.7 Geotechnical/Subsurface/Seismic/Hazardous Materials

Implementation of the following proposed mitigation measures and plans would offset the direct adverse geotechnical, subsurface, seismic, or hazardous materials impacts during construction:

- Design criteria would be established during project design that requires the construction contractor to limit movement to less than an acceptable threshold value as a performance standard. This acceptable threshold standard would be a function of several factors including, but not limited to, the type of structure and its existing condition. Additional data and survey information would be gathered during preliminary engineering for each building to enable assessment of the tolerance of the subject structures. In addition, standard threshold criteria and guidelines published by agencies and for similar type of structures would be reviewed. Additional geotechnical studies would be performed to define the nature of the soils and to refine the means of achieving the performance specification.

- Ground improvement such as grouting or other methods to fill voids where appropriate and offset potential settlement when excess material has been removed during excavation would be required. The criteria for requiring grouting or ground improvement would be based on the additional data collection and reviews as noted above and the acceptable threshold value.

- The tunnel alignment would be grouted in advance to provide adequate soil support and minimize settlement as geotechnical conditions require.

- Settlement would be monitored along project alignment using a series of measuring devices above the route of the alignment. Leveling surveys would be conducted prior to tunneling, to monitor for possible ground movements.

- A preconstruction survey of buildings would be conducted to establish a baseline for measuring potential construction-induced damage.

- Tunnel construction monitoring requirements would be described and defined. In addition, provisions could be included to use the Earth Pressure Balance or Slurry TBM for tunnel construction to minimize ground loss. During tunnel construction, the soils encountered would be monitored relative to anticipated soil conditions as described in a Geotechnical Report.

A Contaminated Soil/Groundwater Management Plan would be implemented during construction to establish procedures to follow if contamination is encountered. The plan would be prepared during the final design phase of the project, and the construction contractor would be held to the level of performance specified in the plan. The plan would include the following:

- Notification procedures and contact information for appropriate regulatory agencies

- Procedures for sampling and analysis of soil and/or groundwater known or suspected to be impacted by hazardous materials

- Procedures for the proper handling, storage, transport, and disposal of contaminated soil and/or groundwater, in consultation with regulatory agencies
- Dust control measures (e.g., soil wetting, wind screens, etc.) for contaminated soil
- Groundwater collection, treatment and discharge procedures and applicable standards

A Worker Health and Safety Plan would be implemented prior to the start of construction activities. All workers would be required to review the plan, receive training if necessary, and sign the plan prior to starting work. The plan would, at a minimum, identify the following:

- Properties of concern and the nature and extent of contaminants that could be encountered during excavation activities
- All appropriate worker, public health, and environmental protection equipment and procedures
- Emergency response procedures, including most direct route to a hospital
- The Site Safety Officer

During construction of the underground portions of the At-Grade Emphasis LRT Alternative mitigation would be required to address the potential indirect impact of the creation of a preferential pathway and resulting spread of existing groundwater contamination. This could entail the use of impermeable grout where necessary to fill gaps between the tunnel and the surrounding earth along underground portions of the alignment where groundwater contamination exists.

To reduce potential impacts from subsurface gases associated with oilfields in the vicinity of the project area, mitigation measures would be implemented during construction of the underground portions of the At-Grade Emphasis LRT Alternative to address both exposure to toxic gases and the risk of explosion. This would be particularly important in methane zones and methane buffer zones, but testing would be required in all underground segments, as oilfield gases could occur outside of mapped zones. Specific precautions to protect workers and the public from exposure to toxic gases would be required, and specialized excavation methods would be needed to prevent explosion. Prior to building demolition, surveys of asbestos containing materials and lead-based paint would be conducted. If necessary, destructive sampling would be used. All asbestos containing materials and lead-based paint would be removed or otherwise abated prior to demolition. Removal and abatement activities would comply with all applicable laws, regulations, and rules.

4.18.4.2.8 Water Resources

If contaminated groundwater is encountered during initial drilling and water quality testing prior to construction, and it is determined that there is potential for the contamination to spread, this would be mitigated during the design and engineering process. For example, it could be specified that impermeable concrete-based grouting materials be used to fill the gap between the tunnel and the surrounding earth. The permeability of grouting materials is lower than surrounding soil types and this would reduce the possibility that the tunnel could serve as a preferential pathway for contaminant migration. Additional BMPs that would address potential impacts from encountering contaminated groundwater and groundwater dewatering activities are proposed in Appendix U.

Additional potential construction mitigation measures to offset direct impacts could include:

- Establishment of an erosion control plan prior to the initiation of construction activities. The erosion control plan would include:
  - Use of natural drainage, detention ponds, sediment ponds, or infiltration pits to allow runoff to collect and reduce or prevent erosion
  - Use of barriers to direct and slow the rate of runoff and to filter out large-sized sediments
  - Use of down-drains or chutes to carry runoff from the top of a slope to the bottom
  - Control of water use for irrigation and dust control so as to avoid off-site runoff

Potentially significant impacts to water quality stemming from construction of the Regional Connector project could be mitigated with the following measures as appropriate:

- Project design that includes properly designed and maintained biological oil and grease removal systems in new storm drain systems to treat water before it leaves project sites
- Proper storage of hazardous materials to prevent contact with precipitation and runoff
- Development and maintenance of an effective monitoring and cleanup program for spills and leaks of hazardous materials
- Placement of equipment to be repaired or maintained in covered areas on a pad of absorbent material to contain leaks, spills, or small discharges
- Periodic and consistent removal of landscape and construction debris
- Removal of any significant chemical residue on the project sites through appropriate methods
- Use of non-toxic alternatives for any necessary applications of herbicides or fertilizers
- Installation of detention basins to remove suspended solids by settlement
- Periodic monitoring of the water quality of runoff before discharge from the site and into the storm drainage system

4.18.4.2.9 Cultural/Archeological Resources

The Regional Connector Transit Corridor project may impact one or more National Register- or California Register-eligible archeological sites, including the Los Angeles Zanja System, along with an unknown number of previously unidentified archeological resources. In the event that resource avoidance is not possible, and to mitigate impacts to previously unidentified archeological resources, the following mitigation measures could be implemented.

Historic Resources

- Historic Properties/Historical Resources Documentation. Documentation of historic properties and historical resources adversely affected by the project would consist of the development of individual Historic American Building Survey/Historic American Engineering Record (HABS/HAER) submissions. The HABS/HAER documents would be prepared so that the original archival-quality documentation could be donated for inclusion in the Library of Congress if the National Park Service accepts these materials. Archival copies of the documentation would also be offered for donation to local repositories, including the Los Angeles Central Library and the Los Angeles Conservancy. The appropriate level of recordation would be established in consultation with the California SHPO and formalized as a part of an MOA.

- Pre-Construction Baseline Survey And Geo-Technical Investigations. A survey of historic properties and/or historical resources within 21 feet of vibration producing construction activity would be conducted to assess the building category and the potential for ground borne vibration to cause damage. The survey would also be used to establish baseline, preconstruction conditions for historic properties and historical resources. During preliminary and final design of the project, subsurface (geotechnical) investigations would be undertaken under this measure to evaluate soil, groundwater, seismic, and environmental conditions along the alignment. This analysis would assist in the development of appropriate support mechanisms for cut and fill construction areas. The subsurface investigation would also identify areas that could experience differential settlement as a result of using a tunnel boring machine in close proximity to historic properties and/or historical resources. An architectural historian or historical architect who meets the Secretary of the Interior’s Professional Qualification Standards would provide input and review of final design documents prior to implementation of measures (36 CFR Part 61).

- Building Protection Measures, Geotechnical and Vibration Monitoring, and Post Construction Survey. For those historic properties and historical resources that have the potential to be affected or impacted by ground borne vibrations and/or differential settlement, Metro would use building protection measures such as underpinning, soil grouting, or other forms of ground improvement, as well as lower vibration equipment and/or construction techniques. These techniques, combined with a geotechnical and vibration monitoring program, would help protect identified historic properties and historical resources. The historic property and historical resource protection measures as well as the geotechnical and vibration monitoring program would be reviewed by an architectural historian or historical architect who meets the Secretary of the Interior’s Professional Qualification Standards (36 CFR Part 61) to ensure that the measures would adequately protect the properties/resources. A post construction survey would also be undertaken to ensure that no adverse effects or significant impacts had occurred to historic properties and historical resources.

- TBM Specifications/Requirements Near Historic Properties And Historical Resources. For those historic properties and historical resources that have the potential to be affected or impacted by differential settlement caused by TBM construction, a contractor would be required to develop and use an earth pressure balance or slurry shield tunnel boring machine. The method of machine operation would be based on the anticipated ground conditions near historic properties and historical resources. These construction methods and machinery types would reduce the potential for differential settlement near historic properties and historical resources.
- Memorandum of Agreement. For those historic properties and historical resources that would be anticipated to experience adverse effects, a memorandum of agreement would be developed to resolve those adverse effects consistent with 36 CFR 800. This agreement, developed by FTA and Metro in consultation with the CA SHPO and other consulting parties would resolve and/or avoid, minimize, or mitigate potential effects to historic properties and/or historical resources. The agreement would include stipulations that outline the specific requirements for consultation and decision making between the lead federal agency and consulting parties, specify the level of HABS/HAER recordation, and outline specific requirements for pre- and post- construction surveys, geotechnical investigations, building protection measures, and TBM specifications.

