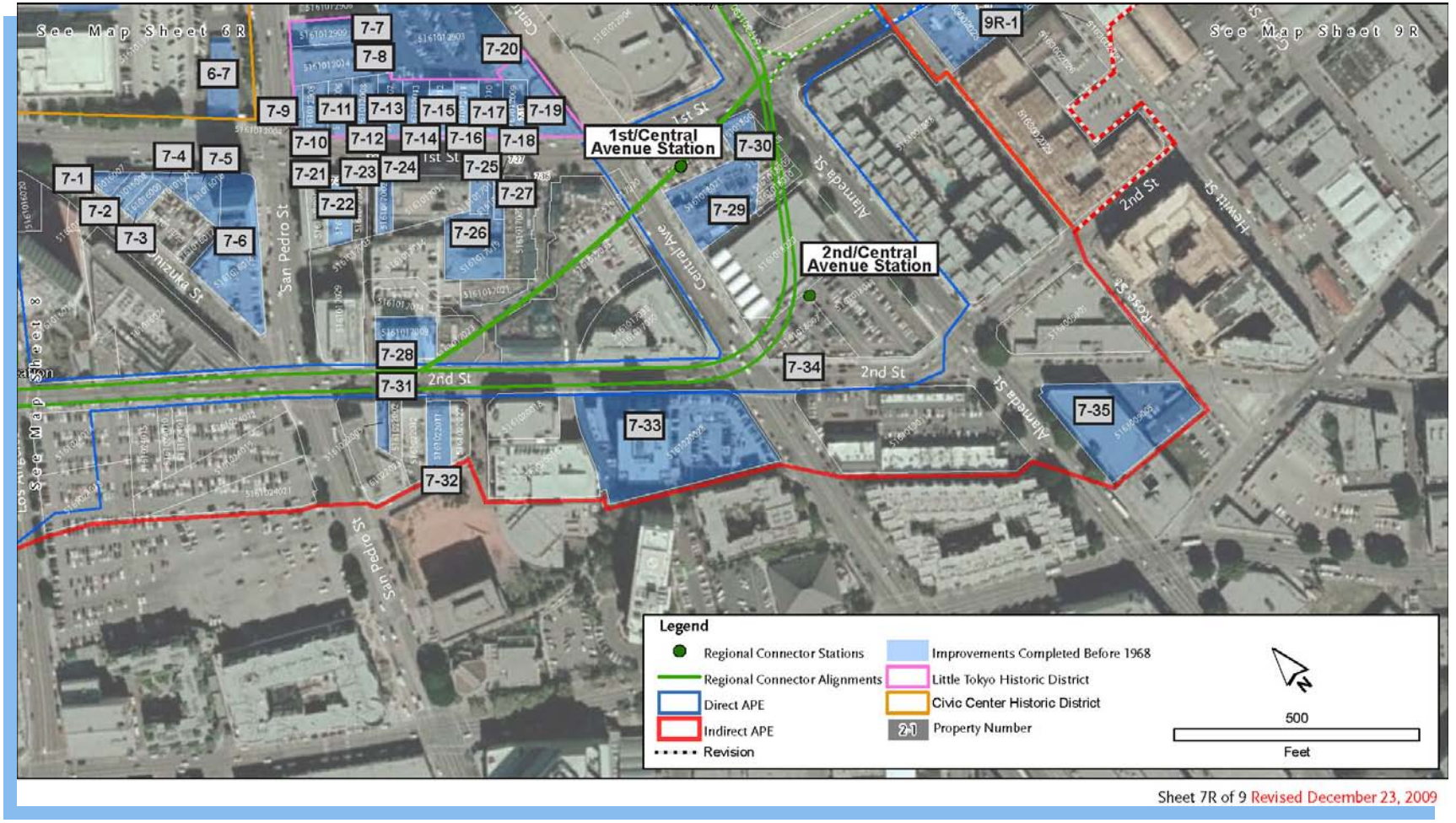


Figure 4.12-7. Historic Resources APE – Sheet 7

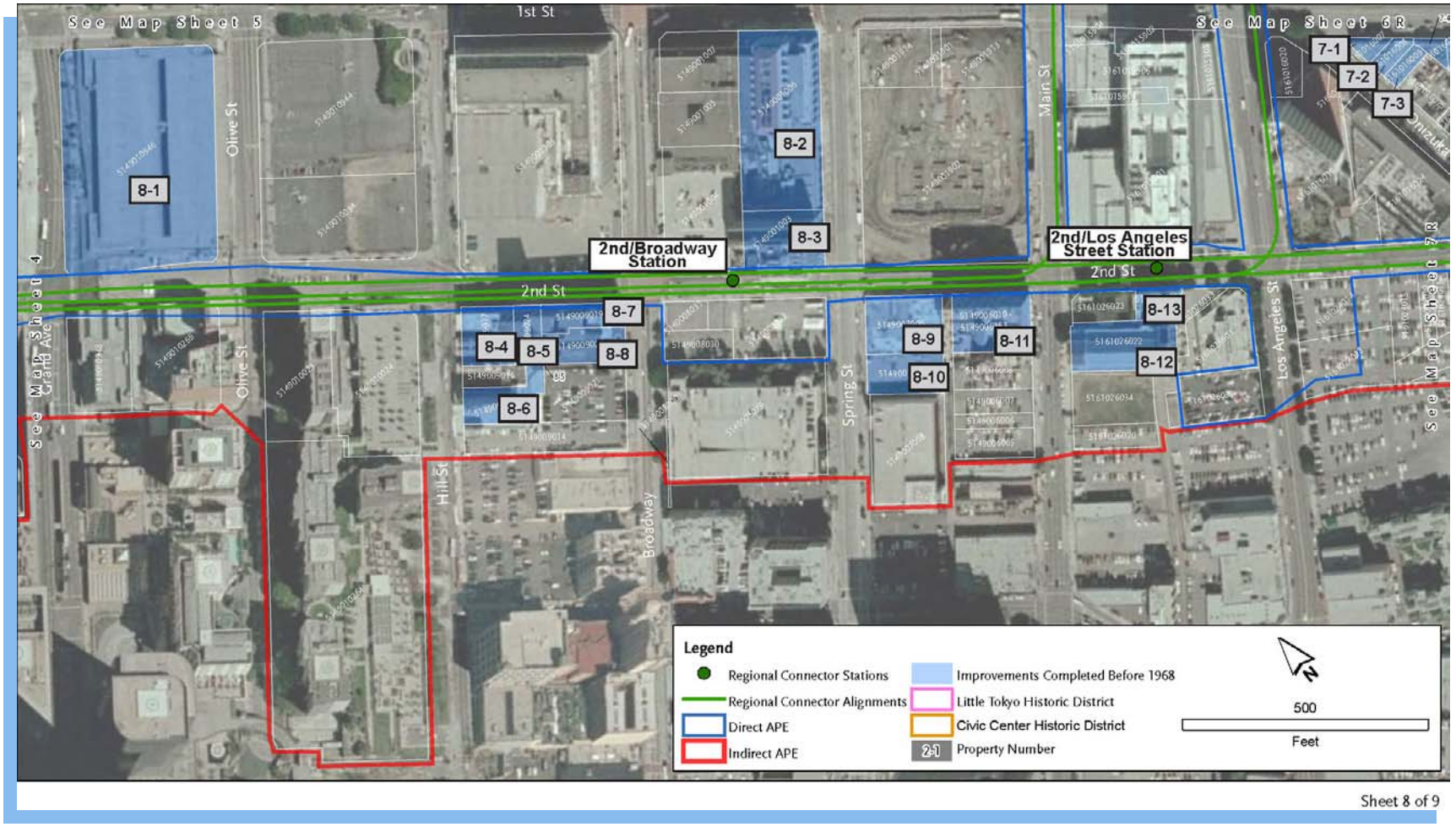


Figure 4.12-8. Historic Resources APE – Sheet 8

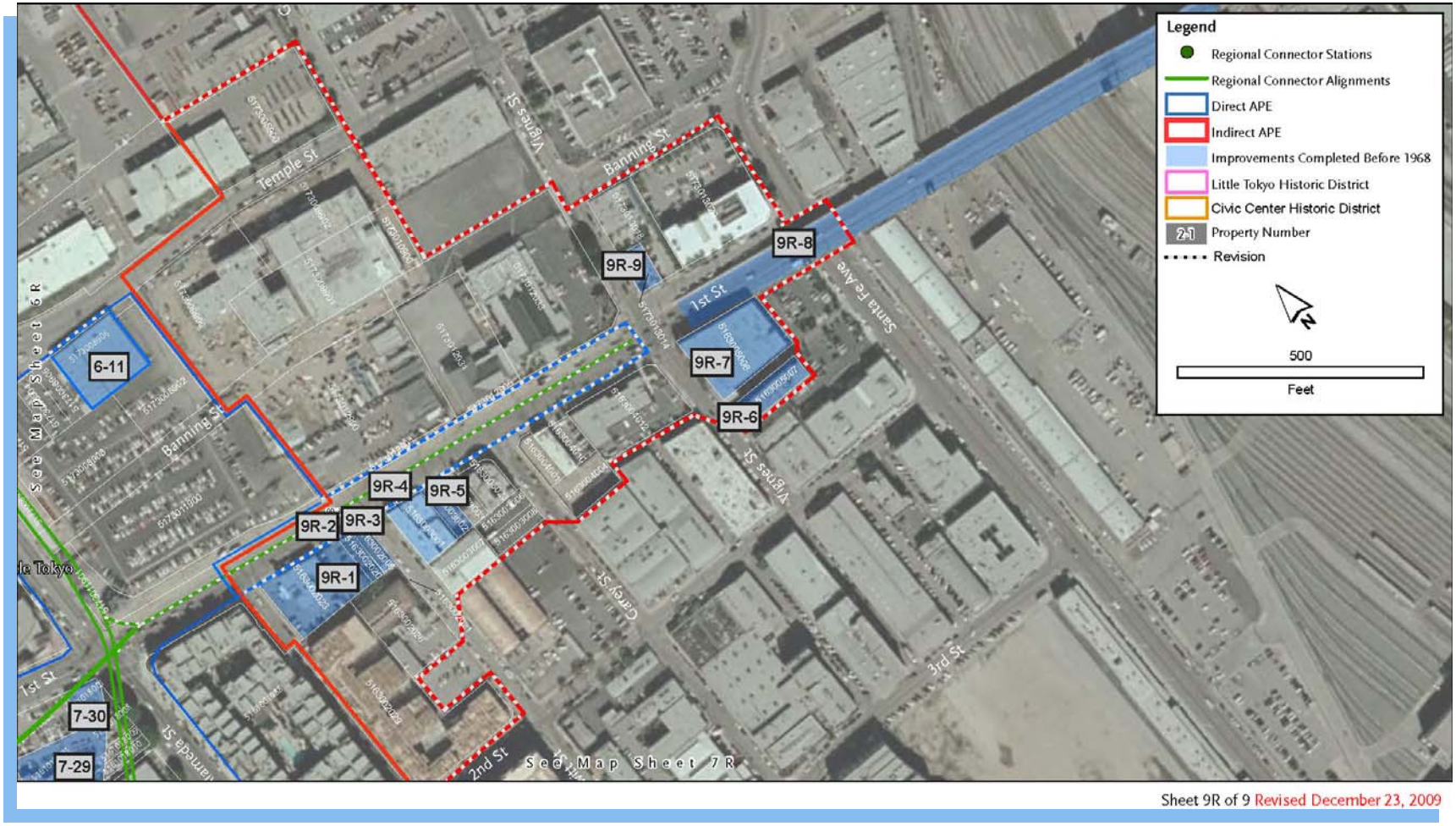


Figure 4.12-9. Historic Resources APE – Sheet 9

Of the 55 resources mentioned above, six are historical resources listed in, determined eligible for listing in, or recommended as eligible for listing in only the CRHR and not the NRHP. A complete list of evaluated properties and the details of their analysis are provided in Appendix X, Cultural Resources - Built Environment (Updated).

The APE contains portions of one NRHP/National Historic Landmark (NHL)-listed historic district (Little Tokyo Historic District) and one district that is eligible for inclusion in the CRHR (Los Angeles 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. The effects from the project for all eligible resources within the APE were considered regardless of whether they were individually eligible or contributing resources to a NRHP/CRHR historic district.

