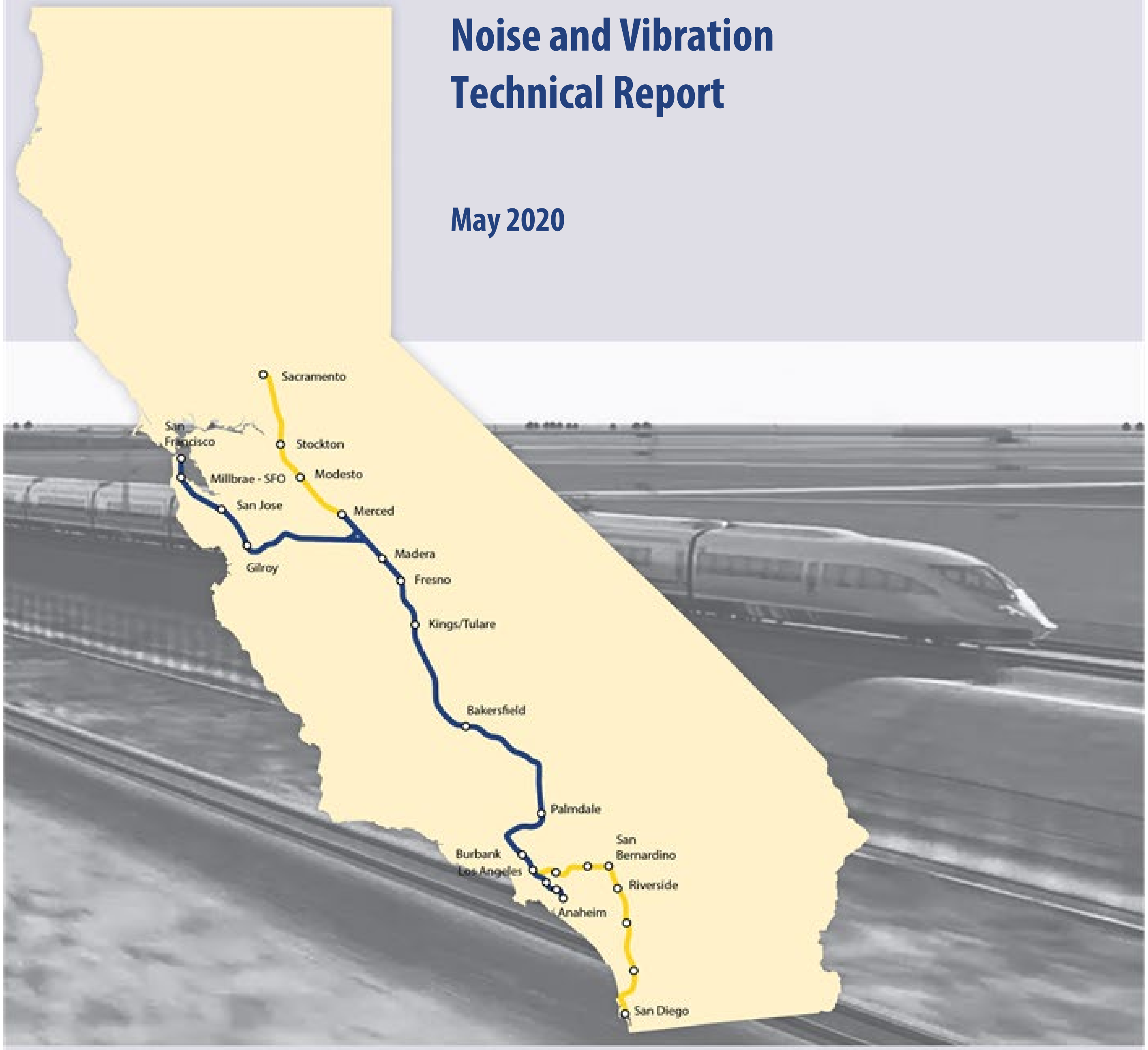
California High-Speed Rail Authority

Burbank to Los Angeles Project Section



Noise and Vibration Technical Report

May 2020

CALIFORNIA
High-Speed Rail Authority

The environmental review, consultation, and other actions required by applicable Federal environmental laws for this project are being or have been carried out by the State of California pursuant to 23 U.S.C. 327 and a Memorandum of Understanding dated July 23, 2019, and executed by the Federal Railroad Administration and the State of California.