Archaeological Resources

A detailed Cultural Resources Monitoring and Mitigation Plan (CRMMP) would be prepared prior to implementation of this project, similar in scope to the CRMMP that was prepared for Metro Gold Line to East Los Angeles (Glenn and Gust 2004). Implementation of a CRMMP during ground disturbance in highly sensitive archeological areas would ensure that cultural resources are identified and adequately protected. If cultural resources are discovered or if previously identified resources are affected in an unanticipated manner, the Monitoring Plan would also ensure that such resources receive mitigation to reduce the impact to less than significant levels. This plan would include, but not be limited to, the following elements:

- Worker training
- Archeological monitoring
- Scientific evaluation and mitigation of archeological discoveries
- Native American participation, as needed
- Appropriate treatment of human remains, if applicable
- Reporting of monitoring and mitigation results

Treatment of Known Archeological Resources

The destruction of a resource that is eligible for listing in the National Register or California Register would be a significant adverse effect. This effect may be resolved through the implementation of a MOA between FTA, Metro, and the SHPO, as well as other interested parties. For the purposes of this report, four archeological sites that are either within or immediately adjacent to the direct APE are presumed eligible for listing on both the National Register and the California Register. These include the Los Angeles Zanja System and numerous unrecorded numbered zanjas and other known sites.

Effects to the data potential of archeological sites can be mitigated to a less than significant level through the preparation and implementation of a data recovery plan under Section 106 and CEQA. The actual measures agreed upon in the MOA may vary in substance and degree, but the MOA would include a process to resolve any adverse effects upon archeological resources within the direct APE that are eligible for listing in the National Register or California Register. The treatment of sites may include systematic and scientific exposure, evaluation, and if necessary, archeological data recovery.

Los Angeles Zanja System

To mitigate potential impacts to the Los Angeles Zanja system, the project MOA would provide that the system be adequately documented under the direction of an experienced archaeologist and an experienced historical architect, architectural historian, or historian, both meeting the Secretary of the Interior's qualification standards. This documentation would include a combination of historical research, archeological testing, and architectural documentation, and would be followed by a formal evaluation of National Register and California Register eligibility. The collation of available data for the system as a whole would accomplish much of the documentation effort that is advocated here, while intensive, original research would be restricted to the Zanja segments that cross the direct APE.

Such research and documentation may include such specific measures as:

- Historical research using historical maps, photographs, and other written sources to document the creation, maintenance, modification, and abandonment of the system.

- Archeological research to establish the physical condition, presence of associated features and artifacts, and precise location of each zanja segment within the project's direct APE through the use of physical exposure through controlled excavation and/or remote sensing. Resources would be documented using California Department of Parks and Recreation (DPR) series 523 primary and detail forms, maps, and photographs. The results would be presented in a detailed technical report following Archeological Resource Management Report (OHP 1990) guidelines that addresses research questions and assesses the National Register and California Register eligibility of the system.

- Architectural documentation of exposed zanja segments through the production of narrative records, measured drawings, and photographs in conformance with Historic American Engineering Record (HAER) standards prior to any alteration or demolition activity.

- Preserving the results of the historical, archeological, and historic architectural studies in repositories such as the local main library branch, the lead agency headquarters library, and with identified non-profit historic groups interested in the subject matter.

- Interpreting the Los Angeles zanja system for the public through signage along the project alignment, visual representations of zanja alignments using colored pavement, or other appropriate means such as a dedicated internet website.

4.18.4.2.10 Paleontological Resources

The following mitigation measures have been developed in accordance with the Society of Vertebrate Paleontology (SVP) (1995) standards and guidelines and meet the paleontological requirements of CEQA. These mitigation measures have been used throughout California and have been demonstrated to be successful in protecting paleontological resources while allowing timely completion of construction.

- A Qualified Paleontologist would be retained to produce a Paleontological Monitoring and Mitigation Plan for the proposed project and to supervise monitoring of construction excavations. Paleontological resource monitoring would include inspection of exposed rock units during active excavations within sensitive geologic sediments. The monitor would have authority to temporarily divert grading away from exposed fossils to professionally and efficiently recover the fossil specimens and collect associated data.

- All project-related ground disturbances that could potentially affect the Puente Formation, Fernando Formation, and Quaternary older alluvium and terrace deposits would be monitored by a qualified paleontological monitor on a full-time basis, as these geologic sediments are determined to have a high paleontological sensitivity. Very shallow superficial excavations (less than 5 feet) within Quaternary younger alluvium would be monitored on a part-time basis to ensure that underlying sensitive units are not adversely affected.

- At each fossil locality, field data forms would be used to record pertinent geologic data, stratigraphic sections would be measured, and appropriate sediment samples would be collected and submitted for analysis.

- Due to the likelihood of the presence of microfossils, matrix samples would be collected and tested within the Puente Formation and Fernando Formation. Testing for microfossils would consist of screen-washing small samples (approximately 30 pounds) to determine if significant fossils are present. Productive tests would result in screen-washing of additional bulk matrix up to a maximum of 2,000 pounds per locality to ensure recovery of a scientifically significant sample.

- Recovered fossils would be prepared to the point of curation, identified by qualified experts, listed in a database to facilitate analysis, and stored in a designated paleontological curation facility (such as the LACM).

- The Qualified Paleontologist would prepare a final monitoring and mitigation report to be filed with the client, the lead agency, and the repository.

4.18.4.2.11 Parklands and Other Community Facilities

Metro would prepare a traffic management plan to facilitate the flow of traffic in and around the construction zone and reduce restrictions to the access of public services along the alignment to the greatest extent feasible. This traffic management plan would include the following measures:

- Scheduling a majority of construction-related travel (i.e., deliveries, hauling, and worker trips) during the off-peak hours
- Developing detour routes to facilitate traffic movement through construction zones without significantly increasing cut-through traffic in adjacent residential areas
- Where feasible, temporarily re-striping roadway to maximize the vehicular capacity at those locations affected by construction closures
- Where feasible, temporarily removing on-street parking to maximize the vehicular capacity at those locations affected by construction closures
- Where feasible, stationing traffic control officers at major intersections during peak hours to minimize delays related to construction activities
- Developing and implementing an outreach program to inform the general public about the construction process and planned roadway closures
- Developing and implementing a program with business owners to minimize impacts to businesses during construction activity, including but not limited to signage programs

4.18.4.2.12 Economic and Fiscal

The following potential mitigation measures would apply to construction-related direct effects to minimize the economic construction effects of the proposed project:

- Compensation to property owners for acquisition of property in compliance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970
- Relocation assistance offered affected property and business owners in compliance with the California Relocation Act

4.18.4.2.13 Safety and Security

The following potential mitigation measures would apply to construction-related effects to minimize the direct construction effects of the proposed project:

- Providing alternate walkways for pedestrians around construction staging sites in accordance with American with Disability Act (ADA) requirements.
- Signing and properly marking all pedestrian detour locations around staging sites in accordance with the Manual on Uniform Traffic Control Devices “work zone” guidance, and other applicable local and state requirements.

- Coordinating work plans and traffic control measures with emergency responders to prevent effects to emergency response times.

- Metro would develop a Construction Mitigation Program that would be implemented during construction. The Program would guide Metro in communicating to the community and obtaining input from residents and businesses affected during construction. This would include communicating traffic control measures, schedule of activities and duration of operations.

4.18.4.2.14 Ecosystems and Biological Resources

The following potential mitigation measures would apply to construction-related removal of trees associated with the At-Grade Emphasis LRT Alternative:

- Avoid tree disturbances as much as possible. As project design progresses, it may be possible to reduce the number of trees potentially disturbed by avoidance or fencing. It may also be possible to reduce the scale of disturbance by trimming individual trees instead of removing them completely.

- Time necessary tree removal and trimming activities to seasons outside of the bird breeding season, which can extend from February 1 to August 31. If it is not feasible to avoid tree removal and trimming related to construction during the breeding bird season from February 1 to August 31, breeding bird surveys would be conducted as recommended by the California Department of Fish and Game. Two biological surveys would be conducted, one 15 days and a second 72 hours prior to construction activities that would remove or disturb suitable nesting habitat. The surveys would be performed by a biologist with experience conducting breeding bird surveys. The biologist would prepare survey reports documenting the presence or absence of active nests of any protected native bird in the habitat to be removed and any other such habitat within 300 feet of the construction work area (or within 500 feet for raptors). If an active nest is located, construction within 300 feet of the nest (or 500 feet for raptor nests) would be postponed until the nest is vacated, juveniles have fledged, and there is no evidence of a second attempt at nesting.

- If construction of the project requires removing any of the native trees located along the proposed alignment and stations for any of the build, a removal permit would be required from the Los Angeles Board of Public Works in accordance with the City of Los Angeles Native Tree Protection Ordinance. The tree removal permit may require replanting of native trees within the project area or at another location within the City of Los Angeles to mitigate for the removal of these trees. The City's ordinance requires replacement of protected trees at a 2:1 ratio and other trees at a 1:1 ratio. If construction would require pruning of any protected native tree, the pruning would be performed in a manner that does not cause permanent damage or adversely affect the health of the trees.

4.18.4.3 Underground Emphasis LRT Alternative and Fully Underground LRT Alternative

For the Underground Emphasis LRT Alternative and Fully Underground LRT Alternative, the same mitigation measures discussed for the At-Grade Emphasis LRT Alternative in Section 4.18.4.2 would apply, in addition to the following considerations.