4.12.1.3 Environmental Impacts/Environmental Consequences

The impact analysis examines likely adverse effects of the proposed Regional Connector Transit Corridor alternatives, including the LPA, to historic properties under NEPA and the NHPA and potential significant impacts to historic resources under CEQA. This analysis incorporates the findings of other applicable technical studies as needed. APE Map Resource numbers provided in this section correspond to the APE Map Resources shown in Figures 4.12-1 through 4.12-9. Impact conclusions for all of the alternatives are based on the thresholds identified above in Section 4.12.1.1.

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 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 NPS) is invited to participate under Section 110(f) of the NHPA. For this project, the Little Tokyo Historic District NHL and its associated contributing resources are situated within the APE and would not be adversely affected by any of the alternatives, including the LPA. If project planning necessitates changes, and potential adverse effects to the NHL arise, consultation with the National Park Service will be conducted. Information regarding the At-Grade Emphasis LRT Alternative's effects on the 2nd Street Tunnel is provided in Section 4.12.1.3.3.2. Only the At-Grade Emphasis LRT Alternative would have an adverse effect on the 2nd Street Tunnel. Other alternatives, including the LPA, would avoid adverse effects to this resource.

CEQA also requires that proposed public projects be evaluated for their probability to cause significant impacts on "historical resources." CEQA equates a "substantial adverse change" in the significance of a historic property with a significant impact on the environment (Public Resources Code (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/NHPA Finding (Section 106 Determination)

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 adverse effects on historical resources, alter significant characteristics of historic properties, or cause adverse noise or vibration impacts.

4.12.1.3.2.1 NEPA/NHPA Finding (Section 106 Determination)

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, construct underground right-of-way, and install at-grade and underground stations, all within the APE.

Underground segments of the alternative would use parts of the existing 2nd Street Tunnel (APE Map Resource #4-3) and would require new cut and cover excavation on Flower Street between 7th and 4th Streets, north of the existing 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 minimized.

4.12.1.3.3.1 Demolition, Partial Takes, or Alteration of a Property

To construct the At-Grade Emphasis LRT Alternative, there would also be partial takes of several historic properties and historical resources. Portions of properties occupied by the Los Angeles Police Facilities Building (APE Map Resource #6-6), Motor Transport Division Building (APE Map Resource #6-7), and City Health Building (City Hall South) (APE Map Resource #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 new uses would include converting landscaped areas adjacent to the buildings to sidewalks and placing at-grade light rail transit stations along the curb. Landscape and urban design features that complement the historic resources would be included in the station facilities. These changes would be consistent with the existing urban setting of the resources.

NEPA/Section 106 Effects Analysis for Historic Properties

In applying the criteria of adverse effect for historic properties (36 CFR 800.5(a)(1)), there are no adverse effects to historic properties from the partial takes of three NRHP/CRHR eligible properties. The project would not diminish the integrity of their location, design, setting, materials, workmanship, feeling, or association and therefore, there would not be adverse effects.

CEQA Impact Analysis for Historical Resources

The partial property acquisitions would not constitute a substantial adverse change that would impair the significance of the historical resource. The characteristics that make the historical resources eligible for the CRHR and NRHP would remain to convey their significance. This alternative, therefore, would not have a significant impact upon historical resources.

4.12.1.3.3.2 Tunnels

The NRHP-eligible 2nd Street Tunnel (APE Map Resource #4-3) would be altered under this alternative. The walls of the tunnel would be partially demolished along its southwest interior to construct a new entrance and exit for the new tunnel in which the light rail transit would run. New elements that would be added to the tunnel include double tracks, catenary wires, and a walkway. The cut and cover trench along Flower Street would also require demolition of a portion of the CRHR-eligible Belmont Tunnel (APE Map Resource #3-4). The Belmont Tunnel is not eligible for the NRHP.

NEPA/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. 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, Cultural Resources - Built Environment (Updated)). Documentation of the property in accordance with the mitigation measure described in Section 4.12.1.4.1 of the Draft EIS/EIR is proposed to resolve the potential adverse effect.

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 of the Draft EIS/EIR would reduce the impact to a less than significant level. Implementation of the documentation mitigation measure (Section 4.12.1.4.1 of the Draft EIS/EIR) would reduce any impact to the CRHR-eligible Belmont Tunnel to a less than significant level.

4.12.1.3.3.3 Differential Settlement

Based on the activities described in 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 differential settlement than more recently constructed buildings.

Based on the activities described in the Description of Construction (Appendix K), four NRHP and/or CRHR eligible properties could be potentially affected by differential settlement due to cut and cover construction associated with the At-Grade Emphasis LRT Alternative:

- Superior Oil Company Building (APE Map Resource #2-13)
- The California Club (APE Map Resource #3-1)
- 2nd Street Tunnel (APE Map Resource #4-3)
- Walt Disney Concert Hall (APE Map Resource #4-4)

NEPA/Section 106 Effects Analysis for Historic Properties

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 of the Draft EIS/EIR) and would avoid adverse effects to all properties. If these measures are properly implemented, short-term construction activities would not directly alter any characteristics 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 four properties listed below:

- The Superior Oil Company Building (APE Map Resource #2-13)
- The California Club (APE Map Resource #3-1)
- 2nd Street Tunnel (APE Map Resource #4-3)
- Walt Disney Concert Hall (APE Map Resource #4-4)

Implementation of mitigation measures described in Sections 4.12.1.4.2 and 4.12.1.4.3 of the Draft EIS/EIR would reduce the potential impacts to these historical resources to a less than significant level.

4.12.1.3.3.4 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 into an underpass configuration.

Ground-borne vibration (GBV) 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 bulldozers and drill rigs as the main sources of construction vibration that could have the potential to cause vibration damage (Section 4.7). If these large pieces of equipment are not used within 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 Resource #2-1)
- Roosevelt Building (APE Map Resource #2-7)
- General Petroleum-Mobil Oil Building (APE Map Resource #2-12)
- Superior Oil Company Building (APE Map Resource #2-13)
- The California Club (APE Map Resource #3-1)
- Los Angeles Central Library (APE Map Resource #3-2)
- 2nd Street Tunnel (APE Map Resource #4-3)
- Los Angeles Times Mirror Building (APE Map Resource #8-3)
- Higgins Building (APE Map Resource #8-11, CRHR-eligible only)
- Cathedral of Saint Vibiana (APE Map Resource #8-12)
- Cathedral of Saint Vibiana Rectory (APE Map Resource #8-13)

NEPA/Section 106 Effects Analysis for Historic Properties

Adverse effects would not occur if mitigation measures described in Sections 4.12.1.4.2, 4.12.1.4.3, and 4.12.1.4.5 of the Draft EIS/EIR 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 any characteristics 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. Implementation of mitigation measures described in Sections 4.12.1.4.2, and 4.12.1.4.3 of the Draft EIS/EIR would reduce potential impacts to a less than significant level.

4.12.1.3.3.5 NEPA/NHPA Finding (Section 106 Determination)

Construction of the At-Grade Emphasis LRT Alternative would be expected to result in one direct adverse effect. On June 1, 2010, 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, Cultural Resources - Built Environment (Updated)). Alteration of the 2nd Street Tunnel (APE Map Resource #4-3) during construction to

accommodate the LRT facility would require implementation of mitigation measures described in Sections 4.12.1.4.1 and 4.12.1.4.5 of the Draft EIS/EIR. Consistent with 36 CFR 800, additional consultation with 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.

4.12.1.3.3.6 CEQA Determination

Construction of the At-Grade Emphasis LRT Alternative would potentially result in two direct significant impacts (Belmont Tunnel (APE Map Resource #3-4)) and 2nd Street Tunnel (APE Map Resource #4-3) and 11 indirect significant impacts. 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 of the Draft EIS/EIR 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 Resource #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. SHPO did not comment on properties identified solely for CRHR determination in the June 1, 2010 letter (a copy of the SHPO concurrence letter is located in Appendix X, Cultural Resources - Built Environment (Updated)).

NEPA/Section 106 Effects Analysis for Historic Properties

The S. Kamada Restaurant, Atomic Café, Señor Fish, and Coast Imports building is not NRHP-eligible, and no adverse effects would occur under NEPA/Section 106 as a result of its acquisition and demolition.

Table 4.12.1-1. At-Grade Emphasis LRT Alternative Historic Resources Impacts NEPA/NHPA Findings (Section 106 Determinations) and CEQA Determinations

APE Map Resource No.	Name	NRHP Eligibility	CRHR Eligibility	Potential Impact	Section 106 Determination	CEQA Determination	Can be Mitigated Below Level of Significance (CEQA)?
2-1	Barker Brothers	Eligible	Listed	Vibration	Effect Not Adverse	Significant Impact	Yes
2-7	Roos evelt Building	Listed	Listed	Vibration	Effect Not Adverse	Significant Impact	Yes
2-12	General Petroleum-Mobil Oil Building	Listed Listed		Vibration	Effect Not Adverse	Significant Impact	Yes
2-13	Superior Oil Company Building	Listed Listed		Vibration Settlement	Effect Not Adverse	Significant Impact	Yes
3-1	The California Club	Eligible	Listed	Vibration Settlement	Effect Not Adverse	Significant Impact	Yes
3-2	Los Angeles Central Library	Listed	Listed	Vibration	Effect Not Adverse	Significant Impact	Yes
3-4	Belmont Tunnel, Hollywood-Glendale-Burbank-San Fernando Valley Tunnel	Not Eligible	Eligible	Partial Removal	No Historic Property Affected	Significant Impact	Yes
4-3	2nd Street Tunnel, Bridge (tunnel) #53C 1318	Eligible El	igible	Demolition	Adverse Effect	Significant Impact	Yes
4-4	Walt Disney Concert Hall	Eligible	Eligible	Vibration Settlement	Effect Not Adverse	Significant Impact	Yes

Table 4.12.1-1. At-Grade Emphasis LRT Alternative Historic Resources Impacts NEPA/NHPA Findings (Section 106 Determinations) and CEQA Determinations (continued)

APE Map Resource No.	Name	NRHP Eligibility	CRHR Eligibility	Potential Impact	Section 106 Determination	CEQA Determination	Can be Mitigated Below Level of Significance (CEQA)?
5-1 Thru 5-13, 6-1 thru 6-7, 6-12	Los Angeles Civic Center Historic District	Eligible Eligi	ble	Partial Take	Effect Not Adverse	Less than Significant Impact	N/A
6-4	City Health Building, City Hall South	Eligible (as a contributor to Los Angeles Civic Center Historic District)	Eligible Partial	Take	Effect Not Adverse	Less than Significant Impact	N/A
6-6, 6-7	Police Facilities Building, Parker Center, Motor Transport Building	Eligible (as a contributor to Los Angeles Civic Center Historic District)	Eligible Partial	Take	Effect Not Adverse	Less than Significant Impact	N/A
8-3	Los Angeles Times Mirror Building	Eligible El	igible	Vibration	Effect Not Adverse	Significant Impact	Yes
8-11	Higgins Building, General Petroleum Building, (Los Angeles) County Engineers Building	Not Eligible	Eligible	Vibration	No Historic Property Affected	Significant Impact	Yes
8-12	Cathedral of Saint Vibiana	Eligible	Eligible	Vibration	Effect Not Adverse	Significant Impact	Yes
8-13	Cathedral of Saint Vibiana, Rectory	Eligible El	igible	Vibration	Effect Not Adverse	Significant Impact	Yes

Note:
**No Historic Property Affected indicates that no properties eligible for the NRHP would be affected. Effect Not Adverse indicates that proposed candidate mitigation measures would reduce impacts to the point where no adverse effects would occur under Section 106 of NHPA.*

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 Section 4.12.1.4.1 of the Draft EIS/EIR, along with the additional mitigation measures developed specifically for this building under the LPA in Section 4.12.1.4.2 below, 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 Resource #3-4). The Belmont Tunnel is not eligible for the NRHP.

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 Los Angeles Times Mirror Building (APE Map Resource #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 Resource #8-13).

NEPA/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 any 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 of the Draft EIS/EIR 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 (Appendix S), construction activities with the most potential for impacts include the cut and cover tunnel under Flower Street, proposed underground cut and cover station at Flower/5th/4th Streets, cut and cover

construction of the approach to the proposed 2nd/Hope Street station and the station itself, construction of either of the proposed 2nd Street station locations (Los Angeles Street or Broadway Options), and the junction at 1st and Alameda Streets, which includes lowering Alameda Street into an underpass configuration.