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ACRONYMS AND ABBREVIATIONS

ADT	average daily traffic
Amtrak	National Railroad Passenger Corporation
Authority	California High-Speed Rail Authority
Caltrans	California Department of Transportation
CEQA	California Environmental Quality Act
C.F.R.	Code of Federal Regulations
CMF	(Metrolink) Central Maintenance Facility
CNEL	community noise equivalent level
dB	decibel(s)
dBA	A-weighted decibel(s)
EIR	environmental impact report
EIS	environmental impact statement
FHWA	Federal Highway Administration
FRA	Federal Railroad Administration
FTA	Federal Transit Administration
EMU	electric-multiple-unit
HSR	high-speed rail
Hz	hertz
I	Interstate
in/sec	inches per second
LAMC	Los Angeles Municipal Code
LAUS	Los Angeles Union Station
L_{dn}	day-night average noise level
L_{eq}	equivalent continuous sound level
L_{max}	maximum instantaneous noise level
LMF	light maintenance facility
LOSSAN	Los Angeles–San Diego–San Luis Obispo Rail Corridor
L_v	root-mean-square vibration level
LT	long-term
Metro	Los Angeles County Metropolitan Transportation Authority
MOIF	maintenance of infrastructure facility
MOIS	maintenance of infrastructure siding facility
mph	miles per hour
N/A	not applicable
NAC	noise abatement criteria

NEPA	National Environmental Policy Act
PPV	peak particle velocity
PTC	Positive Train Control
RMS	root-mean-square
RSA	resource study area
SAA	Supplemental Alternatives Analysis
SEL	sound exposure level
SR	State Route
SST	supplemental short-term
ST	short-term
TNM 2.5	Traffic Noise Model 2.5
TPSS	traction power supply station
UPRR	Union Pacific Railroad
U.S.	United States
VdB	vibration velocity decibel(s)
VSA	vibration-sensitive area

EXECUTIVE SUMMARY

This Noise and Vibration Technical Report describes the regulatory setting, existing conditions, and potential effects associated with noise and vibration generated from construction and operation of the proposed Burbank to Los Angeles Project Section of the California High-Speed Rail (HSR) System. This project section is approximately 14 miles long and travels through the cities of Burbank, Glendale, and Los Angeles. The HSR for this project section would be located within a narrow and constrained urban environment, crossing major streets and highways, and in some portions would be adjacent to the Los Angeles River. The Los Angeles County Metropolitan Transportation Authority (Metro) owns the railroad right-of-way, the Southern California Regional Rail Authority owns the track and operates the Metrolink commuter rail service, the National Railroad Passenger Corporation (Amtrak) provides intercity passenger service, and Union Pacific Railroad (UPRR) holds track access rights and operates freight trains.

There are a number of federal, state, and local regulations related to noise and vibration. However, the assessment of noise and vibration effects from high-speed rail construction and operations is largely based on the application of Federal Railroad Administration (FRA) methodology and guidelines (FRA 2012). The FRA guidance includes impact criteria for annoyance to humans, wildlife, and livestock as well as guidelines for identifying noise-sensitive locations where increased annoyance can occur as a result of the sudden increase in noise (the *startle effect*) from the rapid approach of high-speed trains. The FRA guidelines are supplemented by Federal Transit Administration (FTA) guidelines (FTA 2018) for associated fixed facilities, such as storage and maintenance yards, passenger stations and terminals, parking facilities, and electrical substations. In addition, project-related traffic noise effects are assessed based on Federal Highway Administration (FHWA) (2011) and California Department of Transportation (Caltrans) (2013) procedures and criteria.

Sources of existing noise along the proposed high-speed rail alignment include passenger and freight trains, roadway traffic, aircraft, and local community sources. To characterize the existing noise conditions at noise-sensitive areas along the project alignment, ambient noise measurements were conducted at 46 sites throughout the noise resource study area for the Burbank to Los Angeles Project Section. Because the project alignment is within existing rail corridors, the measurement results indicate generally high existing noise levels with measured noise exposure (L_{dn}) in the range of 52.3 to 76.7 A-weighted decibels (dBA). For vibration, the only significant sources of existing ground vibration along the proposed alignment are passenger and freight trains. To characterize the ground vibration transmission conditions at vibration-sensitive locations along the project alignment, vibration propagation measurements were conducted at nine sites throughout the vibration resource study area. Propagation measurements are used to determine the distance sound or vibration travels or is transmitted. The results were used to predict existing and future ground-borne vibration and noise levels at sensitive locations.