4.18.4.3.1 Paleontological Resources

In addition to the impacts and mitigation measures discussed for the At-Grade Emphasis LRT Alternative in section 4.18.4.2.10, there would be additional impacts for the Underground Emphasis LRT Alternative and Fully Underground LRT Alternative associated with the use of TBMs. Mitigation measures are not available to offset the possible destruction of undiscovered paleontological resources in the paths of the proposed TBM tunnels.

4.19 Cumulative Impacts

This section summarizes potential cumulative impacts that could result from the Regional Connector Transit Corridor project in combination with identified past, present, and reasonably foreseeable projects. Information in this section is based on the Cumulative Impacts Technical Memorandum prepared for the project and contained in Appendix GG, Cumulative Impacts of this DEIS/DEIR.

4.19.1 Regulatory Framework

4.19.1.1 NEPA Guidance

An analysis of cumulative impacts is required by NEPA, as defined in 40 CFR 1508.7. The NEPA analysis of cumulative impacts follows the guidance of the CEQ 1997 document, *Considering Cumulative Effects Under the National Environmental Policy Act*. In accordance with this guidance, the significance of impacts is evaluated based on context and intensity. Considerations of context and intensity also include a discussion of the severity of the impacts and the likelihood of their occurrence.

The standards of significance for cumulative impacts depend on “the type of resource being analyzed, the condition of the resource, and the importance of the resource as an issue (as identified through scoping)” (CEQ 1997, p.45). Therefore, the standards of significance used for cumulative impacts are discipline-specific and may follow the same standards of significance established for the direct and indirect impacts of the project on each resource area. For some resources, limited details about other projects may prevent analysis from reaching the level of precision implied in the standards of significance for the direct and indirect impacts.

4.19.1.2 CEQA Guidance

In accordance with CEQA, a significant adverse cumulative impact would occur if an alternative would have environmental effects that are individually limited but cumulatively considerable. “Cumulatively considerable” means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects or expected growth.

The standards for “significant” or “cumulatively considerable” are based on the established significance thresholds for each resource area. However, as noted in the State *CEQA Guidelines*, cumulative impacts do not need to be discussed in as great of detail as project-level impacts. The Los Angeles *CEQA Thresholds Guide* provides some guidance for the cumulative analysis for some resource areas, but does not contain specific standards of significance for each resource area with regard to cumulative impacts.

Determining whether a cumulative impact is "considerable" should also consider the effect of mitigation measures in reducing the effect on a resource. Compliance with previously approved plans or mitigation programs may also be a guide to determining that an effect is not significant. Depending on the discipline area, demonstrating that the project is included in a regional plan or projection may be a measure of whether the project is contributing cumulative effects. Regional plans developed by the SCAG such as the RTP, the RCPG, or the RTIP may provide appropriate thresholds or mitigation measures for particular project-related effects.

4.19.2 Affected Environment

The cumulative context includes the geographic area, timeframe, and/or type of projects that would contribute to the potential cumulative effect. This context differs for each discipline. Each discipline identifies a relevant geographic area for evaluation for direct, indirect, and cumulative impacts. The geographic range considered for the cumulative analysis can vary based on the resource area.

For example, the geographic range over which air quality impacts would occur would not necessarily be the same as the geographic range considered for traffic impacts. In addition, for some disciplines the scope of analysis for cumulative impacts is based on a list of reasonably foreseeable related projects while for others it is be based on general trends in demographics or other regional forecasts.

4.19.2.1 Project Time Frames

Construction Period: 2014 -2019

The construction period is assumed to extend from 2014 to 2019. A worst-case (i.e., maximum potential impact) scenario was assumed for each discipline. For example, it is assumed that all other related projects for which there is no current construction schedule will be under construction during the project construction period. Related projects within the general project area that may be under construction during this project's proposed construction period of 2014 to 2019 are listed in Tables 4.19-3 through 4.19-5.

Year of Opening: 2019

During 2019, any potential effects from operation of the system would begin to be seen. The planning horizon for the project is 2035.

Project Baseline Year: 2035

The future year 2035 is the baseline year for assumptions regarding the No Build alternative.

4.19.2.2 Current and Reasonably Foreseeable Related Actions

There are two ways to address the question of what is reasonably foreseeable within the project area. The first is to evaluate the project effects in combination with expected trends in population, employment, land use, and transportation. The second method is to generally review a list of projected projects within the project area that are expected to be under construction or in operation during the same time frames as the proposed project. The most appropriate method may vary by discipline.

Forecasts for elements such as population, employment, land use, air quality, and transportation from regional plans were used in the analysis. Regional plans prepared by the SCAG and general plans prepared by the City and County of Los Angeles and other nearby cities provided information on trends and forecasts relevant to the impact analysis for specific disciplines.

The following tables identify projects within the general project area that are either anticipated to be completed prior to start of construction in 2014 or which may be under construction during this project's proposed construction period of 2014 to 2019. There are several subcategories identified, including major renovations, new construction, transportation, and utility projects. The locations of the new construction projects are also indentified in Figures 4.19-1 through 4.19-3.

The project lists were developed from information available from the Los Angeles Downtown Center Business Improvement District (DCBID) fourth quarter 2008 project database and the utility district CIP. The Community Redevelopment Agency of Los Angeles (CRA) also maintains lists of potential projects. However, it would appear that the projects listed in the DCBID database better meet the definition of "reasonably foreseeable". Many of these potential projects are only in the conceptual planning stages and the timing of construction or operations are unknown. Projects that do not have reported completion have been compiled in the tables of projects assumed to be under construction or completed between 2014 and 2019 as a worst-case scenario.

4.19.2.3 Projects Anticipated to be Completed Prior to 2014

Many of the projects identified in Tables 4.19-1 and 4.19-2 are currently under construction and have identified completion dates prior to 2014. These lists may also include some projects which have recently been completed. The locations of related projects are illustrated in Figure 4.19-1.

Transportation

The following transportation capital improvements within the project area are currently identified as funded under Metro's 2009 Long Range Transportation Plan and SCAG's 2008 RTIP. The projects listed in this section are anticipated to be completed prior to 2014 and are shown in Figure 4.19-2.

- Metro Gold Line to East Los Angeles: This 6-mile light rail extension of the Metro Gold Line from its current southern terminus at Union Station eastward to East Los Angeles opened in 2009. From Union Station, the tracks cross over the Santa Ana Freeway (US 101) and veer west toward Alameda Street. The tracks then follow along the east side of Alameda Street and come down to grade at the intersection of Temple and Alameda Streets. After crossing Temple Street at-grade, the tracks reach the Little Tokyo/Arts District Station on the northeast corner of 1st and Alameda Streets. The tracks then turn eastward on 1st Street and continue to East Los Angeles. With this extension, the Metro Gold Line will provide service from East Los Angeles to Pasadena.

- Eastside Four Quadrant Gate Project: This project, sponsored by Metro, would install rail crossing gates at at-grade intersections located along the portion of the Metro Gold Line to

East Los Angeles. This project would include some intersections located along Alameda and 1st Streets in Little Tokyo.

- Metro Expo Line: This 9-mile light rail line will extend from the 7th Street/Metro Center Station to Culver City and is expected to be open in 2010. It will share the boarding platforms at the 7th Street/Metro Center and Pico Stations and the tracks between 7th Street/Metro Center Station and the intersection of Flower Street and Washington Boulevard with the Metro Blue Line.

Table 4.19-1. Major Renovation Projects Anticipated to be Completed Prior to 2014[a]

Number	Project Name	Address[a]	Land Use	Units	Completion
CR1	Rowan Building Lofts	460 S. Spring Street	Residential	206	2009 Q4
CR2	Great Republic Lofts	756 S. Spring Street	Residential	72	2009 Q1
CR3	Metropolitan Lofts	315 W. 5th Street	Residential	84	2009 Q1
CR4	SB Spring	650 S. Spring Street/111 W. 7th Street	Residential	195	2009 Q1
CR5	El Dorado	416 S. Spring Street	Residential	65	2009 Q4
CR6	SB Tower	600 S. Spring Street	Residential	250	2009 Q2
CR7	Rosslyn Lofts	116 W. 5th Street	Residential	297	2009 Q4
CR8	308 E. Ninth Street	308 E. 9th Street	Residential	38	2009 Q1
CR9	Broadway Exchange Building	219 W. 7th Street/660 Broadway	Residential	68	2009 Q1
CR10	Factory Place Arts Complex	1330 Factory Place	Residential	63	2009 Q1
CR11	655 Hope	655 S. Hope Street	Residential	80	2009 Q3
CR12	Barn Lofts	940 E. 2nd Street	Residential	39	2009 Q3

[a] *All projects are located within the City of Los Angeles.*

In addition to the projects listed above, the Metro Gold Line from Pasadena to Azusa and the Metro Expo Line from Culver City to Santa Monica are expected to be completed prior to 2014. These projects are outside of the project area and may only present potential cumulative impacts for operational considerations in a few disciplines. Some cumulative impacts may be beneficial depending upon the alternative.