GBV 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 bulldozers and drill rigs as the main sources of construction vibration that could have the potential to cause vibration damage. 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 to historic properties and significant impacts would not occur to 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 Resource #2-1)
- Roosevelt Building (APE Map Resource #2-7)
- General Petroleum-Mobil Oil Building (APE Map Resource #2-12)
- Superior Oil Company Building (APE Map Resource #2-13)
- The California Club (APE Map Resource #3-1)
- Los Angeles Central Library (APE Map Resource #3-2)
- 2nd Street Tunnel (APE Map Resource #4-3)
- Los Angeles Times Mirror Building (APE Map Resource #8-3)
- Higgins Building (APE Map Resource #8-11)
- Cathedral of Saint Vibiana (APE Map Resource #8-12)
- Cathedral of Saint Vibiana Rectory (APE Map Resource #8-13)

The TBM(s) would not cause vibratory effects or impacts to historic properties or historical resources because TBM(s) 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 peak particle velocity (PPV) at a distance of 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 TBM(s) 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.

NEPA/Section 106 Effects Analysis for Historic Properties

Effects would occur during construction at the following locations from vibration-induced damage, but would not be adverse after mitigation measures described in Sections 4.12.1.4.2, 4.12.1.4.3, and 4.12.1.4.5 of the Draft EIS/EIR are implemented. The potentially affected buildings would be:

- Barker Brothers (APE Map Resource #2-1)
- Roosevelt Building (APE Map Resource #2-7)
- General Petroleum-Mobil Oil Building (APE Map Resource #2-12)
- Superior Oil Company Building (APE Map Resource #2-13)
- The California Club (APE Map Resource #3-1)
- Los Angeles Central Library (APE Map Resource #3-2)
- 2nd Street Tunnel (APE Map Resource #4-3)
- Los Angeles Times Mirror Building (APE Map Resource #8-3)
- Cathedral of Saint Vibiana (APE Map Resource #8-12)
- Cathedral of Saint Vibiana Rectory (APE Map Resource #8-13)

If these mitigation measures are properly implemented, construction of this alternative would not directly alter any characteristics 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 significant impact that would impair the following locations:

- Barker Brothers (APE Map Resource #2-1)
- Roosevelt Building (APE Map Resource #2-7)
- General Petroleum-Mobil Oil Building (APE Map Resource #2-12)
- Superior Oil Company Building (APE Map Resource #2-13)
- The California Club (APE Map Resource #3-1)
- Los Angeles Central Library (APE Map Resource #3-2)

- 2nd Street Tunnel (APE Map Resource #4-3)
- Los Angeles Times Mirror Building (APE Map Resource #8-3)
- Higgins Building (APE Map Resource #8-11)
- Cathedral of Saint Vibiana (APE Map Resource #8-12)
- Cathedral of Saint Vibiana Rectory (APE Map Resource #8-13)

Implementation of mitigation measures described in Sections 4.12.1.4.2 and 4.12.1.4.3 of the Draft EIS/EIR would reduce the potential impacts to a less than significant level.

4.12.1.3.4.4 Differential Settlement

Based on the activities described in the Description of Construction (Appendix K), eight NRHP- and/or CRHR-eligible properties could be potentially affected by tunneling (TBM operation) and cut and cover construction:

- Superior Oil Company Building (APE Map Resource #2-13)
- The California Club (APE Map Resource #3-1)
- 2nd Street Tunnel (APE Map Resource #4-3)
- Walt Disney Concert Hall (APE Map Resource #4-4)
- Former Nishi Hongwanji Buddhist Temple (APE Map Resource #7-19)
- Los Angeles Times Building (APE Map Resource #8-2)
- Higgins Building (APE Map Resource #8-11)
- Cathedral of Saint Vibiana (APE Map Resource #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) of the Draft EIS/EIR would avoid potential adverse effects to historic properties and reduce potential impacts to historical resources to a less than significant level.

NEPA/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 of the Draft EIS/EIR) to protect and stabilize the ground near the following locations would avoid adverse effects to all properties under this alternative:

- Superior Oil Company Building (APE Map Resource #2-13)
- The California Club (APE Map Resource #3-1)
- 2nd Street Tunnel (APE Map Resource #4-3)
- Walt Disney Concert Hall (APE Map Resource #4-4)
- Former Nishi Hongwanji Buddhist Temple (APE Map Resource #7-19)
- Los Angeles Times Building (APE Map Resource #8-2)
- Cathedral of Saint Vibiana (APE Map Resource #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 and 4.12.1.4.3 of the Draft EIS/EIR would reduce potential impacts to a less than significant level.

4.12.1.3.4.5 NEPA/NHPA Finding (Section 106 Determination)

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, 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, Cultural Resources - Built Environment (Updated)).

4.12.1.3.4.6 CEQA Determination

Construction of the Underground Emphasis LRT Alternative would result in two direct significant impacts (Belmont Tunnel (APE Map Resource #3-4) and S. Kamada Restaurant, Atomic Café, Señor Fish, and Coast Imports building (APE Map Resource #7-30)) and 14 indirect significant impacts to historical resources. Implementation of mitigation measures described in Sections 4.12.1.4.1 through 4.12.1.4.4 of the Draft EIS/EIR 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.

Table 4.12.1-2. Underground Emphasis LRT Alternative Historic Resources Impacts NEPA/NHPA Findings (Section 106 Determinations) and CEQA Determinations

APE Map Resource No.	Name	NRHP Eligibility	CRHR Eligibility	Potential Impact	Section 106 Determination	CEQA Determination	Can be Mitigated Below Level of Significance (CEQA)?
2-1	Barker Brothers	Eligible	Listed	Vibration	Effect Not Adverse	Significant Impact	Yes
2-7	Roosevelt Building	Listed	Listed	Vibration	Effect Not Adverse	Significant Impact	Yes
2-12	General Petroleum-Mobil Oil Building	Listed Listed		Vibration	Effect Not Adverse	Significant Impact	Yes
2-13	Superior Oil Company Building	Listed Listed		Vibration Settlement	Effect Not Adverse	Significant Impact	Yes
3-1	The California Club	Eligible	Listed	Vibration Settlement	Effect Not Adverse	Significant Impact	Yes
3-2	Los Angeles Central Library	Listed	Listed	Vibration	Effect Not Adverse	Significant Impact	Yes
3-4	Belmont Tunnel, Hollywood-Glendale-Burbank-San Fernando Valley Tunnel	Not Eligible	Eligible	Partial Removal due to Station Construction	No Historic Property Affected	Significant Impact	Yes
4-3	2nd Street Tunnel, Bridge (tunnel) #53C 1318	Eligible El	igible	Vibration Settlement	Effect Not Adverse	Significant Impact	Yes
4-4	Walt Disney Concert Hall	Eligible	Eligible	Vibration Settlement	Effect Not Adverse	Significant Impact	Yes

Table 4.12.1-2. Underground Emphasis LRT Alternative Historic Resources Impacts NEPA/NHPA Findings (Section 106 Determinations) and CEQA Determinations (continued)

APE Map Resource No.	Name	NRHP Eligibility	CRHR Eligibility	Potential Impact	Section 106 Determination	CEQA Determination	Can be Mitigated Below Level of Significance (CEQA)?
7-19	Former Nishi Hongwanji Buddhist Temple	Listed (as a contributor to Little Tokyo Historic District)	Listed	Vibration Settlement	Effect Not Adverse	Significant Impact	Yes
7-30	S. Kamada Restaurant, Atomic Café, Señor Fish, and Coast Imports	Not Eligible	Eligible	Demolition	No Historic Property Affected	Significant Impact	Yes
8-2	Los Angeles Times Building	Eligible	Listed	Vibration Settlement	Effect Not Adverse	Significant Impact	Yes
8-3	Los Angeles Times Mirror Building	Eligible El	igible	Station Construction/ Vibration	Effect Not Adverse	Significant Impact	Yes
8-11	Higgins Building, General Petroleum Building, (Los Angeles) County Engineers Building	Not Eligible	Eligible	Vibration Settlement	No Historic Property Affected	Significant Impact	Yes
8-12	Cathedral of Saint Vibiana	Eligible	Eligible	Vibration Settlement	Effect Not Adverse	Significant Impact	Yes
8-13	Cathedral of Saint Vibiana, Rectory	Eligible El	igible	Station Construction/ Vibration	Effect Not Adverse	Significant Impact	Yes

Note:
**No Historic Property Affected indicates that no properties eligible for the NRHP would be affected. Effect Not Adverse indicates that proposed candidate mitigation measures would reduce impacts to the point where no adverse effects would occur under Section 106 of NHPA.*

4.12.1.3.5 Locally Preferred Alternative

The alignment for the LPA would extend underground from the 7th Street/Metro Center Station under Flower Street to 2nd Street. Tracks would then proceed east underneath the 2nd Street Tunnel and 2nd Street to midblock between San Pedro Street and Central Avenue. At that point, the tracks would continue underground curving northeast under the Japanese Village Plaza (JVP) toward 1st and Alameda Streets. Two new portals would be constructed to connect to the existing at-grade Metro Gold Line tracks:

- In the median of 1st Street between Alameda and Garey Streets
- Just northeast of Temple and Alameda Streets

Construction activities for the LPA 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. Other effects to historic properties and impacts to historical resources are described in more detail in the following sections.

4.12.1.3.5.1 Demolition, Partial Takes, or Alteration of a Property

To construct the LPA, one parcel would be acquired that contains a historical resource. The S. Kamada Restaurant, Atomic Café, Señor Fish, and Coast Imports (APE Map Resource #7-30) is a CRHR-eligible (not NRHP-eligible) commercial building built in 1913 that is anticipated to be acquired for station construction. SHPO did not comment on properties identified solely for CRHR determination in the June 1, 2010 letter (a copy of the SHPO concurrence letter is located in Appendix X, Cultural Resources - Built Environment (Updated)).

NEPA/Section 106 Effects Analysis for Historic Properties

The S. Kamada Restaurant, Atomic Café, Señor Fish, and Coast Imports building is not NRHP-eligible, and no adverse effects would occur under NEPA/Section 106 as a result of its acquisition and demolition. SHPO has concurred with these findings for the LPA, as discussed in Section 4.12.1.3.5.6.

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. Implementation of the following mitigation measures described in Section 4.12.1.4.2 below and committed to in the MMRP for the LPA (Chapter 8) would reduce potential impacts to a less than significant level. Implementation of these mitigation measures would ensure that the LPA would not result in a considerable contribution to cumulative impacts.

- Historic properties/historical resources documentation
- Relocation of S. Kamada Restaurant, Atomic Café, Señor Fish, and Coast Imports building
- Interpretive programs for S. Kamada Restaurant, Atomic Café, Señor Fish, and Coast Imports building

4.12.1.3.5.2 Station Construction

For the LPA, a station is proposed to be constructed underground southwest of the intersection of 2nd and Hope Streets at a shallower depth than the similar station proposed for the Underground Emphasis LRT Alternative. The NRHP-eligible Walt Disney Concert Hall (APE Map Resource #4-4) is located on the hill adjacent to the proposed station and tunnels. The preliminary conceptual designs would be compatible with the contemporary forms, materials, and massing of this historical resource. However, noise and vibration from the construction of the tunnels would cause a moderate GBN impact under FTA's noise guidance, affecting the use of the historic property as a concert hall and recording facility. This impact shall be mitigated to reduce the noise impact below significance so that concert hall and recording facility use would not be adversely affected. The station is also near the NRHP-eligible 2nd Street Tunnel (APE Map Resource #4-3), and the LRT tunnels would be constructed directly below the 2nd Street Tunnel using TBM(s).

There would also be a station on 2nd Street between Broadway and Spring Street. Entrances would be located in the property currently used as a surface parking lot on the south side of 1st Street between Broadway and Spring Streets. A portion of the property located on the northwest corner of 2nd and Broadway would be used for access and other ancillary facilities. The construction of the station and other facilities would be in the vicinity of the Los Angeles Times Mirror Building (APE #8-3). The addition of these facilities would represent a slight alteration to the setting of the building, in that the parking lot across the street would be converted to a station plaza. This would remain consistent with the urban setting of the building, and urban design features would complement the building's historic qualities.