Table ES-1 provides a summary of the expected noise effects associated with operation of the HSR Build Alternative to the noise-sensitive receptors within the resource study area (RSA). The table provides the effects due to HSR operations compared to the existing noise levels measured, as well as the effect of HSR operations compared to the assumed year 2040 conditions without the project, which include an assumed increase in ambient noise in the project vicinity.

Table ES-1 Expected High-Speed Rail Project Operational Noise Effects[1]

Level of Effect	Existing Conditions[1]	Year 2040 Cumulative Conditions
Severe Impact	212 receptors	190 receptors
Moderate Impact	718 receptors	521 receptors

Source: California High-Speed Rail Authority, 2020
[1] With no mitigation.

Based on an FTA screening analysis, no noise or vibration effects are projected from fixed facilities, including stations, or from ancillary and support facilities. In addition, increased annoyance related to startle and noise effects on wildlife are not anticipated.

1 INTRODUCTION

1.1 California High-Speed Rail System Background

The California High-Speed Rail Authority (Authority) is responsible for planning, designing, building, and operating the first high-speed passenger rail service in the nation. The California High-Speed Rail (HSR) System will connect the mega-regions of the state, contribute to economic development and a cleaner environment, create jobs, and preserve agricultural and protected lands. When it is completed, it will run from San Francisco to the Los Angeles basin in under 3 hours at speeds capable of exceeding 200 miles per hour. The system will eventually extend to Sacramento and San Diego, totaling 800 miles with up to 24 stations, as shown on Figure 1-1.[1] In addition, the Authority is working with regional partners to implement a statewide rail modernization plan that will invest billions of dollars in local and regional rail lines to meet the state's 21st century transportation needs.

The California HSR System is planned to be implemented in two phases. Phase 1 would connect San Francisco to Los Angeles and Anaheim via the Pacheco Pass and the Central Valley.[2] Phase 2 would connect the Central Valley to Sacramento, and another extension is planned from Los Angeles to San Diego. The California HSR System would meet the requirements of Proposition 1A,[3] including the requirement for a maximum nonstop service travel time between San Francisco and Los Angeles of 2 hours and 40 minutes.

1.2 Burbank to Los Angeles Background

The Burbank to Los Angeles Project Section would be a critical link in Phase 1 of the California HSR System connecting the San Francisco Bay Area to the Los Angeles Basin. The Authority and the Federal Railroad Administration (FRA) selected the existing railroad right-of-way as the corridor for the preferred alternative between Sylmar and Los Angeles Union Station (LAUS) in the 2005 *Statewide Program Environmental Impact Report/Environmental Impact Statement* (EIR/EIS) (Authority and FRA 2005). The Sylmar to Los Angeles railroad corridor includes Burbank, which is southeast of Sylmar. Therefore, the Project EIR/EIS for the Burbank to Los Angeles Project Section focuses on alignment alternatives along the existing Sylmar to Los Angeles railroad corridor.

The Burbank to Los Angeles Project Section was initially considered as part of the Palmdale to Los Angeles Project Section. The Authority and FRA announced their intention to prepare a joint EIR/EIS for the Palmdale to Los Angeles Project Section in March 2007. On March 12, 2007, the Authority released a Notice of Preparation, and FRA published a Notice of Intent on March 15, 2007. Over the next several years, the Authority and FRA conducted scoping and prepared alternatives analysis documents for that section. The 2010 Palmdale to Los Angeles Preliminary Alternatives Analysis recommended alignment alternatives and station options for the Palmdale to Los Angeles Project Section based on the program-level corridor selected in 2005. The 2011 Palmdale to Los Angeles Supplemental Alternatives Analysis (SAA) focused specifically on the subsections from the community of Sylmar to LAUS, and reevaluated the alternatives and station options. In June 2014, the Authority published a Palmdale to Los Angeles SAA Report, which introduced the concept of splitting the Palmdale to Los Angeles Project Section into two sections. On July 24, 2014, the Authority released a Notice of Preparation and FRA published a Notice of Intent to prepare EIR/EIS documents for the Palmdale to Burbank and Burbank to Los Angeles project sections.

[1] The alignments on Figure 1-1 are based on Authority/FRA decisions made in the 2005, 2008, and 2012 Programmatic EIR/EIS documents.