Utility Projects

The City of Los Angeles maintains an extensive project list of public works projects. One utility project has been identified for construction prior to year 2014. This related project involves the development of District Cooling System proposed by the City of Los Angeles, Department of Water and Power. The District Cooling System would provide air conditioning to office buildings in downtown. The project involves a cooling plant, which would be constructed near 1st Street and Beaudry Avenue with distribution lines located in 1st Street from the cooling plant to San Pedro Street. The projected build out year for this related project is 2014. Given that the project involves operation of a district cooling system with trunk lines in 1st Street, it is unlikely that it would change the existing baseline conditions. No other projects are planned before 2014 within the project area that would change the existing baseline conditions. Most of the planned projects within the City are related to ongoing maintenance or replacement in-kind of existing infrastructure.

Table 4.19-2. New Construction Projects Anticipated to be Complete Prior to 2014

Number	Project Name	Address[a]	Land Use	Units	Completion
CC1	717 Ninth	845 S. Flower Street	Residential	214	2009 Q3
CC2	The Medallion	334 S. Main Street	Mixed Use	200	2009 Q4
CC3	Concerto	900 Figueroa Street	Mixed Use	629	2009 Q3
CC4	Sakura Crossing	235 S. San Pedro Street	Mixed Use	230	2009 Q2
CC5	Hewitt-First Lofts	120-130 S. Hewitt Street	Residential	33	2009 Q3
CC6	LA Live	777 W. Chick Hearn Court	Mixed Use	224	2010 Q1
CC7	The Orsini (Phase III)	867 W. Cesar E Chavez Avenue	Residential	210	2010 Q3
CC8	Alameda and Fourth Condos	4th & Alameda Street	Residential	52	2011 Q1
CC9	Hanjin Group	7th and Figueroa	Mixed Use	unknown	2014

4.19.2.4 Projects Potentially Under Construction 2014 to 2019

Tables 4.19-3, 4.19-4, and 4.19-5 show projects which are currently in some stage of conceptual planning, but which do not have a defined schedule. Given the uncertainties of project development compounded by the current economic conditions, the probability that these projects will occur is unknown. It may be reasonable to assume that this compilation of projects represents a worst case condition for the construction period. The locations of these related projects are shown in Figure 4.19-3.

Major Renovations

Projects located within the project area that propose to convert offices to residential housing and/or which involve a major renovation of an existing structure are listed in Table 4.19-4.

Table 4.19-3. Institutional and Public Facility Projects Expected to be Completed by 2014[a]

Number	Project Name	Address[a]	Land Use
CC10	Police Headquarters Building	1st Street between Main and Spring	Institution
CC11	Police Headquarters Vehicle Maintenance Facility	Main Street between 2nd and 3rd Streets	Institution
CC12	Metropolitan Detention Center	Temple & Los Angeles Street	Institution

[a] *All projects are located within the City of Los Angeles.*

New Construction

Figure 4.19-3 provides a map of the location of new potential construction projects in the project area. New construction encompasses building new structures on vacant lots, as well as any demolition of older structures needed to clear the lots for construction.

Table 4.19-4. Major Renovation Projects Potentially Under Construction 2014-2019[a]

Number	Project Name	Street Address[a]	Land Use	Units
R1	Chester Williams Building	5th Street & Broadway	Residential	82
R2	Cosavings Building	315 W. 9th Street	Residential	98
R3	Former Beacon Storage Building	350 S. Alameda Street	Residential	59
R4	Giannini Place	649 S. Olive Street	Residential	100
R5	Gill Lofts	752-756 S. Los Angeles	Residential	9
R6	Herald Examiner	1111 S. Broadway	Mixed Use	587
R7	Mercantile Arcade Building	541 S. Broadway	Residential	140
R8	Chinatown Lofts	Not Mapped	Mixed Use	318