Another station would be constructed southeast of the intersection of 1st Street and Central Avenue. The station would be located under Central Avenue, Alameda Street and privately held properties on the south side of 1st Street between Central Avenue and Alameda Street. This station may include a small building at ground level on the southwest corner of 1st and Alameda Streets to house ventilation fans. This shallow station may potentially be built without a roof, leaving parts of the below-grade platform level exposed. The property currently contains the CRHR-eligible S. Kamada Restaurant, Atomic Café, Señor Fish, and Coast Imports building (APE Map Resource #7-30). This building would be removed as part of construction for the LPA.

NEPA/Section 106 Effects Analysis for Historic Properties

Construction of proposed tunnels would create effects on the Walt Disney Concert Hall (APE Map Resource #4-4), and the proposed station at 2nd Street between Broadway and Spring Street would create effects, including slight alterations to the setting, of the Los Angeles Times Mirror Building (APE Map Resource #8-3). However, the effects on these historic properties would not be considered adverse because the potential changes would not diminish the integrity of the

properties' location, design, setting, materials, workmanship, feeling, or association. SHPO has concurred with these findings for the LPA, as discussed in Section 4.12.1.3.5.6.

CEQA Impact Analysis for Historical Resources

Construction of proposed stations and tunnels would not constitute a substantial adverse change that would impair the significance of the Walt Disney Concert Hall (APE Map Resource #4-4) or Los Angeles Times Mirror Building (APE Map Resource #8-3). Implementation of the historic properties/historical resources documentation mitigation measure in Section 4.12.1.4.2 below would reduce any potential impact to the CRHR-eligible Belmont Tunnel to a less than significant level. Potential changes in setting created by stations would not diminish the integrity of the resources' significant historic features. The LPA therefore, would have a less than significant impact upon these 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 following mitigation measures in Section 4.12.1.4.2 below and the MMRP for the LPA (Chapter 8) would reduce impacts to a less than significant level. With implementation of the following mitigation measures, construction and operation of the LPA would not contribute to potentially significant cumulative noise or vibration impacts.

- Historic properties/historical resources documentation
- Relocation of S. Kamada Restaurant, Atomic Café, Señor Fish, and Coast Imports building
- Interpretive programs for S. Kamada Restaurant, Atomic Café, Señor Fish, and Coast Imports building

It should be noted that the historical uses of the building, such as the Atomic Café, have long been gone. The building now houses a Mexican restaurant that is unrelated to the historical uses. The architectural features of the building have been substantially altered, and offer little semblance of the historical uses. The fact that those former uses have an association with events linked to community history, which is the primary basis for why the building is considered historically significant, is best preserved through the recommended mitigation measures. The proposed mitigation measures would address the criteria that render the building historically significant because they would incorporate and enhance the story of the building's historic use into a museum exhibit and place interpretive materials on-site.

4.12.1.3.5.3 Portal Construction

Two portals would be constructed for this alternative. One would be located just north of Temple and Alameda Streets and the existing at-grade Little Tokyo/Arts District Station. There are no historic properties or historical resources within the vicinity of the portal.

The second portal would be located within 1st Street between Alameda and Garey Streets. Tracks would rise to the east within this second portal and connect at-grade to the existing Metro Gold

Line tracks toward the Eastside. 1st Street would be widened to the north to accommodate this second portal and maintain the existing number of through lanes. This portal would be within the viewshed of two historic properties: the Little Tokyo Historic District and the NRHP-eligible John A. Roebling Sons Co. Building (APE Map Resource #7-35). However, the portal is not encompassed within the boundary of a historic property, historical resource, or a contributing element to the significance of either property.

NEPA/Section 106 Effects Analysis for Historic Properties

No adverse effect would occur to the Little Tokyo Historic District or the John A. Roebling Sons Co. Building from the construction of the portal. Potential effects would not alter the setting of historic properties in a manner that would diminish the integrity of the historic district. SHPO has concurred with these findings for the LPA, as discussed in Section 4.12.1.3.5.6.

CEQA Impact Analysis for Historical Resources

Construction of the portal would not constitute a substantial adverse change that would impair the significance of historical resources. The change in setting created by the portal would not diminish the integrity of the resources' significant historic features. Construction of the portal, therefore, would have a less than significant impact upon historical resources. This would not result in a considerable contribution to a cumulative impact.

4.12.1.3.5.4 Vibration

According to the Updated Locally Preferred Alternative Noise and Vibration Analysis, Appendix 2 of this Final EIS/EIR, construction activities with the most potential for noise and vibration impacts include the cut and cover tunnel under Flower Street, TBM excavation beneath 2nd Street, the TBM insertion site northeast of 1st and Alameda Streets, proposed underground cut and cover station at 2nd/Hope Street, proposed underground cut and cover station at 2nd/Broadway, proposed underground cut and cover station at 1st/Central Avenue, and the underground junction at 1st and Alameda Streets.

GBV from these construction activities could affect historic structures. Pre-augering of soldier piles at cut and cover sections would eliminate the need for impact pile driving. This would leave large bulldozers and drill rigs as the main sources of construction vibration that could have the potential to cause vibration damage. 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 to historic properties and significant impacts would not occur to 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 Resource #2-1)
- Roosevelt Building (APE Map Resource #2-7)
- General Petroleum-Mobil Oil Building (APE Map Resource #2-12)
- Superior Oil Building (APE Map Resource #2-13)

- The California Club (APE Map Resource #3-1)
- Los Angeles Central Library (APE Map Resource #3-2)
- 2nd Street Tunnel (APE Map Resource #4-3)
- Walt Disney Concert Hall (APE Map Resource #4-4)
- Mirror Building (APE Map Resource #8-3)
- Higgins Building(APE Map Resource #8-11)
- Cathedral of Saint Vibiana (APE Map Resource #8-12)
- Cathedral of Saint Vibiana Rectory (APE Map Resource #8-13)

The TBM(s) associated with tunneling activities would not cause vibratory effects or impacts to historic properties or historical resources because TBM(s) perform 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 TBM(s) 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.

According to the Updated Locally Preferred Alternative Noise and Vibration Analysis, Appendix 2 of this Final EIS/EIR, that outlines how project refinements affect historic properties and historical resources and verified (Wilson Ihrig & Associates 2011; See also Section 4.7), the Walt Disney Concert Hall (APE Map Resource #4-4) has the potential to be affected by GBV and GBN during project construction that exceeds FTA annoyance criteria. This effect has the potential to alter the building's use and diminish its historical integrity if not mitigated.

The Walt Disney Concert Hall houses a variety of uses that range from Category 1 to Category 3 land uses. Taking into account building isolation and losses through the parking structure, the temporary and short-term GBV generated from TBM(s) would range from approximately 53 VdB experienced at the most sensitive areas (Category 1) to 68 VdB experienced at the less sensitive areas (Category 2 and 3). These levels would not exceed the FTA GBV criteria of 65 VdB for Category 1 uses and 78 to 80 VdB for Category 2 and 3 land uses. The temporary and short-term GBN potentially generated from TBM(s) at the Walt Disney Concert Hall would range from approximately 18 to 48 dBA, respectively, which would exceed the FTA GBN criteria of 25 to 35 dBA for the Walt Disney Concert Hall. The temporary and short-term GBV and GBN potentially generated from TBM(s) at the REDCAT (a theater at Walt Disney Concert Hall) would be approximately 53 VdB and up to 33 dBA, respectively. These levels would not exceed the FTA criteria of 80 VdB and 43 dBA for the REDCAT. It should be noted that operation of the TBM

would be temporary and it would not operate for the entire duration of construction. The TBM would be underground in the vicinity of the Walt Disney Concert Hall and the REDCAT for approximately ten days assuming 35 feet per day.

GBN and GBV would also be generated by delivery trains in the tunnel during construction. It is estimated that the vibration generated by the delivery trains would be approximately 0 to 5dB greater than that generated by the LRT vehicles. Thus, at the Walt Disney Concert Hall, this would result in GBV of 50 VdB experienced at the most sensitive areas (Category 1) to 65 VdB experienced at the less sensitive areas (Category 2 and 3). These levels would not exceed the FTA GBV criteria of 65 VdB for Category 1 uses and 78 to 80 VdB for Category 2 and 3 land uses. GBN experienced at the Walt Disney Concert Hall would be 28 to 42 dBA at the most sensitive and less noise-sensitive land uses, respectively. Based on the FTA criteria for the Walt Disney Concert Hall indicated above, the delivery trains would potentially cause a short-term GBN impact at the Walt Disney Concert Hall. It is anticipated that the delivery trains would generate GBV of 44 VdB and GBN of approximately 26 dBA at the REDCAT, and impacts would be less than significant.

Overall during construction, operation of TBM(s) and delivery trains would result in a potentially significant GBN impact to the Walt Disney Concert Hall. Operation of TBM(s) and delivery trains would not result in a significant GBV or GBN impact to the REDCAT. With implementation of mitigation identified in Section 4.12.1.4.2 below, GBN generated by TBM(s) and delivery trains would not impact the sensitive activity occurring at the Walt Disney Concert Hall.

Due to the refinements to the LPA, operation of the LPA could result in GBN impacts at the following sensitive receptors: the Walt Disney Concert Hall. Both a one and two LRT vehicle pass-by scenario would occur under operation the LPA. One LRT vehicle pass-by would be the normal occurrence, which is why it was considered a frequent event under FTA criteria. The two LRT vehicle pass-by would be less frequent, which is why it was considered an occasional/infrequent event under FTA criteria.

One LRT vehicle pass-by associated with the LPA, which is considered a frequent event under FTA criteria, would potentially generate GBN up to 37 dBA at the Walt Disney Concert Hall. This GBN level would potentially exceed the FTA annoyance criterion for frequent events of 25 dBA for the Walt Disney Concert Hall. Thus, potentially significant GBN impacts from LRT vehicle pass-bys are predicted. Project operation would result in GBV levels of 41 to 60 VdB, which would not exceed the FTA criteria for the most sensitive use at the Walt Disney Concert Hall.

Under a two LRT vehicle pass-by scenario, which would be considered an occasional/infrequent event under FTA criteria, the LPA would potentially generate GBN between 26 and 40 dBA at the Walt Disney Concert Hall, which would potentially exceed the FTA annoyance criterion for occasional/infrequent events of 25 dBA for sensitive uses and 38 to 43 dBA for less sensitive uses for the Walt Disney Concert Hall. Thus, potentially significant GBN impacts from two LRT vehicle pass-bys are predicted at the Walt Disney Concert Hall. It should be noted that a two LRT vehicle pass-by would be infrequent. Under a two LRT vehicle pass-by scenario, GBV levels

would range from 42 to 63 VdB, which would not exceed the FTA criteria for the most sensitive use at the Walt Disney Concert Hall.

NEPA/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.

- Barker Brothers (APE Map Resource #2-1)
- Roosevelt Building (APE Map Resource #2-7)
- General Petroleum Mobil Oil Building (APE Map Resource #2-12)
- Superior Oil Building (APE Map Resource #2-13)
- The California Club (APE Map Resource #3-1)
- Los Angeles Central Library (APE Map Resource #3-2)
- 2nd Street Tunnel (APE Map Resource #4-3)
- Walt Disney Concert Hall (APE Map Resource #4-4)
- Mirror Building (APE Map Resource #8-3)
- Cathedral of Saint Vibiana (APE Map Resource #8-12)
- Cathedral of Saint Vibiana Rectory (APE Map Resource #8-13)

The effect would not be adverse after implementation of the following mitigation measures described in Section 4.12.1.4.2 below and committed to in the MMRP for the LPA (Chapter 8) and MOA (Appendix 3):

- Pre-construction baseline survey and geotechnical investigations
- Building protection measures, geotechnical and vibration monitoring, and post-construction survey

For the Walt Disney Concert Hall (APE Map Resource #4-4), an effect from GBN could occur during construction and operation. No adverse effect from GBV or GBN generated during construction or operation would occur at the REDCAT (APE Map Resource #4-4). The effect would not be adverse in nature after mitigation measures are implemented. These measures include performing pre-construction surveys and geotechnical investigation as well as geotechnical and vibration monitoring, and post-construction surveys. These investigations would protect and stabilize the ground near these resources and identify impacts before they become adverse. The use of an earth pressure balance or slurry shield TBM(s) would further

reduce the potential vibration impacts. Implementation of the MOA would specify the specific requirements for pre- and post-construction surveys, geotechnical investigations, building protection measures, and TBM specifications. Mitigation measures for noise and vibration during operation and construction would further reduce potential effects to historic properties so they fall below FTA impact threshold criteria for noise and vibration. These mitigation measures are described further in Section 4.12.1.4.2 below.