[2] Phase 1 may be constructed in smaller operational segments, depending on available funds.

[3] www.catc.ca.gov/programs/hsptbp.htm.

Source: California High-Speed Rail Authority and Federal Railroad Administration, 2017

Figure 1-1 California High-Speed Rail System

One of the main reasons for the project section split was the Initial Operating Section[4] concept and its interim terminus in the San Fernando Valley, which was discussed in the Authority's 2012 and 2014 Business Plans. Additionally, the Authority and FRA determined that separate environmental documents would be more beneficial to address environmental impacts and conduct stakeholder outreach. The key environmental resources likely to be impacted were different between the two sections, and separate environmental documents better supported project phasing and sequencing.

In April 2016, the Authority released the Burbank to Los Angeles SAA, which refined the previously studied alignments. Additionally, the Authority released the 2016 Palmdale to Burbank SAA, which refined the concepts at the Burbank Airport Station and the alignments from south of the Burbank Airport Station to Alameda Avenue in the city of Burbank. The 2016 Burbank to Los Angeles SAA Report proposed to evaluate one build alternative south of Alameda Avenue to LAUS. The subsection between the Burbank Airport Station and Alameda Avenue was studied in the 2016 Palmdale to Burbank SAA, which proposed two station options and two alignment options. Table 1-1 summarizes the conclusions of the two SAA reports.

Table 1-1 2016 Supplemental Alternatives Analysis Recommendations for the Burbank to Los Angeles Project Section

Alternative	Alignment/ Station	Area/Station	Alignment/Station Type
No Project Alternative			
HSR Build Alternative	Alignments	Burbank Airport Station to Alameda Avenue	Alignment Option A (Surface) Alignment Option B (Below-Grade and Surface)
		Alameda Avenue to LAUS	Surface Alignment
	Stations	Burbank Airport Station	Station Option A (Surface) Station Option B (Below-Grade)
		LAUS	Surface Station Option

Sources: California High-Speed Rail Authority, 2016a, 2016b
HSR = high-speed rail
LAUS = Los Angeles Union Station

Since the release of the two SAA documents in 2016, the design has undergone further refinements. The surface options from Burbank Airport to Alameda Avenue (Alignment Option A and Station Option A) have been eliminated from consideration. The below-grade options (Alignment Option B and Station Option B) have been refined in order to minimize potential environmental effects and reduce cost. Therefore, this environmental document evaluates one build alternative for the project section.

FRA requires logical termini for project level analysis. The Authority has determined that logical termini are defined by stations, with Burbank Airport Station as the northern terminus and LAUS as the southern terminus for the Burbank to Los Angeles Project Section. These two stations are also termini for the Palmdale to Burbank and Los Angeles to Anaheim Project Sections. The analysis for the Burbank Airport Station is consistent with what is included in the Palmdale to Burbank EIR/EIS. Similarly, the analysis for LAUS is consistent with what is included in the Los Angeles to Anaheim EIR/EIS.

[4] The Initial Operating Section was the first segment planned for construction and operations, as outlined in the 2014 Business Plan. The segment permitted operation of HSR service from Merced to the San Fernando Valley. The 2016 Business Plan revised the initial segment termini to the Central Valley and Silicon Valley.

1.3 Project Description Purpose

This project description describes the project for use during environmental impact analyses to complete technical reports to inform the Burbank to Los Angeles Project Section EIR/EIS. The basis of this project description is the HSR Build Alternative as defined in the *Burbank to Los Angeles Project Section Draft Preliminary Engineering for Project Definition* document. This project description describes the physical design elements of the project and does not define all operating plans and scenarios, construction plans, or capital and operating costs. This project description will serve as the basis for Chapter 2, Alternatives, of the project EIR/EIS. Chapter 2 of the EIR/EIS will include additional detail beyond the content of this report.

This report documents the detailed environmental resource analysis conducted for the Burbank to Los Angeles Project Section of the California HSR System and includes the following:

- A brief description of the project and the alternatives under study
- A discussion of pertinent statutes and regulations
- A description of the existing environmental resource conditions in the study area
- A description of the analytical methodologies and assumptions used for this study
- The results of these analyses, including effects or benefits resulting from the project

2 PROJECT DESCRIPTION

The Burbank to Los Angeles Project Section of the California HSR System is approximately 14 miles long, crossing the cities of Burbank, Glendale, and Los Angeles on an existing railroad corridor. HSR for this project section would be within a narrow and constrained urban environment, crossing major streets and highways and, in some portions, adjacent to the Los Angeles River. The Los Angeles County Metropolitan Transportation Authority (Metro) owns the railroad right-of-way, the Southern California Regional Rail Authority owns the track and operates the Metrolink commuter rail service, the National Railroad Passenger Corporation (Amtrak) provides intercity passenger service, and the Union Pacific Railroad (UPRR) holds track access rights and operates freight trains.