[a] *All projects are located within the City of Los Angeles.*

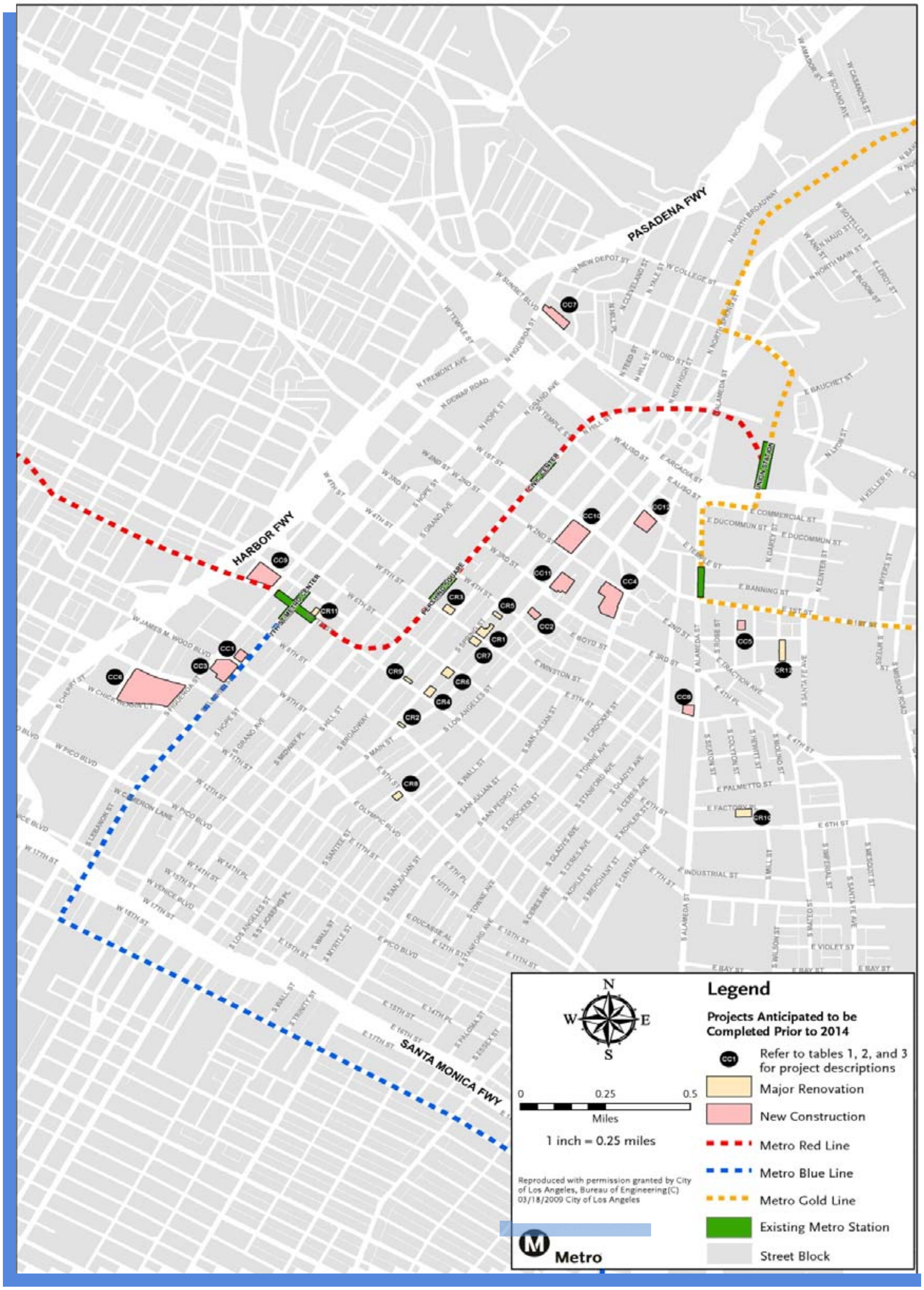


Figure 4.19-1. Projects Anticipated to be Completed Prior to 2014

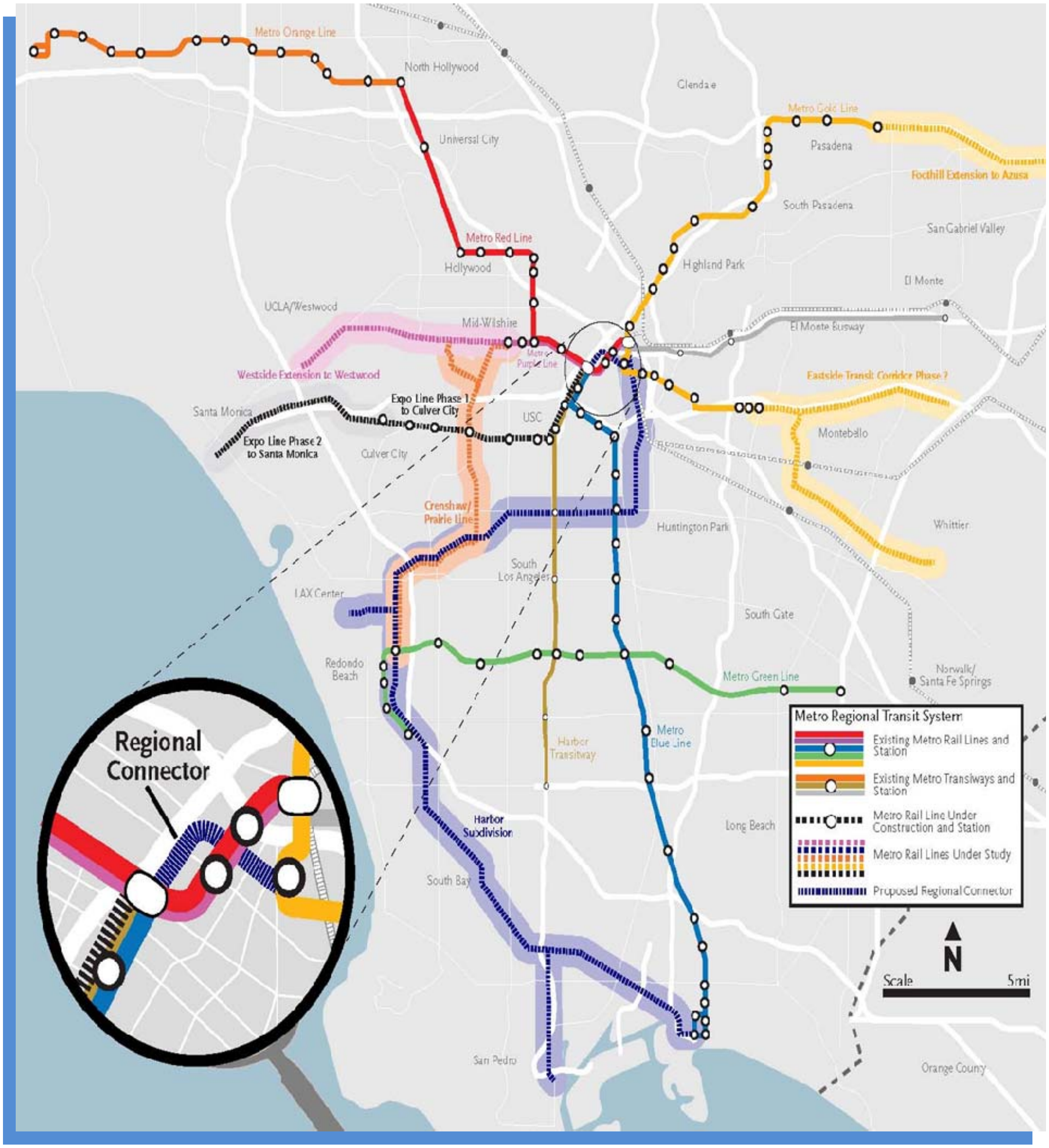


Figure 4.19-2. Year 2035 Rail Transit and Bus Rapid Transit Projects

Table 4.19-5. New Residential and Mixed Use Construction Projected For 2014-2019[a]

Number	Project Name	Street Address[a]	Land Use	Units
C1	611 Place	611 W. 6th Street	Mixed Use	402
C2	751 S. Spring Street	751 S. Spring Street	Residential	257
C3	808 N Spring Street	808 N Spring Street	Residential	123
C4	808 S. Olive Street	808 S. Olive Street	Residential	
C5	1027 Wilshire	1027 Wilshire Blvd.	Residential	402
C6	1133 S. Hope Street	1133 S. Hope Street	Residential	159
C7	1150 Grand	1150 Grand Avenue	Residential	374
C8	1340 S. Figueroa Street	1340 S. Figueroa Street	Mixed Use	
C9	1500 Figueroa	1500 S. Figueroa Street	Mixed Use	195
C10	AMP Lofts	695 S. Santa Fe Street	Mixed Use	180
C11	BC Plaza Lofts	711 N. Broadway	Residential	53
C12	Block 8	200 S. Los Angeles Street		510
C13	Blossom Plaza	900 N. Broadway	Mixed Use	262
C14	Capitol Milling Building	1231 N. Spring Street	Mixed Use	40
C15	Chinatown Gateway Plaza	617 N. Broadway	Mixed Use	280
C16	City Front Place	530 E. Washington Blvd.	Residential	136
C17	Glass Tower	1050 S. Grand Avenue	Residential	128
C18	Hai Wei	871 Figueroa Terrace	Residential	102
C19	Holland Partners Project	Not Mapped	Residential	360
C20	Industrial Lofts	1800 E Industrial Street	Residential	36
C21	L.A. Central	11th & Figueroa Street	Mixed Use	860
C22	L.A. Lofts	1024 S. Hope Street	Residential	250
C23	Lucia Tower	Grand Ave & Cesar Chavez	Residential	200

Table 4.19-5. New Residential and Mixed Use Construction Projected For 2014-2019[a] (continued)

Number	Project Name	Street Address[a]	Land Use	Units
C24	Matsu	2nd & Los Angeles Street	Residential	
C25	McGregor Company Tower	Not Mapped	Mixed Use	123
C26	Metropolis Phase I	831 Francisco Street	Mixed Use	351
C27	Metropolis Phase II	831 Francisco Street	Mixed Use	388
C28	Metropolis Phase III	831 Francisco Street	Mixed Use	88
C29	Nikkei Center	1st & Alameda Street	Mixed Use	390
C30	Olive Street Lofts	1103 S. Olive Street	Residential	105
C31	Olympic	Olympic & Grand	Residential	150
C32	One Santa Fe	230 S. Santa Fe Avenue	Mixed Use	440
C33	Opus	718 S. Grand Avenue	Residential	875
C34	Pacific Exchange	233 Beaudry Avenue	Residential	850
C35	Park Fifth	5th between Hill & Olive	Mixed Use	790
C36	Piero II	1052 W 6th Street	Mixed Use	340
C37	Renato Apartments	527-531 S. San Julian Street	Residential	123
C38	Residences @ Bixel	1110 Ingraham Street	Mixed Use	334
C39	Seven West	1401 W. 7th Street	Residential	62
C40	Shy Barry Tower II	Main & 6th Street	Residential	700
C41	South Village	8th & Hope Street	Residential	225
C42	South Village- Park Tower	9th & Hope Street	Residential	300
C43	The Grand Phase I (Parcel Q)	121 S. Olive Street	Mixed Use	500
C44	The Grand Phase II (Parcel L)	220 S. Hope Street	Mixed Use	720
C45	The Grand Phase II (Parcel M2)	236 S. Hope Street	Mixed Use	720
C46	The Grand Phase III (Parcel W2)	440 W 1st Street	Mixed Use	720

Table 4.19-5. New Residential and Mixed Use Construction Projected For 2014-2019[a] (continued)

Number	Project Name	Street Address[a]	Land Use	Units
C47	The Yards	875 E. Traction Avenue	Residential	400
C48	Ullman Tower I	Broadway between 8th & 9th Streets	Residential	320
C49	Ullman Tower II	Broadway between 9th Street & Olympic Blvd.	Residential	195
C50	Vibiana Phase II	114 E. 2nd Street	Mixed Use	300
C51	Zen	250 S. Hill Street	Residential	302

[a] *All projects are located within the City of Los Angeles.*

Table 4.19-6: New Institutional and Public Facility Construction Projected For 2014-2019[a]

Number	Project Name	Street Address[a]	Land Use
C52	Children's Museum and Art Park	Temple & Judge Aiso Street	Public
C53	Federal Courthouse	1st Street & Broadway	Institution
C54	Proposed Civic Park	Main Street to Grand Avenue	Public

[a] *All projects are located within the City of Los Angeles.*

Transportation

The following transportation capital improvements within the project area are currently identified as funded under Metro's 2009 Long Range Transportation Plan and the Southern California Association of Governments' (SCAG) 2008 Regional Transportation Improvement Program. In addition to the projects listed below, the Metro Crenshaw Line and the Metro Purple Line from Wilshire/Western to Westwood will be under construction, although they are located well outside of the project area and are not likely to present construction-related cumulative impacts.

- Congestion Reduction Demonstration Program: This program will convert existing high-occupancy vehicle (HOV or carpool) lanes to high-occupancy toll (HOT) lanes, where solo drivers could pay a toll to use the lanes. Several stretches of Los Angeles County freeway HOV lanes have been identified for this pilot program, including the El Monte Busway, which runs parallel to the Santa Ana (US 101) and San Bernardino (I-10) Freeways from Alameda Street to El Monte.

- SR 110 Auxiliary Lanes: This project would reconfigure ramp structures and construct northbound and southbound auxiliary lanes on the Harbor Freeway (SR 110) between 8th Street and the Santa Monica Freeway (I-10).

- Angels Flight Railway Rehabilitation: This project would involve an easement between Hill and Olive Streets and 3rd and 4th Streets for the construction of a new propulsion system. The rehabilitation will allow for service along the currently inactive rail line to be restored. The Angels Flight is a short funicular railway that travels the length of one city block up the side of Bunker Hill.

- Eastside Light Rail Pedestrian Linkages: This project, sponsored by the City of Los Angeles, would improve pedestrian access to the Metro Gold Line to East Los Angeles stations, including the Little Tokyo/Arts District Station at 1st and Alameda Streets.

- Fashion District Streetscape Phase II: This project would provide streetscape and sidewalk enhancements to facilitate increased pedestrian activity between the Fashion District and the 7th Street transit corridor. The Fashion District is roughly bounded by 7th Street, Main Street, San Pedro Street, and the Santa Monica Freeway (I-10).

- Downtown Los Angeles Alternative Green Transit Modes Trial Program: This program would offer shared-ride bicycles and neighborhood electric vehicles as an alternative to existing DASH shuttle services for the purpose of accessing City Hall. City Hall is located within the block bounded by 1st, Spring, Temple, and Main Streets.

- Little Tokyo Pedestrian Linkages: This City of Los Angeles project would create sidewalk and crosswalk enhancements to encourage pedestrian activity within the Little Tokyo area. The project also calls for new landscaping and street furniture.

- East Downtown Truck Access Improvements: This City of Los Angeles project calls for roadway improvements, widening, and restriping to facilitate truck access to the industrial area in the southeastern portion of the project area.