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. SHPO has concurred with these findings for the LPA, as discussed in Section 4.12.1.3.5.6.

CEQA Impact Analysis for Historical Resources

The potential for construction-related vibration could cause a substantial significant impact that would impair the following locations:

- Barker Brothers (APE Map Resource #2-1)
- Roosevelt Building (APE Map Resource #2-7)
- General Petroleum Mobil Oil Building (APE Map Resource #2-12)
- Superior Oil Building (APE Map Resource #2-13)
- The California Club (APE Map Resource #3-1)
- Los Angeles Central Library (APE Map Resource #3-2)
- 2nd Street Tunnel (APE Map Resource #4-3)
- Walt Disney Concert Hall (APE Map Resource #4-4)
- Mirror Building (APE Map Resource #8-3)
- Higgins Building (APE Map Resource #8-11)
- Cathedral of Saint Vibiana (APE Map Resource #8-12)
- Cathedral of Saint Vibiana Rectory (APE Map Resource #8-13)

Implementation of the following mitigation measures described in Section 4.12.1.4.2 below and committed to in the MMRP for the LPA (Chapter 8) would reduce the potential impacts to a less than significant level.

- Pre-construction baseline survey and geotechnical investigations
- Building protection measures, geotechnical and vibration monitoring, and post-construction survey
- Memorandum of Agreement

For the Walt Disney Concert Hall (APE Map Resource #4-4), a substantial adverse impact from GBN could occur during construction and operation. The effect would not be adverse in nature after mitigation measures are employed. These measures include performing pre-construction surveys and geotechnical investigation as well as geotechnical and vibration monitoring, and post-construction surveys. These investigations would protect and stabilize the ground near these resources and identify impacts before they become adverse. The use of an earth pressure balance or slurry shield TBM(s) would further reduce the potential vibration impacts. Mitigation measures for noise and vibration during operation and construction, would further reduce potential effects to the Walt Disney Concert Hall (APE Map Resource # 4-4) so they fall below FTA impact threshold criteria for noise and vibration. These mitigation measures are described further in Section 4.12.1.4.2 below. With implementation of mitigation measures, construction and operation of the LPA would not contribute to potentially significant cumulative noise or vibration impacts.

4.12.1.3.5.5 Differential Settlement

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 differential settlement than more recently constructed buildings.

Based on the activities described in the Description of Construction (Appendix K) and Construction Impacts section (Section 4.18), eight NRHP and/or CRHR eligible properties could be potentially affected by tunneling (TBM operation) and cut and cover construction:

- Superior Oil Company Building (APE Map Resource #2-13)
- The California Club (APE Map Resource #3-1)
- 2nd Street Tunnel (APE Map Resource #4-3)
- Walt Disney Concert Hall (APE Map Resource #4-4)

- Former Nishi Hongwanji Buddhist Temple (APE Map Resource #7-19)
- Los Angeles Times Building (APE Map Resource #8-2)
- Higgins Building (APE Map Resource #8-11)
- Cathedral of Saint Vibiana (APE Map Resource #8-12)

Implementation of the mitigation measures described in Section 4.12.1.4.2 below (when applicable) and committed to in the MMRP for the LPA (Chapter 8) would avoid potential adverse effects to historic properties and reduce potential impacts to historical resources to a less than significant level.

- Pre-construction baseline survey and geotechnical investigations
- Building protection measures, geotechnical and vibration monitoring, and post-construction survey
- TBM specifications/requirements near historic properties and historical resources

NEPA/Section 106 Effects Analysis for Historic Properties

Implementation of mitigation measures described in Section 4.12.1.4.2 below and committed to in the MMRP for the LPA (Chapter 8) and MOA (Appendix 3) to protect and stabilize the ground near the following locations would avoid adverse effects to all properties under this alternative:

- Superior Oil Company Building (APE Map Resource #2-13)
- The California Club (APE Map Resource #3-1)
- 2nd Street Tunnel (APE Map Resource #4-3)
- Walt Disney Concert Hall (APE Map Resource #4-4)
- Former Nishi Hongwanji Buddhist Temple (APE Map Resource #7-19)
- Los Angeles Times Building (APE Map Resource #8-2)
- Cathedral of Saint Vibiana (APE Map Resource #8-12)

If the following mitigation measures from Section 4.12.1.4.2 below are properly implemented, as committed in the MMRP for the LPA (Chapter 8) and MOA (Appendix 3), 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.

- Pre-construction baseline survey and geotechnical investigations
- Building protection measures, geotechnical and vibration monitoring, and post-construction survey
- Memorandum of Agreement

SHPO has concurred with these findings for the LPA, as discussed in Section 4.12.1.3.5.6.

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 the following mitigation measures described in Section 4.12.1.4.2 below and committed to in the MMRP for the LPA (Chapter 8) would reduce potential impacts to a less than significant level. Implementation of these mitigation measures would ensure that the LPA would not result in a considerable contribution to cumulative impacts.

- Pre-construction baseline survey and geotechnical investigations
- Building protection measures, geotechnical and vibration monitoring, and post-construction survey

4.12.1.3.5.6 NEPA/NHPA Finding (Section 106 Determination)

Construction and operation of the LPA would not be expected to result in any direct or indirect adverse effects to historic properties. On June 1, 2010, SHPO concurred with FTA's finding of no adverse effect from the Fully Underground LRT Alternative (LPA) (a copy of the SHPO concurrence letter is located in Appendix X, Cultural Resources - Built Environment (Updated)). An MOA for the LPA was signed in September 2011 and is included in this Final EIS/EIR as Appendix 3.

4.12.1.3.5.7 CEQA Determination

Construction of the LPA would potentially result in two direct significant impacts (Belmont Tunnel (APE Map Resource #3-4) and S. Kamada Restaurant, Atomic Café, Señor Fish, and Coast Imports building (APE Map Resource #7-30)) and 15 indirect significant impacts to historical resources. Implementation of the following mitigation measures described in Section 4.12.1.4.2 below and committed to in the MMRP for the LPA (Chapter 8) would reduce these potential impacts to a less than significant level. Implementation of these mitigation measures would ensure that the LPA would not result in a considerable contribution to cumulative impacts.

- Historic properties/historical resources documentation
- Pre-construction baseline survey and geotechnical investigations

- Building protection measures, geotechnical and vibration monitoring, and post-construction survey
- TBM specifications/requirements near historic properties and historical resources
- Memorandum of Agreement

Project operation would result in one direct significant impact to a historical resource (Walt Disney Concert Hall (APE Map Resource #4-4). Implementation of the following mitigation measures described in Section 4.12.1.4.2 below and committed to in the MMRP (Chapter 8) would reduce this potential impact to a less than significant level.

- Pre-construction baseline survey and geotechnical investigations
- Building protection measures, geotechnical and vibration monitoring, and post-construction survey
- Memorandum of Agreement
- Mitigation for effects from noise and vibration during operation to the Walt Disney Concert Hall
- Mitigation for effects from Noise and Vibration during construction to the Walt Disney Concert Hall

Refer to Table 4.12.1-3 for additional information.

Table 4.12.1-3. Locally Preferred Alternative Historic Resources Impacts
NEPA/NHPA Findings (Section 106 Determinations) and CEQA Determinations

APE Map Resource No.	Name	NRHP Eligibility	CRHR Eligibility	Potential Impact	Section 106 Determination	CEQA Determination	Can be Mitigated Below Level of Significance (CEQA)?
2-1	Barker Brothers	Eligible	Listed	Vibration	Effect Not Adverse	Significant Impact	Yes
2-7	Roosevelt Building	Listed	Listed	Vibration	Effect Not Adverse	Significant Impact	Yes
2-12	General Petroleum-Mobil Oil Building	Listed	Listed	Vibration	Effect Not Adverse	Significant Impact	Yes
2-13	Superior Oil Company Building	Listed Listed		Vibration Settlement	Effect Not Adverse	Significant Impact	Yes
3-1	The California Club	Eligible	Listed	Vibration Settlement	Effect Not Adverse	Significant Impact	Yes
3-2	Los Angeles Central Library	Listed	Listed	Vibration	Effect Not Adverse	Significant Impact	Yes
3-4	Belmont Tunnel, Hollywood-Glendale-Burbank-San Fernando Valley Tunnel	Not Eligible	Eligible	Partial Removal	No Historic Property Affected	Significant Impact	Yes
4-3	2nd Street Tunnel, Bridge (tunnel) #53C 1318	Eligible El	igible	Station Construction/ Vibration Settlement	Effect Not Adverse	Significant Impact	Yes
4-4	Walt Disney Concert Hall	Eligible El	igible	Station Construction/ Vibration Settlement	Effect Not Adverse	Significant Impact	Yes

Table 4.12.1-3. Locally Preferred Alternative Historic Resources Impacts
NEPA/NHPA Findings (Section 106 Determinations) and CEQA Determinations (continued)

APE Map Resource No.	Name	NRHP Eligibility	CRHR Eligibility	Potential Impact	Section 106 Determination	CEQA Determination	Can be Mitigated Below Level of Significance (CEQA)?
7-19	Former Nishi Hongwanji Buddhist Temple	Listed (as a contributor to Little Tokyo Historic District)	Listed	Vibration Settlement	Effect Not Adverse	Significant Impact	Yes
7-30	S. Kamada Restaurant, Atomic Café, Señor Fish, and Coast Imports	Not Eligible	Eligible	Demolition	No Historic Property Affected	Significant Impact	Yes
8-2	Los Angeles Times Building	Eligible	Listed	Vibration Settlement	Effect Not Adverse	Significant Impact	Yes
8-3	Los Angeles Times Mirror Building	Eligible El	igible	Station Construction/ Vibration	Effect Not Adverse	Significant Impact	Yes
8-11	Higgins Building, General Petroleum Building, (Los Angeles) County Engineers Building	Not Eligible	Eligible	Vibration Settlement	No Historic Property Affected	Significant Impact	Yes
8-12	Cathedral of Saint Vibiana	Eligible	Eligible	Vibration Settlement	Effect Not Adverse	Significant Impact	Yes
8-13	Cathedral of Saint Vibiana, Rectory	Eligible	Eligible	Vibration	Effect Not Adverse	Significant Impact	Yes

Note:
** No Historic Property Affected indicates that no properties eligible for the NRHP would be affected. Effect Not Adverse indicates that the MOA would reduce impacts to the point where no adverse effects would occur under Section 106 of NHPA.*

4.12.1.4 Mitigation Measures

4.12.1.4.1 Updates to Candidate Mitigation Measures from the Draft EIS/EIR

The Draft EIS/EIR included candidate mitigation measures for review and comment by the public, agencies, and other stakeholders. Since publication of the Draft EIS/EIR, Metro has adjusted and added specificity to the candidate mitigation measures for built environment impacts presented in the Draft EIS/EIR. The final LPA mitigation measures, shown in Section 4.12.1.4.2 below, are included in the MMRP for the LPA, Chapter 8, of this Final EIS/EIR, and the MOA (Appendix 3) and supersede candidate mitigation measures identified in the Draft EIS/EIR. Updates to the mitigation measures made since publication of the Draft EIS/EIR include:

- Addition of offering the S. Kamada Restaurant, Atomic Café, Señor Fish, and Coast Imports building to any party willing to move it off of the 1st/Central Avenue station site at their own expense, or exploration of incorporating portions of the building into the station should no party come forward.
- Addition of protection for facades of historic buildings adjacent to construction areas.
- Addition of mitigation measures to offset potential GBN impacts at the Walt Disney Concert Hall.
- Addition of detail to mitigation measures for consistency with other sections.

4.12.1.4.2 Final Mitigation Measures for the Locally Preferred Alternative

Mitigation measures listed for the LPA in this section have been carried forward and included in the MMRP for the LPA, Chapter 8, of this Final EIS/EIR. Some of the following built environment mitigation measures are also included in the MOA between SHPO, Metro, and FTA. They are the final committed mitigation measures for the LPA. MMRP index numbers are shown in parenthesis after each mitigation measure. The MOA is included in this Final EIS/EIR as Appendix 3.