This section describes the No Project Alternative and the HSR Build Alternative to be evaluated in the Burbank to Los Angeles Project EIR/EIS.

2.1 No Project Alternative

Under the No Project Alternative, the California HSR System would not be built. The No Project Alternative represents the condition of the Burbank to Los Angeles Project Section as it existed in 2015, and as it would exist without the HSR System at the horizon year (2040).

The No Project Alternative assumes that all currently known programmed and funded improvements to the intercity transportation system (highway, transit, and rail) and reasonably foreseeable local land development projects (with funding sources identified) would be developed by 2040. The No Project Alternative is based on a review of regional transportation plans for all modes of travel; the State Transportation Improvement Program; the Federal Transportation Improvement Program; Southern California Regional Rail Authority strategic plans, transportation plans and programs for Los Angeles County; airport master plans; and city and county general plans.

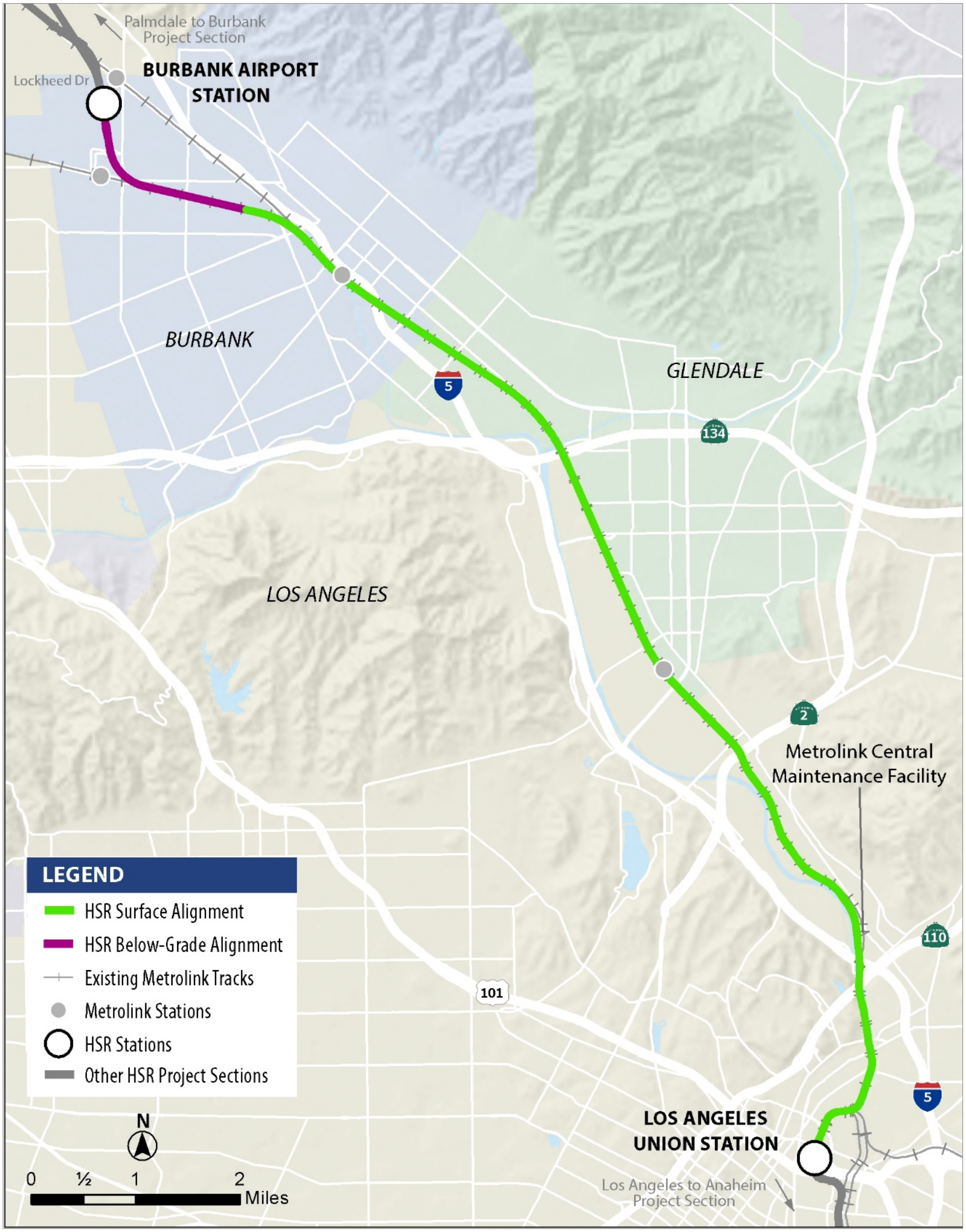
2.2 High-Speed Rail Build Alternative