- Route 101 Southbound Improvements: This State of California Department of Transportation (Caltrans) project calls for replacement of the southbound Vignes Street and Hewitt Street ramps with new ramps at Garey Street on the northeast corner of the project area.

- Route 101 Pedestrian Bridge Enhancement: This City of Los Angeles project calls for the enhancement of pedestrian bridges across the Santa Ana Freeway (US 101) along the northern edge of the project area.

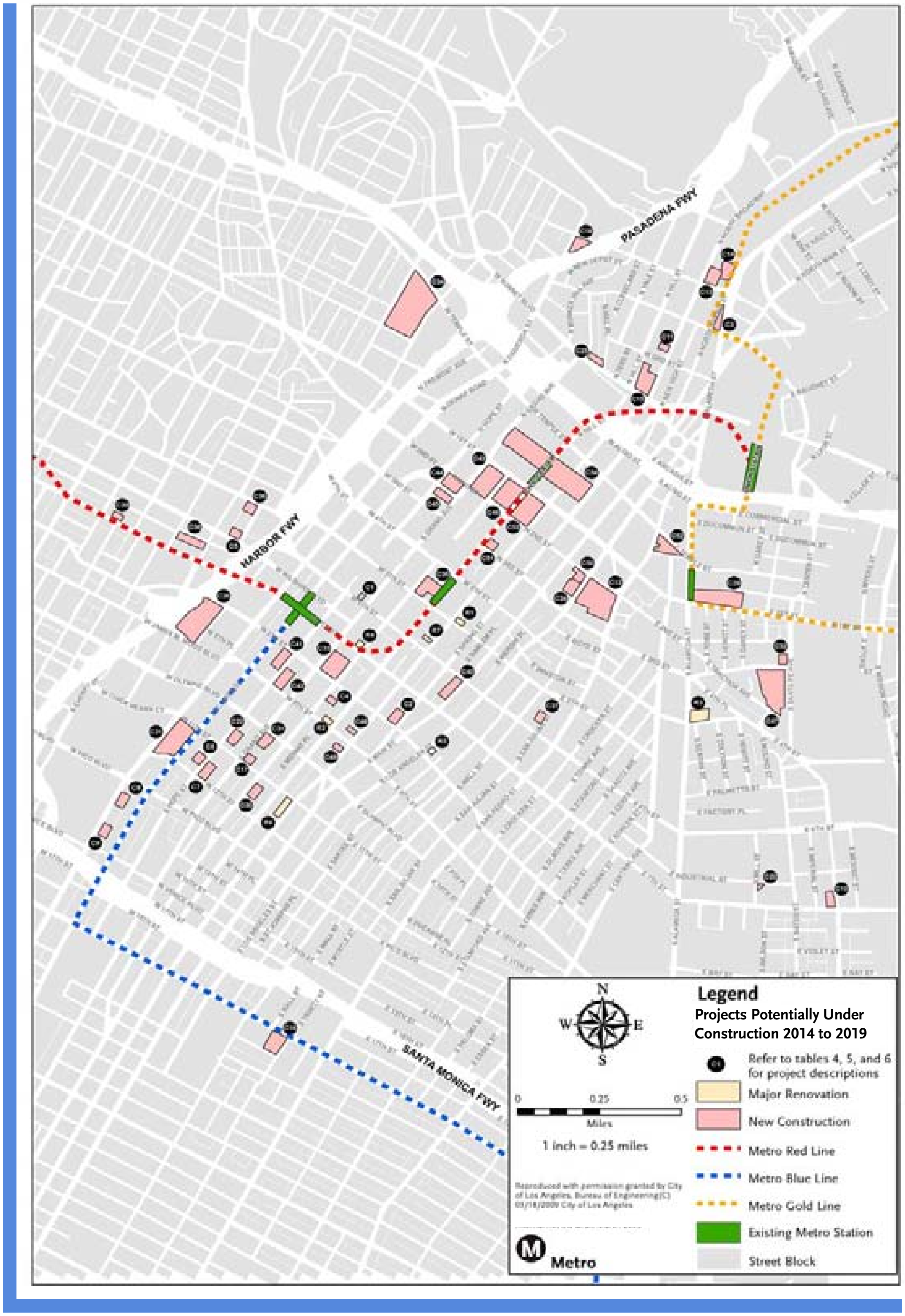


Figure 4.19-3. Projects Potentially Under Construction 2014 to 2019

The following two projects are not currently included in the regional transportation plans listed above; however, these projects are in some stage of planning and could potentially occur during the construction period for the Regional Connector project.

- Resurrection of the Red Car Trolley Services in the Downtown Los Angeles Area: This project seeks to implement a historic streetcar service connecting the South Park, Financial District, South Broadway, and Little Tokyo areas of downtown Los Angeles. The service would be primarily, if not entirely, at grade and the tracks could potentially be constructed in existing mixed-flow lanes. Though streetcar technology is similar to light rail, the Red Car service would be more local in scope, with stops spaced every two blocks or so.

- Broadway Transit Mall: This project would close part of South Broadway to auto traffic, tentatively from 2nd Street to 9th Street, in order to create a pedestrian and transit mall. Under this plan, only transit buses and delivery trucks would be permitted to drive through the transit mall. Broadway currently experiences among the highest volumes in pedestrian traffic in Los Angeles, and this project would help alleviate crowding on the sidewalks.

The California High-Speed Rail project proposes to construct a 700-mile long electric-power, steel-wheel-on-steel-rail, high-speed train system from Sacramento to San Diego. The Los Angeles portion of the project would provide a connection between Palmdale and Orange County utilizing existing Metrolink right-of-way to connect to Union Station. The high speed rail system would likely be built as an elevated guideway connecting to the upper level of Union Station and transitioning to an at-grade system in or near the Burlington Northern Santa Fe/Metrolink rail corridor (LOSSAN rail corridor). The high speed rail system would either share tracks with existing non-electric trains or operate using dedicated tracks within the LOSSAN rail corridor. Project build out is anticipated for year 2030. The California High-Speed Rail project is designed to interface with existing passenger rail service and to provide additional capacity to meet increases in intercity travel demand in California. The Regional Connector Project would be constructed and operated in coordination with the California High-Speed Rail project. Metro would also coordinate and interface with the County of Los Angeles portion of the California High-Speed Rail project.

Utility Projects

No major utility projects have been identified within the project area during the construction period of 2014 to 2019. The City of Los Angeles maintains an extensive project list of public works projects. However, there do not appear to be many projects planned after 2014 within the City and there do not appear to be any planned within the project area. Most of the planned projects within the City are related to ongoing maintenance or replacement in kind of existing infrastructure.

4.19.2.5 Projects Potentially Under Construction post-2019

The existing databases and long-range plans do not include any reasonably foreseeable projects beyond 2019. For potential cumulative impacts beyond the year of opening, trend information on land use, and population and employment growth from adopted regional plans have been used. The cumulative impacts analysis includes positive impacts as well as adverse effects, particularly with respect to the enhancements in regional mobility that may be represented by the build alternatives when compared to the No Build Alternative.

4.19.3 Environmental Impacts/Environmental Consequences

Appendix GG, Cumulative Impacts, summarizes the potential cumulative impacts that could result from the Regional Connector Transit Corridor project in combination with the identified past, present and reasonably foreseeable projects for the following resource areas:

- Transit, Traffic, Circulation, and Parking
- Land Use
- Displacement and Relocation
- Community and Neighborhood
- Visual and Aesthetics
- Air Quality Impacts and Health Risk Assessment
- Climate Change
- Noise and Vibration
- Ecosystems and Biological Resources
- Geotechnical/Subsurface/Seismic/Hazardous Materials
- Water Resources
- Energy
- Cultural Resources
- Parklands and Other Community Facilities
- Economic and Fiscal
- Safety and Security
- Growth-Inducing
- Environmental Justice

Cumulative impacts are analyzed in more detail in each of the technical memoranda prepared for each resource area, which are contained in Appendix L through Appendix EE of this DEIS/DEIR. For more information about potential cumulative impacts see the resource specific technical memoranda.

4.19.3.1 No Build Alternative

The No Build Alternative would not involve any construction and, therefore, would not result in any cumulative impacts, with the exception of transit systems and environmental justice impacts. Cumulative transit impacts associated with the No Build Alternative would be adverse as this alternative would not close the gap in the rail transit system and would not provide the travel time and convenience benefits for transit users associated with the build alternatives. This adverse transit impact would disproportionately affect transit-dependent users who also tend to be environmental justice populations based on income and other factors. For these transit patrons that have no other travel options, travel times would increase and transit usage would be less convenient resulting in a cumulative adverse environmental justice impact from the No Build Alternative. There would be a negative transit impact upon those that rely on the public transit system, for east-west and north-south travel through the downtown area. This would result in an adverse cumulative transit impact. The No Build Alternative would result in cumulative disproportionate adverse impacts related to transit service equity.

4.19.3.1.1 NEPA Finding and CEQA Determination

The No Build Alternative would result in an adverse cumulative transit impact and a cumulative disproportionate adverse impact related to transit service equity. All cumulative impacts would be less than significant.