To offset construction-related direct and indirect adverse impacts, the following mitigation measures shall be applied as indicated in 4.12.1.3.5:

- Documentation of historic properties and historical resources adversely affected by the project shall consist of the development of individual HABS/HAER submissions. The appropriate level of recordation shall be established in consultation with the California SHPO and formalized as a part of a MOA as described in Section 4.12.1.4.5 of the Draft EIS/EIR and included in Appendix 3 of this Final EIS/EIR. The HABS/HAER documents shall be offered to the Library of Congress and the documents shall be prepared so that the original archival-quality documentation would be suitable for inclusion in the Library of Congress if the National Park Service accepts these materials. Archival copies of the documentation shall also be offered for donation to local repositories, including the Los Angeles Central Library and the Los Angeles Conservancy. (CR/B-1)

- A survey of historic properties and/or historical resources within 21 feet of vibration producing construction activity shall be conducted to confirm the building category, and to provide a baseline for monitoring of GBV and the potential for GBV to cause damage. The survey shall also be used to establish baseline, pre-construction conditions for historic properties and historical resources. During preliminary engineering and final design of the project, additional subsurface (geotechnical) investigations shall be undertaken to further evaluate soil, groundwater, seismic, and environmental conditions along the alignment. The analysis shall assist in the selection and development of appropriate support mechanisms for cut and cover construction areas and any sequential excavation method (mining) construction areas, in accordance with industry standards and the Building Code. The subsurface investigation shall 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 Interior's Professional Qualification Standards shall provide input and review of design contract documents prior to implementation of the mitigation measures. (CR/B-2)

- The historic property and historical resource protection measures as well as the geotechnical and vibration monitoring program shall be reviewed by an architectural historian or historical architect who meets the Secretary of Interior's Professional Qualification Standards to ensure that the measures would adequately protect the properties/resources. A post-construction survey shall also be undertaken to ensure that adverse effects or significant impacts have not occurred to historic properties or historical resources. (CR/B-3)

- For those historic properties and historical resources where adverse impacts are anticipated, a MOA has been 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 shall resolve and/or avoid, minimize, or mitigate potential effects to historic properties and/or historical resources. The agreement includes 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. See Appendix 3 (MOA) of this Final EIS/EIR for specific requirements. (CR/B-4)

- The S. Kamada Restaurant, Atomic Café, Señor Fish, and Coast Imports building (to be removed) shall be offered for a period of one year following certification of the Final EIS/EIR for the price of $1 to any party willing to move it off of the 1st/Central Avenue station site at their own expense. Should no parties come forward, Metro shall incorporate materials from the building into the project facilities. Metro shall explore keeping portions of the building intact for use in the 1st/Central Avenue station. Metro shall also offer to provide an exhibit commemorating the building at the Japanese American National Museum, the 1st/Central Avenue station site, or other suitable location. An individual HABS/HAER submission shall be developed. (CR/B-5)

- Facades of historic buildings adjacent to the construction areas shall be protected from accumulation of excessive dirt or shall be cleaned in an appropriate manner periodically while construction activities are occurring nearby. (CR/B-6)

In order to mitigate potential ground movement associated with cut and cover construction and potential ground loss due to tunneling that could affect historic resources:

- Before any construction, a survey of structures within the anticipated zone of construction influence shall be conducted in order to establish baseline conditions. A geotechnical instrumentation and settlement monitoring plan and mitigation measures shall be developed and adhered to during construction to ensure appropriate measures are taken to address any construction-induced movement. If assessments indicate the necessity to proactively protect nearby structures, additional support for the structures by underpinning or other ground improvement techniques shall be required prior to the underground construction. Metro shall require the construction contractor to limit movement to less than acceptable threshold values for vertical, horizontal, and angular deformation as a performance standard. These acceptable threshold values shall be established such that the risk of damage to buildings and utilities will be negligible to very slight. For buildings, these threshold values will be based on the relationship of building damage to angular distortion and horizontal strain consistent with Boscardin and Cording (1989) and qualitative factors including but not limited to the type of structure and its existing condition. For utility mains, these threshold values shall be those established by the utility owners. Additional data and survey information shall be gathered during final design for each building and utility main to enable assessment of the tolerance of potentially affected structures and utilities. Additional engineering and design level geotechnical studies shall be performed to define the nature of the soils and to refine the means of achieving each performance specification. (GT-1)

- Ground improvement such as grouting or other methods shall be required to fill voids where appropriate and offset potential settlement when excess material has been removed during excavation. The criteria for implementing grouting or ground improvement measures shall be based on the analysis described in the preceding mitigation measure. (GT-2)

- The tunnel alignment shall be grouted in advance to provide adequate soil support and minimize settlement as geotechnical conditions require. (GT-3)

- Settlement along the project alignment shall be monitored using a series of measuring devices above the route of the alignment. Leveling surveys shall be conducted prior to tunneling to monitor for possible ground movements. (GT-4)

- Tunnel construction monitoring requirements shall be described and defined in design contract documents. Additional geotechnical provisions shall be included to the extent feasible, including use of an Earth Pressure Balance or Slurry Tunnel Boring Machine for tunnel construction to minimize ground loss. During tunnel construction, the soils encountered shall be monitored relative to anticipated soil conditions as described in a Geotechnical Baseline Report. (GT-5)

To offset the potentially significant GBN impacts that could occur during construction at Walt Disney Concert Hall:

- Construction of the LPA, in the vicinity of the Walt Disney Concert Hall, shall be done in accordance with the MOA between FTA and the SHPO, which includes 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. (NV-18)

Tunnel Boring Machine

- Maintenance and Operation: The construction contractor shall minimize vibration from jacking or pressing operations (if applicable, the action could be smoothed out to avoid a sharp push), and maintain machinery in good working order. (NV-19)

- Coordination and Notification: There would be times when the Main Auditorium of the Walt Disney Concert Hall is vacant or not used for a noise-sensitive activity, thereby eliminating any noise impact from TBM. Similarly, there would be times at the Los Angeles Philharmonic Association (LAPA) Conference Room (and offices) of the Walt Disney Concert Hall and at the recording/performance halls of the Colburn School when activities are not particularly noise-sensitive. Metro shall coordinate closely with the Walt Disney Concert Hall, the Colburn School, and the Broad Art Foundation Museum, which is currently under construction, to ensure that the noise-generating parts of TBM operations shall be conducted to avoid noise-sensitive periods. (NV-20)

Delivery Train

- Speed: Delivery train speed shall be limited to 5 MPH in the vicinity of the Walt Disney Concert Hall, the Colburn School, and the Broad Art Foundation Museum, currently under construction, which would reduce the GBN to the lower range, or 5 dBA from the maximum range. (NV-21)

- Resilient Mat: A resilient system to support and fasten the delivery train tracks shall be used during construction, which would reduce GBN levels by at least 4 dBA.

  - Such as system shall include a) resilient mat under the tracks and b) a resilient grommet or bushing under the heads of any track fasteners (assuming some kind of anchor or bolt system). The hardness of the resilient mat shall be in the 40 to 50 durometer range, and be about one to two inches thick, depending on how heavily loaded the cars would be. The contractor shall select the mat thickness so that the rail doesn't bottom out during a car pass-by. (NV-22)

- Conveyor: The delivery train shall be replaced with a conveyor system to transport materials in the tunnel if GBN exceeds the FTA annoyance criteria at the Walt Disney Concert Hall, the Colburn School, or the Broad Art Foundation Museum, which is currently under construction. (NV-23)

- Coordination and Notification: There would be times when the Main Auditorium and Choral Hall of the Walt Disney Concert Hall and the recording/performance halls of the Colburn School are vacant or not used for noise-sensitive activities, thereby eliminating any noise impact from the delivery train. Metro shall coordinate closely with the Walt Disney Concert Hall, the Colburn School, and the Broad Art Foundation Museum, which is currently under construction, to ensure that the delivery train pass-bys would be conducted to avoid noise-sensitive periods. (NV-24)

To offset the potentially significant GBN impacts that could occur during operations at Walt Disney Concert Hall:

- In the vicinity of the Walt Disney Concert Hall and the Colburn School, Metro shall implement resiliently supported fasteners, isolated slab track, or other appropriate measures as needed to eliminate impacts and to reduce GBN below FTA annoyance criteria. (NV-27)

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, including the LPA, on these resources. Information in this section is based on the Cultural Resources – Archaeology Technical Memorandum prepared for the project contained in Appendix Y, Cultural Resources - Archaeology (Updated), of this EIS/EIR. No substantial changes to this section have been made since publication of the Draft EIS/EIR. Environmental effects of the LPA are discussed in Section 4.12.2.3.5 and mitigation measures are discussed in Section 4.12.2.4.2.

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 CFR Part 800. These regulations require federal agencies to consider the effects of proposed projects on historic properties. 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 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 could potentially 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 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, however effects on historic properties under Section 106 of the NHPA of 1966, as amended, are evaluated in accordance with the criteria of adverse effect in the regulations contained in 36 CFR Part 800.5 (a)(1) On June 1, 2010, the California SHPO concurred with the determinations of eligibility and finding of effects by the FTA for the Project and Alternatives and an MOA has been prepared to conclude Section 106 consultation (see Appendix 3). The MOA was signed in September 2011.

In accordance with CEQA a project would result in a significant impact on an archaeological resource if it results 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), 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 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 five 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 (see 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 archaeologist, 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 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 Native American Heritage Commission (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. These five groups included the Ti'At Society, Gabrielino Tongva Indians of California Tribal Council, Gabrielino Tongva Nation, Gabrielino/Tongva San Gabriel Band of Mission Indians, and Tongva Ancestral Territorial Tribal Nation. Responses were received from two of the five Native American contacts (Gabrielino/Tongva San Gabriel Band of Mission Indians and Tongva Ancestral Territorial Tribal Nation). These responses are documented in Appendix Y, Cultural Resources – Archaeology (Updated), of this EIS/EIR.

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 settlement 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. Zanja segments P-19-003103 and P-19-003352 were recorded outside of the APE. A segment of the Zanja System (P-19-003103) north and outside 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.

4.12.2.3 Environmental Impacts/Environmental Consequences

This section describes the environmental impacts and consequences of the proposed alternatives, including the LPA. Impact conclusions for all of the alternatives are based on the thresholds identified above in Section 4.12.2.1.

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/NHPA Finding (Section 106 Determination)

The No Build Alternative would not result in adverse effects to archaeological resources.

4.12.2.3.1.1 CEQA Determination

The No Build Alternative would not result in 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. Zanja remnants (Zanja 6-1; P-19-003352), for instance, have been identified at depths as shallow as 1.5 feet below grade. 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 of the Draft EIS/EIR would reduce this potential impact to a 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 of the Draft EIS/EIR would reduce construction-related impacts to previously unidentified archaeological resources to a 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 of the Draft EIS/EIR would reduce both direct and cumulative impacts to this resource to a 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 NRHP and CA Register eligible	Foster, J. 2006

4.12.2.3.2.1 NEPA/NHPA Finding (Section 106 Determination)

As the segments of the Zanja system (CA-LAN-887H) within the APE have not been determined eligible for the NRHP, the TSM Alternative may have adverse effects upon these resources if, during implementation of the MOA and Cultural Resources Monitoring and Mitigation Plan (CRMMP), they are determined to be eligible for the NRHP. These adverse effects under Section 106 would be resolved through the implementation of the MOA and CRMMP.

Operation of the TSM Alternative would not result in adverse effects to archaeological resources.

4.12.2.3.2.2 CEQA Determination

With implementation of the MOA and CRMMP, potential construction and cumulative impacts would not be significant under CEQA. Operation of the TSM Alternative would not result in 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 an adverse effect.

Implementation of the mitigation measure described in Section 4.12.2.4.1 of the Draft EIS/EIR 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/NHPA Finding (Section 106 Determination)

The At-Grade Emphasis LRT Alternative may have adverse effects upon previously unidentified archaeological resources or previously undiscovered portions of Site RC-1 if these resources are determined to be eligible for the NRHP. These adverse effects under Section 106 would be resolved through coordination with SHPO and the implementation of the MOA and CRMMP. SHPO has concurred with the project's NHPA determinations.

The At-Grade Emphasis LRT Alternative would not result in adverse operational effects to archaeological resources.