The HSR Build Alternative includes new and upgraded track, maintenance facilities, grade separations, drainage improvements, communications towers, security fencing, passenger train stations, and other necessary facilities to introduce HSR service into the Los Angeles-San Diego-San Luis Obispo Corridor from near Hollywood Burbank Airport to LAUS. In portions of the alignment, new and upgraded tracks would allow other passenger trains to share tracks with the HSR system. HSR stations would be located near Hollywood Burbank Airport and at LAUS. The alignment would be entirely grade-separated at crossings, meaning that roads, railroads, and other transport facilities would be at different heights so the HSR system would not interrupt or interface with other modes of transportation, including vehicle, bicycle, and pedestrian.

For most of the project section, the HSR alignment would be within the existing railroad right-of-way, which is typically 70 to 100 feet wide. The HSR alignment includes northbound and southbound electrified tracks for high-speed trains. The right-of-way would be fenced to prohibit pedestrian and public or unauthorized vehicle access.

The project footprint (the area required to build, operate, and maintain HSR service) is based on the following elements of design: station areas, hydrology, track, roadway, structures, systems, and utilities.

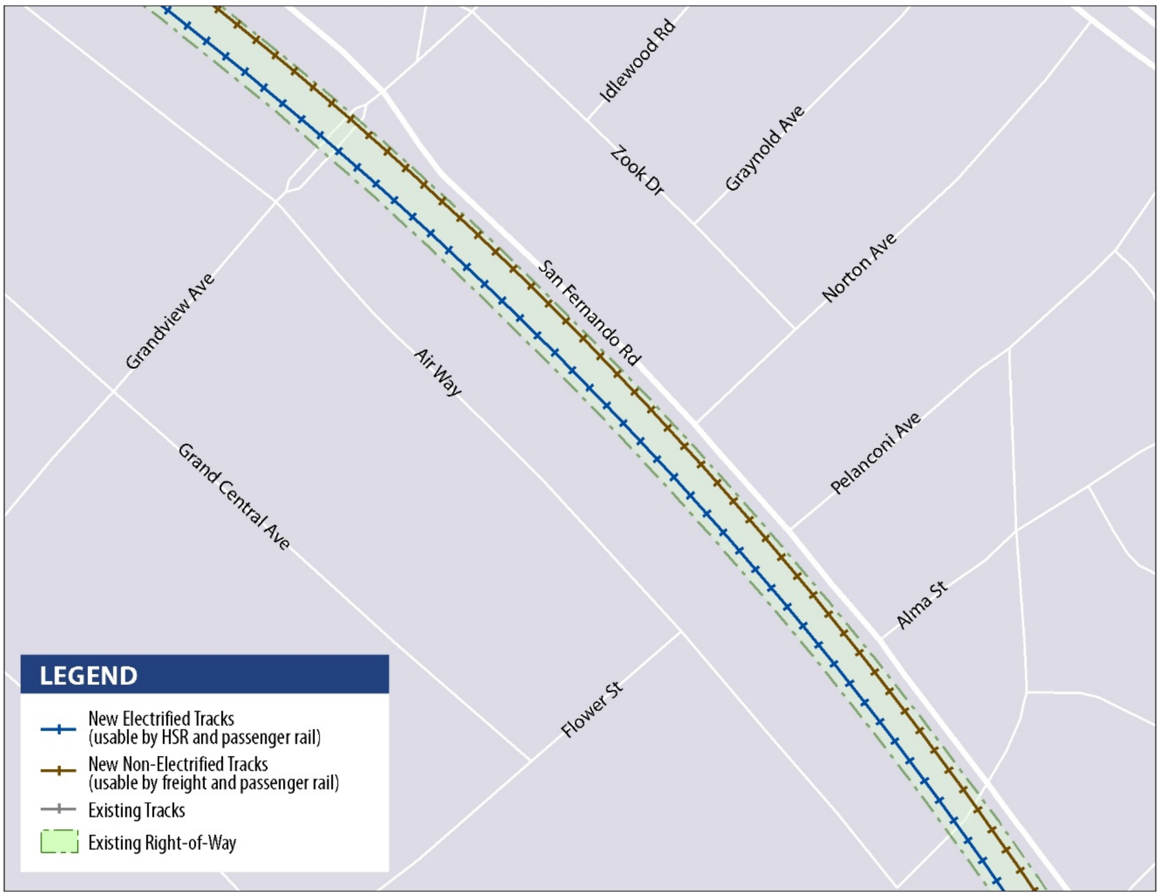
Figure 2-1 shows an overview of the Burbank to Los Angeles Project Section.