4.19.3.2 TSM Alternative

With implementation of mitigation, the TSM Alternative would not contribute to any cumulative impacts, with the exception of transit systems and environmental justice. Cumulative transit impacts associated with the TSM Alternative would be adverse as this alternative would not close the gap in the rail transit system and would not provide the travel time and convenience benefits for transit users associated with the build alternatives. This adverse transit impact would disproportionately affect transit-dependent users who tend to be environmental justice populations based on income and other factors. For these transit patrons that have no other travel options, travel times would increase and transit usage would be less convenient resulting in a cumulative adverse environmental justice impact from the TSM Alternative. There would be a negative transit impact upon those that rely on the public transit system, for east-west and north-south travel through the downtown area. This would result in an adverse cumulative transit impact. The TSM Alternative would result in cumulative disproportionate adverse impacts related to transit service equity.

4.19.3.2.1 NEPA Finding and CEQA Determination

The TSM Alternative would result in an adverse cumulative transit impact and a cumulative disproportionate impact related to transit service equity. All cumulative impacts would be less than significant.

4.19.3.3 At-Grade Emphasis LRT Alternative

Even with implementation of possible mitigation measures, construction of the At-Grade Emphasis LRT Alternative could result in a considerable contribution to cumulative construction impacts associated with bus transit, traffic circulation, and pedestrian and bicycle movements. Given the related projects that could be under construction during the same time as the proposed alternative, construction of the alternative could result in a considerable contribution to cumulative construction impacts on activity levels and revenue of businesses along the alignment.

Construction and operation of the At-Grade Emphasis LRT Alternative would result in a considerable contribution to adverse cumulative impacts at 11 intersections during the AM peak hour and 15 intersections during the PM peak hour.

Although regional construction emissions under the At-Grade Emphasis LRT Alternative would be significant and unavoidable, operation of this alternative would reduce regional VMT, which would result in a beneficial impact to air quality and offset the temporary adverse construction impacts. Cumulative impacts to all other environmental resources would be less than significant.

Development of this alternative would result in the following beneficial impacts. The At-Grade Emphasis LRT Alternative would result in a significant beneficial impact to transit systems compared to the No Build and TSM Alternatives. With implementation of this alternative, transit patrons could travel from east-west or north-south without having to make a transfer in the downtown area. A number of intersections would improve with operation of the At-Grade Emphasis LRT Alternative over the No Build Alternative by virtue of a reduction in delay. During the AM peak hour seven intersections show delay improvements and eight intersections show delay improvements in the PM peak hour.

The alignment passes near several potential development sites, and plans for these sites include high density employment and residential facilities. The At-Grade Emphasis LRT Alternative combined with other projects could also support increases in residential development within the project area which would be a beneficial land use effect.

Implementation of the At-Grade Emphasis LRT Alternative would result in a decrease in highway VMT, which would subsequently result in a net decrease in energy consumption measured in both BTU's and barrels of oil. This net decrease in BTUs and barrels of oil would result in a beneficial impact to energy resources.

Potential beneficial economic impacts associated with the At-Grade Emphasis LRT Alternative include improved accessibility and mobility for the region, which would potentially encourage greater economic activity; and beneficial impacts for businesses and employees traveling to and from work.

4.19.3.3.1 NEPA Finding and CEQA Determination

Construction of the At-Grade Emphasis LRT Alternative would result in a considerable contribution to cumulative impacts associated with bus transit, traffic circulation, pedestrian and bicycle movements, and activity levels and revenue of businesses along the alignment.

Operation of the At-Grade Emphasis LRT Alternative would result in a considerable contribution to adverse and significant cumulative impacts at 11 intersections during the AM peak hour and 15 intersections during the PM peak hour. All other cumulative impacts would be less than significant.

In addition, the At-Grade Emphasis LRT Alternative would result in regional VMT reductions, which would result in beneficial impacts to air quality and energy consumption. The At-Grade Emphasis LRT Alternative would also result in beneficial impacts to transit systems, several intersections within the project area, residential land uses, and accessibility and mobility in the region, which would potentially encourage greater economic activity.

4.19.3.4 Underground Emphasis LRT Alternative

With incorporation of possible mitigation measures, construction of the Underground Emphasis LRT Alternative could still result in a considerable contribution to cumulative construction impacts associated with bus transit, traffic circulation, and pedestrian and bicycle movements. Given the related projects that could be under construction during the same time as the proposed alternative, construction of the alternative could result in a considerable contribution to cumulative construction impacts on activity levels and revenue of businesses along the alignment.

Implementation of the Underground Emphasis LRT Alternative would result in a considerable contribution to significant cumulative impacts at two intersections (Alameda Street/2nd Street and Flower Street/4th Street) during the AM peak hour and three intersections (Judge John Aiso Street/1st Street; Alameda Street/2nd Street; and Judge John Aiso Street/Temple Street) during the PM peak hour.

Although regional construction emissions under the Underground Emphasis LRT Alternative would be significant and unavoidable, operation of this alternative would reduce regional VMT, which would result in a beneficial impact to air quality and offset the temporary adverse construction impacts. Cumulative impacts to all other environmental resources would be less than significant.

Development of this alternative would result in the following beneficial impacts. The Underground Emphasis LRT Alternative would result in a significant beneficial impact to transit systems compared to the No Build and TSM Alternatives. With implementation of this alternative, transit patrons could travel from east-west or north-south without having to make a transfer in the downtown area. A number of intersections would improve under the Underground Emphasis LRT Alternative from the No Build Alternative by virtue of a reduction in delays. During the AM peak hour five intersections show delay improvements and eight intersections show delay improvements in the PM peak hour. It should also be noted that the inclusion of the Regional Connector would increase the person-carrying capacity through the downtown transportation environment without adversely impacting overall traffic operations.

The alignment passes near several potential development sites, and plans for these sites include high density employment and residential facilities. The Underground Emphasis LRT Alternative combined with other projects could also support increases in residential development within the project area which would be a beneficial land use effect.

Implementation of the Underground Emphasis LRT Alternative would result in a decrease in highway VMT, which would subsequently result in a net decrease in energy consumption measured in both BTU's and barrels of oil. This net decrease in BTUs and barrels of oil would result in a beneficial impact to energy resources.

Potential beneficial economic impacts associated with the Underground Emphasis LRT Alternative include improved accessibility and mobility for the region, which would potentially encourage greater economic activity; and beneficial impacts for businesses and employees traveling to and from work.

4.19.3.4.1 NEPA Finding and CEQA Determination

With incorporation of possible mitigation, construction of the Underground Emphasis LRT Alternative would still result in a considerable contribution to cumulative impacts associated with bus transit, traffic circulation, pedestrian and bicycle movements, and activity levels and revenue of businesses along the alignment.

Operation of the Underground Emphasis LRT Alternative would result in a considerable contribution to adverse and significant cumulative impacts at two intersections (Alameda Street/2nd Street and Flower Street/4th Street) during the AM peak hour and three intersections (Judge John Aiso Street/1st Street; Alameda Street/2nd Street; and Judge John Aiso Street/Temple Street) during the PM peak hour. All other cumulative impacts would be less than significant.

In addition, the Underground Emphasis LRT Alternative would result in regional VMT reductions, which would result in beneficial impacts to air quality and energy consumption. The Underground Emphasis LRT Alternative would also result in beneficial impacts to transit systems, several intersections within the project area, residential land uses, and accessibility and mobility in the region, which would potentially encourage greater economic activity.

4.19.3.5 Fully Underground LRT Alternative

With incorporation of possible mitigation measures, construction of the Fully Underground LRT Alternative could still result in a considerable contribution to cumulative construction impacts associated with bus transit, traffic circulation, and pedestrian and bicycle movements. Given the related projects that could be under construction during the same time as the proposed alternative, construction of the alternative could result in a considerable contribution to cumulative construction impacts on activity levels and revenue of businesses along the alignment.

Implementation of this alternative would result in a cumulatively considerable impact at one intersection (Flower Street/ 4th Street) during the AM peak hour.

Although regional construction emissions under the Fully Underground LRT Alternative would be significant and unavoidable, operation of this alternative would reduce regional VMT, which would result in a beneficial impact to air quality and offset the temporary adverse construction impacts. Cumulative impacts to all other environmental resources would be less than significant.

Development of this alternative would result in the following beneficial impacts. The Fully Underground LRT Alternative would result in a significant beneficial impact to transit systems compared to the No Build and TSM Alternatives. With implementation of this alternative, transit patrons could travel from east-west or north-south without having to make a transfer in the downtown area. A number of intersections would improve under the Fully Underground LRT Alternative compared to the No Build Alternative by virtue of a reduction in delays. During the

AM peak hour, four intersections show delay improvements and seven intersections show delay improvements in the PM peak hour. It should also be noted that the inclusion of the Regional Connector would increase the person-carrying capacity through the downtown transportation environment without adversely impacting overall traffic operations.

The alignment passes near several potential development sites, and plans for these sites include high density employment and residential facilities. The Fully Underground LRT Alternative combined with other projects could also support increases in residential development within the project area which would also be a beneficial land use effect.

Implementation of the Fully Underground LRT Alternative would result in a decrease in highway VMT, which would subsequently result in a net decrease in energy consumption as measured in both BTU's and barrels of oil. This net decrease in BTUs and barrels of oil would result in a beneficial impact to energy resources.

Potential beneficial economic impacts associated with the Fully Underground LRT Alternative include improved accessibility and mobility for the region, which would potentially encourage greater economic activity; and beneficial impacts for businesses and employees traveling to and from work.

4.19.3.5.1 NEPA Finding and CEQA Determination

With implementation of possible mitigation, construction of the Fully Underground LRT Alternative would still result in a considerable contribution to cumulative impacts associated with bus transit, traffic circulation, pedestrian and bicycle movements, and activity levels and revenue of businesses along the alignment.