4.12.2.3.3.2 CEQA Determination

With implementation of the MOA and CRMMP, potential construction and cumulative impacts would not be significant under CEQA. The At-Grade Emphasis LRT Alternative would not result in 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 an adverse 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 of the Draft EIS/EIR 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 4.12.2.4.1of the Draft EIS/EIR 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 of the Draft EIS/EIR 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/NHPA Finding (Section 106 Determination)

As the segments of the Zanja system (CA-LAN-887H), site CA-LAN-3588, and previously unidentified archaeological resources within the APE have not been determined eligible for the NRHP, the Underground Emphasis LRT Alternative may have adverse effects upon these resources if, during implementation of the MOA and CRMMP, they are determined to be eligible for the NRHP. These adverse effects under Section 106 would be resolved through coordination with SHPO and the implementation of the MOA and CRMMP. SHPO has concurred with the project's NHPA determinations.

The Underground Emphasis LRT Alternative would not result in adverse operational effects to archaeological resources.

4.12.2.3.4.2 CEQA Determination

With implementation of the MOA and CRMMP, potential construction and cumulative impacts would not be significant under CEQA. The Underground Emphasis LRT Alternative would not result in significant operational impacts to archaeological resources.

4.12.2.3.5 Locally Preferred Alternative

Construction of the LPA 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. 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.

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 an adverse effect. 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 the following mitigation measures described in Section 4.12.2.5 below would reduce potential direct impacts to identified and previously unidentified archaeological resources to a less than significant level.

- Treatment of undiscovered archaeological resources
- Treatment of known archaeological resources

The LPA would not result in operational impacts to either identified or previously unidentified archaeological resources. Given that implementation of the treatment of undiscovered archaeological resources mitigation measure described in Section 4.12.2.4.2 below would reduce potential construction impacts to previously unidentified archaeological resources to a less than significant level, the LPA 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 treatment of known archaeological resources mitigation measure described in Section 4.12.2.4.2 below 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/NHPA Finding (Section 106 Determination)

As the four previously identified resources and unidentified archaeological resources situated within the APE have not been formally evaluated for the NRHP, the LPA may have adverse effects upon these resources if, during implementation of the MOA and CRMMP, they are determined to be eligible for the NRHP. These adverse effects under Section 106 will be resolved through coordination with SHPO and the implementation of the MOA and CRMMP. SHPO has concurred with the project's NHPA determinations, and an MOA was signed for the LPA in September 2011.

The LPA would not result in adverse operational effects to archaeological resources.

4.12.2.3.5.2 CEQA Determination

With implementation of the MOA and CRMMP, potential construction and cumulative impacts would not be significant under CEQA. The LPA would not result in significant operational impacts to archaeological resources.

4.12.2.4 Mitigation Measures

4.12.2.4.1 Updates to the Candidate Mitigation Measures from the Draft EIS/EIR

The Draft EIS/EIR included candidate mitigation measures for review and comment by the public, agencies, and other stakeholders. Since publication of the Draft EIS/EIR, Metro has adjusted and added specificity to the candidate mitigation measures for archaeological resources presented in the Draft EIS/EIR. The final LPA mitigation measures, shown in Section 4.12.2.4.2 below, are included in the MMRP for the LPA, Chapter 8, of this Final EIS/EIR, and the MOA (Appendix 3) and supersede candidate mitigation measures identified in the Draft

EIS/EIR. No substantial new mitigation measures have been added since publication of the Draft EIS/EIR.

4.12.2.4.2 Final Mitigation Measures for the Locally Preferred Alternative

Mitigation measures listed for the LPA in this section have been carried forward and included in the MMRP for the LPA, Chapter 8, of this Final EIS/EIR. They are the final committed mitigation measures for the LPA. MMRP index numbers are shown in parenthesis after each mitigation measure. Some of the following archaeological resources mitigation measures are also included in the MOA between SHPO, Metro, and FTA. The MOA is included in this Final EIS/EIR as Appendix 3.

To offset the impacts of unknown archaeological impacts potentially being disturbed during construction:

- Construction personnel shall be trained on proper procedures by a qualified lead archaeologist. (CR/A-1)
- An archaeological monitor shall be present during ground-disturbing activities. The archaeological monitor shall have authority to halt operations to examine potential resources and recover artifacts using professional archaeological methods. (CR/A-2)
- A Native American cultural resources consultant from the Gabrielino/Tongva San Gabriel Band of Mission Indians and/or the Tongva Ancestral Territorial Tribal Nation shall be contacted to monitor ground-disturbing work if Native American cultural resources are discovered. (CR/A-3)
- Work shall stop if human remains are found, and the Los Angeles County Coroner shall be notified immediately. If the remains are determined to be prehistoric, the Coroner shall notify the NAHC, which will arrange for a MLD to inspect the site within 48 hours and issue recommendations for scientific removal and nondestructive analysis. (CR/A-4)
- If no cultural resources are discovered during construction monitoring, the archaeological monitor shall submit a brief letter to that effect. If previously unidentified cultural resources are discovered in the course of construction monitoring, a report shall 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. (CR/A-5)

To offset impacts caused by disturbance of the Los Angeles Zanja System (CA-LAN-887H and other unnumbered zanjas), and sites CA-LAN-3588, P-19-003338, and P-19-003339, which could occur during construction:

- A proactive identification and documentation program that would facilitate preservation or mitigation in a cost-effective manner shall be undertaken. This shall include using 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 are

planned in the vicinity of mapped zanja segments, full-time archaeological monitoring shall be instituted to ensure documentation consistent with Section 4.12.2.4.2 of the Draft EIS/EIR. (CR/A-6)

4.12.3 Paleontological Resources

This section summarizes the existing paleontological resources located in the project area and the potential impacts of the proposed alternatives, including the LPA, on these resources. Information in this section is based on the Cultural Resources – Paleontology Technical Memorandum prepared for the project contained in Appendix Z, Cultural Resources - Paleontology (Updated), of this EIS/EIR. No substantial changes have been made to this section since publication of the Draft EIS/EIR. Environmental effects of the LPA are discussed in Section 4.12.3.3.5 and mitigation measures are discussed in Section 4.12.3.4.2 below.

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 one mile of the proposed project area 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 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 two 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 Consequences

This section describes the potential environmental impacts and consequences of the proposed alternatives, including the LPA. Impact conclusions for all of the alternatives are based on the thresholds identified above in Section 4.12.3.1.

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 would 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 APE 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 would be protected and information would be 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

The No Build Alternative would not result in adverse effects to paleontological resources.

4.12.3.3.1.2 CEQA Determination

The No Build Alternative would not result in 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 stops 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

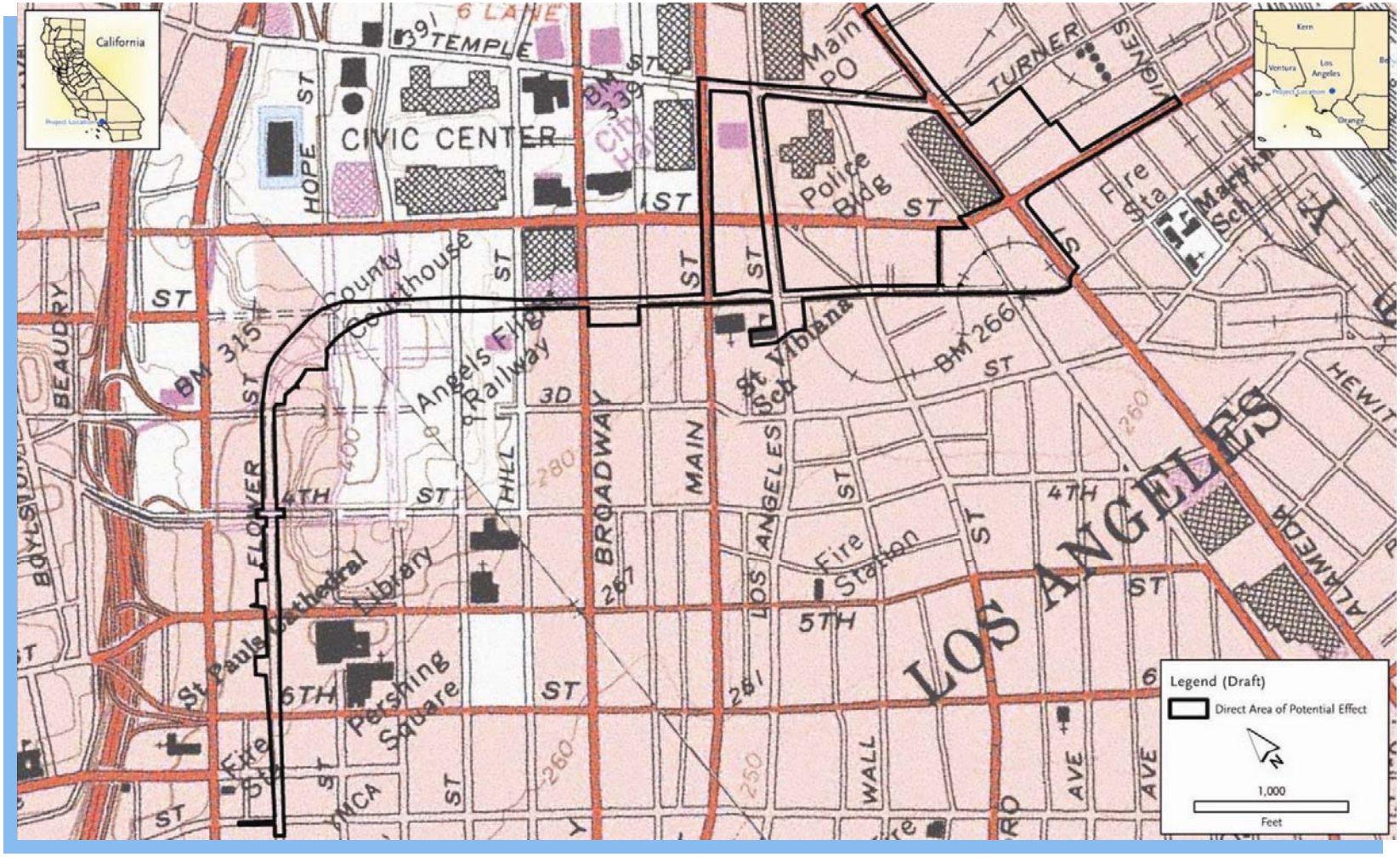
The TSM Alternative could have adverse effects on paleontological resources. With implementation of proposed mitigation, potential construction and cumulative effects would not be adverse under NEPA. Operation of the TSM Alternative would not result in adverse effects to paleontological resources.

4.12.3.3.2.2 CEQA Determination

The TSM Alternative could have significant impacts on paleontological resources. With implementation of proposed mitigation, potential construction and cumulative impacts would not be significant under CEQA. Operation of the TSM Alternative would not result in significant impacts to paleontological resources.