Source: California High-Speed Rail Authority, 2019

Figure 2-1 Overview of Burbank to Los Angeles Project Section

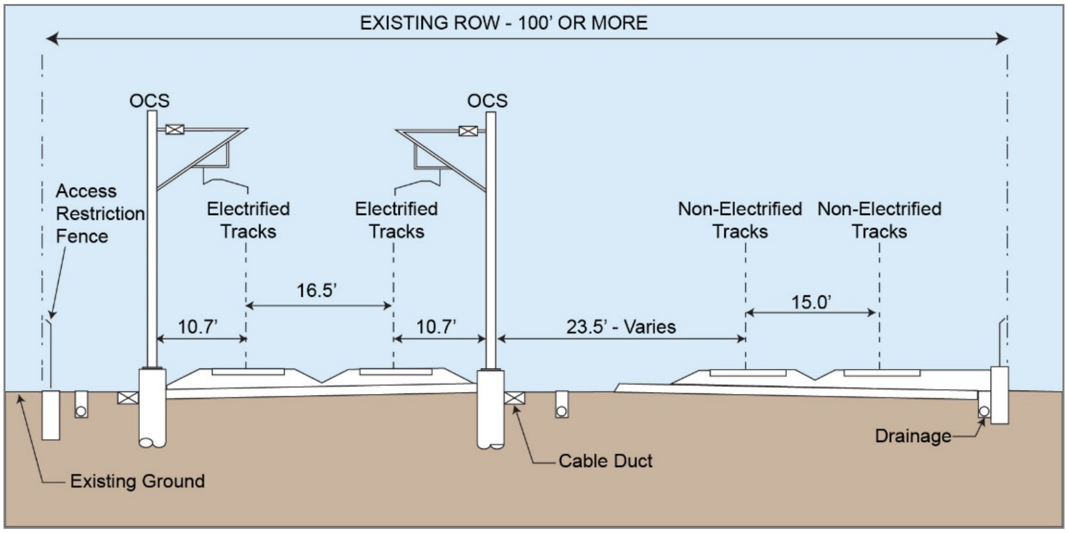
The Burbank to Los Angeles Project Section includes a combination of at-grade, below-grade, and retained-fill track, depending on corridor and design constraints. The at-grade and retained-fill portions of the alignment would be designed with structural flexibility to accommodate shared operations with other passenger rail operators. Throughout most of the project section (between Alameda Avenue and State Route [SR] 110), two new electrified tracks would be placed along the west side of the existing railroad right-of-way and would be useable for HSR and other passenger rail operators. The existing non-electrified tracks would be realigned closer to the east side of the existing right-of-way, for a total of four tracks; these realigned, non-electrified tracks would be usable for freight and other passenger rail operators, but not for HSR. Figure 2-2 illustrates the placement of the new electrified tracks and realigned, non-electrified tracks relative to the existing tracks.