Operation of the Fully Underground LRT Alternative would result in a considerable contribution to an adverse and significant cumulative impact at one intersection (Flower Street/ 4th Street) during the AM peak hour. All other cumulative impacts would be less than significant.

In addition, the Fully Underground LRT Alternative would result in regional VMT reductions, which would result in beneficial impacts to air quality and energy consumption. The Fully Underground LRT Alternative would also result in beneficial impacts to transit systems, several intersections within the project area, residential land uses, and accessibility and mobility in the region, which would potentially encourage greater economic activity.

4.19.4 Mitigation Measures

Possible mitigation measures that could be implemented to avoid, minimize, or mitigate potentially significant impacts are contained within the specific DEIS/DEIR section for each environmental resource.

4.20 Relationship Between Short-Term Uses of the Environment and Long-Term Productivity

Pursuant to NEPA and CEQA, significant irreversible environmental changes are described as the use of nonrenewable resources during the initial and continued phases of a project that may be irreversible (losses that cannot be recovered or reversed) if removal of the resources occurs, or if there is the loss of future options and the resource cannot be recovered or reused. Primary and secondary impacts, such as dedication of right-of-way to transportation uses, typically commit future generations to similar uses. In addition, irreversible damage can result from environmental accidents associated with a project (CEQA Guidelines 15126 (e)).

The Regional Connector Transit Corridor project is included in the Metro LRTP and the SCAG *Regional Transportation Plan*, which consider the need for present and future transportation systems within the context of present and future land use development. The local short-term impacts and use of resources through implementation of any of the build alternatives would be consistent with the maintenance and enhancement of long-term productivity for the local area and region.

The No Build Alternative would not entail construction beyond the projects that are currently under construction or planned for operation by the year 2035 in Metro's LRTP. It would not result in short- or long-term losses or gains nor would it resolve worsening congestion on local streets and highways. As a result, it would not enhance the project area or regional long-term productivity.

The TSM Alternative would include construction of new bus stops, which would not be considered major construction, and it would not result in short-term losses or gains associated with construction. By adding new shuttle bus service, the TSM Alternative would offer long-term gains associated with reducing traffic on local streets and increasing mobility within the downtown area. However, congestion would continue to be problematic across the Los Angeles region. The TSM Alternative would increase jobs and revenue through expanded transit services. It would enhance local and regional long-term productivity.

For the three build alternatives (At-Grade Emphasis LRT Alternative, Underground Emphasis LRT Alternative, and Fully Underground LRT Alternative), short-term losses would include economic losses experienced by businesses that relocate and construction impacts (e.g., noise, visual quality, air quality, and motorized and non-motorized traffic delays or detours). A short-term loss of plant resources would occur from removing street trees and landscaping in the construction areas. This would be considered a short-term loss since Metro would comply with local tree ordinances and replace trees, as necessary. Short-term benefits would include increased jobs and revenue generated during construction.

Long-term losses associated with the build alternatives would include use of construction materials and energy. Construction activities may result in loss of paleontological and archaeological site values. The demolition of up to two historical properties would also be a long-term loss.

Long-term gains would include transit network improvement, increased regional and local activity center access, reduced local street and highway congestion, and increased jobs and revenue through expanded transit services. Equally as important, the build alternatives would locate transit alignments and stations in areas where existing land uses are conducive to transit use and have the potential to develop additional transit-supportive land uses. Development of the construction staging sites after the project is completed would also offer an opportunity for transit-oriented development. Therefore, the build alternatives would enhance local and regional long-term productivity.

4.21 Irreversible and Irretrievable Commitments of Resources

CEQA Section 15126.2(c) requires a discussion of any significant irreversible environmental impacts that would be caused by implementation of a proposed project. Generally, a project would result in significant irreversible environmental impacts if any of the following would occur:

- The project would involve a large commitment of nonrenewable resources.
- The project consumption of resources is not justified (i.e., the project involves wasteful energy use).
- The primary and secondary impacts would generally commit future generations to similar uses.
- The project involves uses in which irreversible damage could result from any potential environmental accidents associated with the project.

Under the No Build Alternative, no new infrastructure would be built within the project area, aside from projects currently under construction or funded for construction and operation by 2035 in Metro's LRTP. The No Build Alternative provides the baseline for comparing the impacts of other alternatives.

The TSM Alternative does not have a construction component, beyond installation of bus stops and minor curb modifications, and would not have an irreversible and irretrievable commitment of nonrenewable resources associated with construction. Operating new shuttle bus service under the TSM Alternative would rely on the use of nonrenewable resources or a commitment of physical resources, such as metal, for the expanded bus fleet. Operation of the TSM Alternative would increase energy consumption due to maintenance and operation of the expanded bus fleet. The use of fossil fuel would be necessary to provide electricity and fuel for buses, worker vehicles, and maintenance operations.

Construction of the build alternatives would entail the one-time, irreversible, and irretrievable commitment of nonrenewable resources, such as energy (fossil fuels used for construction equipment) and construction materials (such as lumber, sand, gravel, metals, and water). Additionally, labor and natural resources would be used to produce construction materials that are not generally retrievable. However, these materials are not in short supply and usage would not have an adverse effect on continued availability of these resources. Construction of one of the build alternatives would also require a substantial one-time expenditure, which is not retrievable, of both local and federal funds.

Land used to construct proposed facilities is considered an irreversible commitment during the period the land is used. After construction is completed, land used for construction staging would be available for other uses. The project would potentially commit land at stations, potential portal and pedestrian bridge sites, and street right-of-way to transit uses. Some station pedestrian entrances and other aboveground elements of the project would be located on sites with existing commercial and retail uses, and would not require a substantial land commitment. The commitment of long-term land resources is consistent with the policies of the City of Los Angeles which promote transit uses.

The consumption of nonrenewable resources related to the build alternatives would include water, petroleum products, and electricity. Tunneling activities would require water for slurry for the tunnel boring machines and in water cooling towers. While much of this water can be recycled and reused, these processes would also create wastewater that would require disposal. In addition, fossil fuels would be used for transporting workers and materials during construction, and electricity and fuel would be used for trains, stations, and worker vehicles for maintenance and operation during the life of the project. The amount and rate of consumption of these resources would not result in significant environmental impacts or the unnecessary, inefficient, or wasteful use of such resources because they would increase transit use (which increases energy efficiency) and decrease automobile use (which uses fossil fuels).

The Regional Connector Transit Corridor project benefits would include improved mobility, transit accessibility, and energy and time savings. The resources committed and consumed for the build alternatives would be considered appropriate because regional and area residents and visitors would benefit from improved transit services, which, in turn, would result in an overall decrease in the irreversible and irretrievable commitment of nonrenewable resources. For example, transportation sources account for over 40 percent of the energy consumed in California. The project is expected to remove passenger cars from the regional roadway network, easing the increase in vehicle miles traveled, and the usage of fossil fuels. The build alternatives would annually reduce regional vehicle miles traveled by approximately 110 to 117 million miles, and reduce annual mobile source energy consumption by approximately 684 to 729 billion BTUs. Therefore, the project can substantially decrease the irreversible and irretrievable commitment of resources.

The project consists of a light rail connector, which would include transit stations, pedestrian station entrances and train portals, potential pedestrian bridges, and a potential automobile underpass. These components of the project would use household-type cleaning materials, such as detergents and cleansers. Oil, solvents, and other materials would be used for train maintenance in relatively small volumes and are not considered acutely hazardous materials according to the National Institute of Health. There is the potential for hazardous materials/waste spills to occur; however, the storage and disposal of hazardous materials/waste would be conducted in accordance with all federal and state requirements to prevent or manage hazards. In the unlikely event that a spill does occur, remediation would be conducted accordingly. Therefore, there would be a minimal risk of irreversible damage caused by an environmental accident associated with hazardous or acutely hazardous materials.

4.22 Anticipated Permits and Approvals

Permits (or approvals) would not be required for the No Build Alternative.

The TSM Alternative would require compliance with Construction General Permit (Order 2009-0009-DWQ) and local City of Los Angeles grading, construction, street use, and tree protection ordinances.

The build alternatives would require compliance with the State General Permit for Storm Water Discharges Associated with Construction Activity (Order No. 99-08-DQW), Construction General Permit (Order 2009-0009-DWQ), and Industrial General Permit (Order No. 97-03-DWQ).

In addition, tunneling would likely occur at or below groundwater levels and dewatering is anticipated. A Los Angeles Regional Water Quality Control Board (LARWQCB) dewatering permit would be required. Waste discharges must comply with LARWQCB Municipal National Pollutant Discharge Elimination System (NPDES) Permit (LARWQCB Order No. R4-2008-0032) and waste discharge requirements (WDRs) (Order No. 93-010 and Order No. 91-93). Approvals for discharges into drainage and sewer systems would be required from the City of Los Angeles, the County Sanitation District, and the Los Angeles County Flood Control District under Municipal Separate Storm Sewer System (MS4) Permits (Order No. 01-182) (NPDES No. CAS004001).

Grading and construction permits and compliance with the tree protection ordinance would be required by the City of Los Angeles. Coordination and approvals from communications and utility purveyors (including, but not limited to, Southern California Gas Company, AT&T, Verizon, MWD, LADWP, etc.) would be needed for temporary or permanent utility relocation or service interruption.