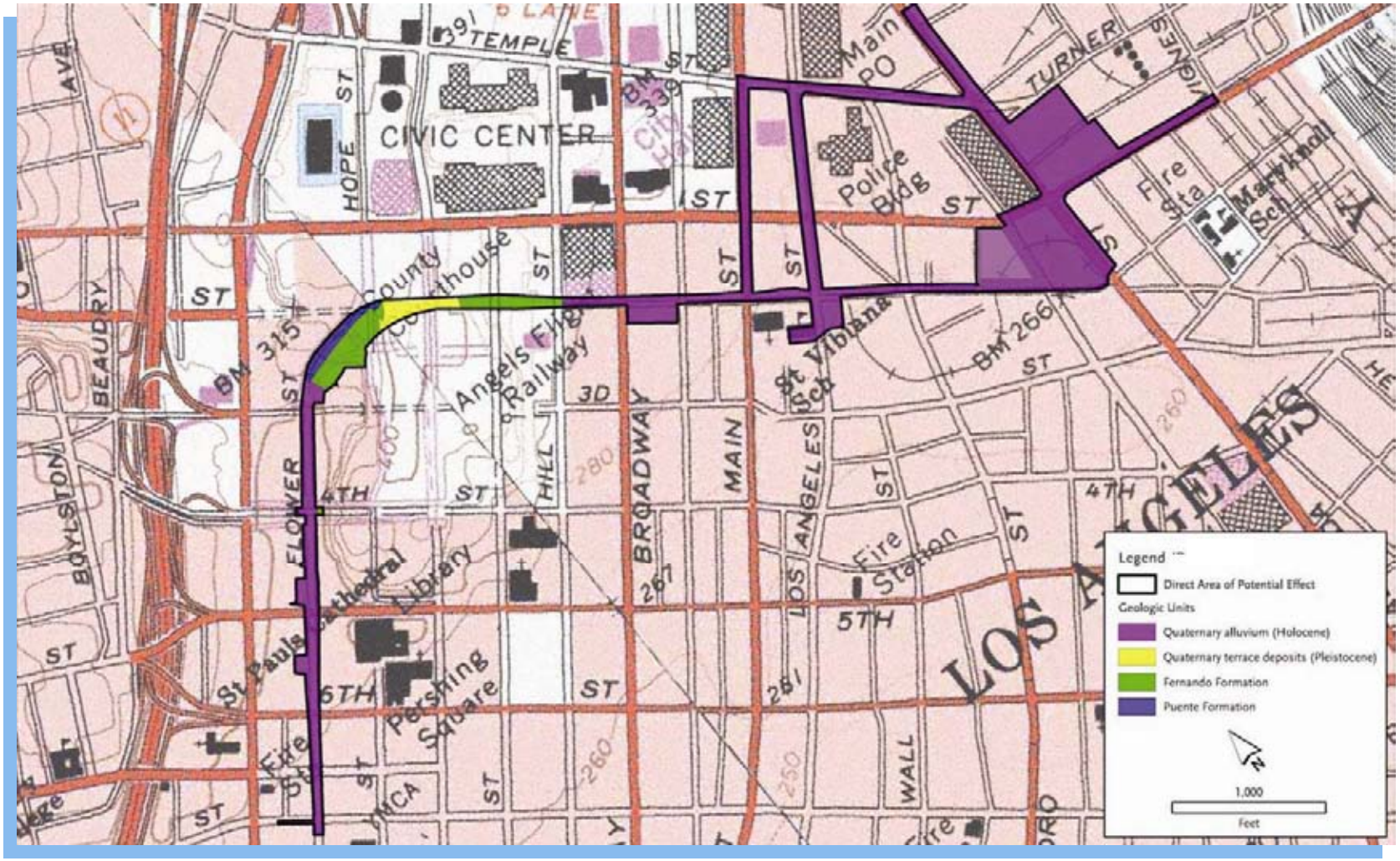
Table 4.12.3-1. Previously Discovered Paleontological Resources In and Around the Direct APE

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 Formation	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)



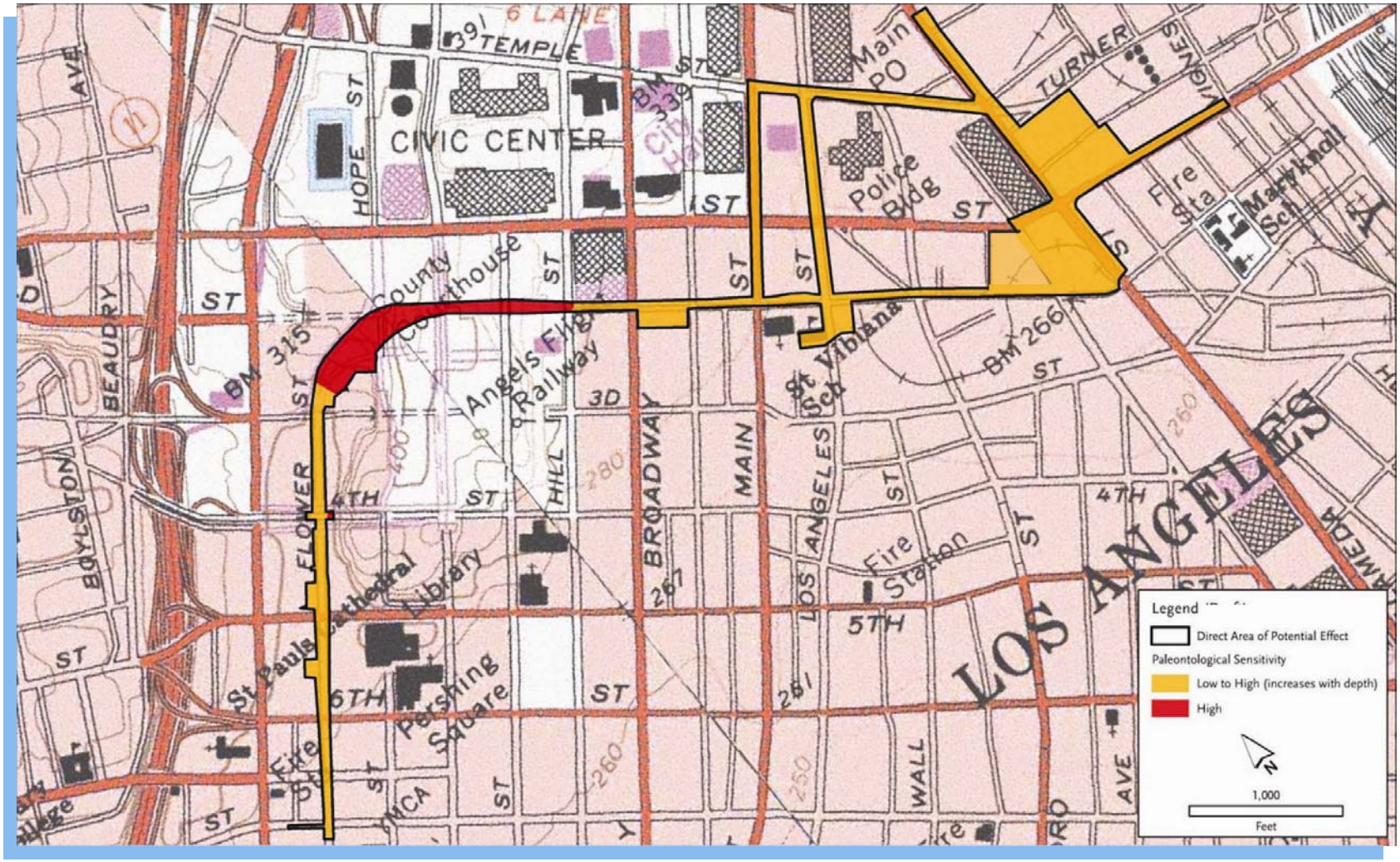
Source: USGS

Figure 4.12.3-1. Area of Potential Effects (APE) for Paleontological Resources



Source: USGS

Figure 4.12.3-2. Geologic Map



Source: USGS

Figure 4.12.3-3. Paleontological Sensitivity Map

4.12.3.3.3 At-Grade Emphasis LRT Alternative

The At-Grade Emphasis LRT Alternative would have 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) would 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 five 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 could be reduced to a less than significant level, thus reducing any cumulative impact on paleontological resources to a less than significant level.

4.12.3.3.3.1 NEPA Finding

Construction of the At-Grade Emphasis LRT Alternative could potentially have adverse effects on paleontological resources. With implementation of mitigation, potential construction and cumulative effects would not be adverse under NEPA. The At-Grade Emphasis LRT Alternative would not have adverse effects on paleontological resources with implementation of proposed mitigation measures. The At-Grade Emphasis LRT Alternative would not result in adverse operational effects to paleontological resources.

4.12.3.3.3.2 CEQA Determination

Construction of the At-Grade Emphasis LRT Alternative could potentially have significant impacts on paleontological resources. With implementation of mitigation, potential construction and cumulative impacts would not be significant under CEQA. The At-Grade Emphasis LRT Alternative would not have significant impacts on paleontological resources with implementation of proposed mitigation measures. The At-Grade Emphasis LRT Alternative would not result in significant operational impacts to paleontological resources.

4.12.3.3.4 Underground Emphasis LRT Alternative

Construction of the Underground Emphasis LRT Alternative would involve 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) would 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 five feet or more below the ground surface. In areas where mitigation measures can be implemented, potential impacts could 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 could be reduced to a less than significant level, thus reducing any cumulative impact on paleontological resources to a less than significant level. 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

Construction of the Underground Emphasis LRT Alternative could potentially have adverse effects on paleontological resources. With implementation of mitigation, potential construction and cumulative effects would not be adverse under NEPA. The Underground Emphasis LRT Alternative would not have adverse 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 effects would be unavoidable.

The Underground Emphasis LRT Alternative would not result in adverse operational effects to paleontological resources.

4.12.3.3.4.2 CEQA Determination

Construction of the Underground Emphasis LRT Alternative could potentially have significant impacts on paleontological resources. With implementation of mitigation, potential construction and cumulative impacts would not be significant under CEQA. The Underground Emphasis LRT Alternative would not have significant impacts 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 significant operational impacts to paleontological resources.

4.12.3.3.5 Locally Preferred Alternative

The LPA involves ground disturbance associated with excavations to construct three new stations and an entirely underground tunnel located from the 7th Street/Metro Center Station to the east and north of the intersection of 1st and Alameda Streets. Any ground disturbances in areas of high sensitivity (See Figure 4.12.3-3) would 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 five feet or

more below the ground surface. Similar impacts to paleontological resources would likely occur during station construction, cut and cover locations and during the use of TBM. In areas where mitigation measures can be implemented, such as at new station locations and cut and cover locations where resources can be actively observed, potential impacts could be reduced to a less than significant level. In areas where new underground TBM segments would be constructed (the non-station portions of the alignment beneath 2nd Street, and beneath Flower Street north of 4th Street), mitigation for paleontological resources would not be feasible resulting in significant and unavoidable impacts.

The LPA would not result in operational impacts to paleontological resources.

In areas where mitigation measures can be implemented, potential impacts could be reduced to a less than significant level, thus reducing any cumulative impact on paleontological resources to a less than significant level. Mitigation measures cannot be implemented in areas where TBM excavation would be used. These areas include the non-station portions of the alignment beneath 2nd Street, and beneath Flower Street north of 4th Street. In these areas, cumulative impacts may be unavoidable.

4.12.3.3.5.1 NEPA Finding

The LPA could have adverse effects on paleontological resources. With implementation of mitigation, potential construction and cumulative effects will not be adverse under NEPA. The LPA will not have adverse 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 will not be feasible and thus construction and cumulative effects would be unavoidable.

The LPA would not result in adverse operational effects to paleontological resources.

4.12.3.3.5.2 CEQA Determination

The LPA could have significant impacts on paleontological resources. With implementation of mitigation, potential construction and cumulative impacts would not be significant under CEQA. The LPA would not have significant impacts 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. Even with the incorporation of mitigation, the LPA would still result in a considerable contribution to cumulative impacts during construction.

The LPA would not result in significant operational impacts to paleontological resources.

4.12.3.4 Mitigation Measures

4.12.3.4.1 Updates to the Candidate Mitigation Measures from the Draft EIS/EIR

The Draft EIS/EIR included candidate mitigation measures for review and comment by the public, agencies, and other stakeholders. The final LPA mitigation measures, shown in Section

4.12.3.4.2 below, are included in the MMRP for the LPA, Chapter 8, of this Final EIS/EIR and supersede candidate mitigation measures identified in the Draft EIS/EIR. No substantial changes have been made to the candidate mitigation measures from the Draft EIS/EIR.

4.12.3.4.2 Final Mitigation Measures for the Locally Preferred Alternative

Mitigation measures listed for the LPA in this section have been carried forward and included in the MMRP for the LPA, Chapter 8, of this Final EIS/EIR. They are the final committed mitigation measures for the LPA. MMRP index numbers are shown in parenthesis after each mitigation measure.

To offset the impacts of previously undiscovered paleontological resources potentially being disturbed during construction:

- A qualified paleontologist shall prepare a Paleontological Monitoring and Mitigation Plan for the proposed project and supervise monitoring of construction excavations within sensitive geologic sediments. The monitor shall have authority to temporarily divert grading away from exposed fossils to professionally and efficiently recover the fossil specimens and collect associated data. (CR/P-1)

- 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. Very shallow surficial excavations (less than five feet) within Quaternary younger alluvium would be monitored on a part-time basis to ensure that underlying sensitive units are not adversely affected. 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. (CR/P-2)

- At each fossil locality, field data forms shall be used to record pertinent geologic data, stratigraphic sections shall be measured, and appropriate sediment samples shall be collected and submitted for analysis. (CR/P-3)

- Due to the likelihood of the presence of microfossils, matrix samples shall be collected and tested within the Puente Formation and Fernando Formation. Testing for microfossils shall consist of screen-washing samples (approximately 30 pounds) to determine if significant fossils are present. Productive tests shall 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. (CR/P-4)

- Recovered fossils shall 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. (CR/P-5)

The paleontologist shall prepare a final monitoring and mitigation report to be filed, at a minimum, with Metro and the identified repository. (CR/P-6)