Source: California High-Speed Rail Authority, 2019

Figure 2-2 New Electrified and Non-Electrified Tracks Within Existing Right-of-Way

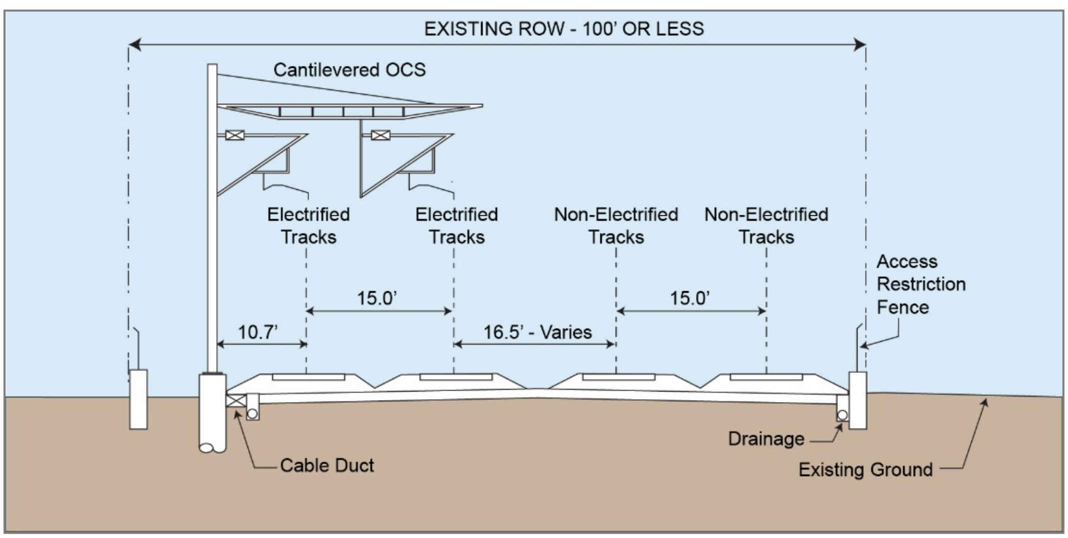
Throughout most of the Burbank to Los Angeles Project Section, the electrified track centerline and the non-electrified track centerline would have a minimum separation of 23.5 feet, and the northbound and southbound electrified tracks would have a separation of 16.5 feet, following the Authority's *Technical Memorandum 1.1.21 Typical Cross Sections for 15% Design* (2013). These standard separations are illustrated on Figure 2-3.



Source: California High-Speed Rail Authority, 2019
This illustration shows the standard separations between the electrified and non-electrified tracks in areas where the railroad right-of-way is at least 100 feet wide. (Figure not to scale.)

Figure 2-3 Standard Track Separations within Non-Constrained Right-of-Way

However, in several areas of the corridor, the right-of-way is less than 100 feet wide, a threshold that constrains the design. As a result, reduced track separations were used in these constrained areas in order to stay within the existing right-of-way to the greatest extent possible and thus minimize property impacts. The reduced separations between the electrified and non-electrified track centerlines would be a minimum of 16.5 feet, and between the two electrified track centerlines would be 15 feet. The narrower cross-section separations are illustrated on Figure 2-4.



Source: California High-Speed Rail Authority, 2019
This illustration shows the narrow separations between the electrified and non-electrified tracks, which would minimize property impacts in areas where right-of-way is constrained. The reduced separations are applied in areas where the railroad right-of-way is less than 100 feet wide. (Figure not to scale.)

Figure 2-4 Reduced Track Separations within Constrained Right-of-Way

2.2.1 HSR Build Alternative Description

The following section describes the HSR Build Alternative in greater detail. Figure 2-5 (Sheets 1 to 3) shows the HSR Build Alternative, including the HSR alignment, new/modified non-electrified tracks, and roadway crossings.

The HSR alignment would begin at the underground Burbank Airport Station and would consist of two new electrified tracks. After exiting the underground station, the alignment would travel southeast beneath the Hollywood Burbank Airport runway in a tunnel, which would be constructed using the sequential excavation method without any disruptions to airport operations. The alignment from south of the airport to where it would join the Metrolink Ventura Subdivision would be constructed as cut-and-cover, and the alignment would then transition to a trench within the Metrolink Ventura Subdivision. The existing Metrolink Ventura Subdivision tracks would be realigned north within the existing right-of-way, and an existing UPRR siding track between Buena Vista Street and Beachwood Drive would be realigned north of the relocated Metrolink Subdivision tracks within the existing right-of-way. These non-electrified tracks would remain at-grade. The trench, which would be south of and parallel to the relocated non-electrified tracks, would be dedicated for HSR tracks only. Figure 2-6, Figure 2-7 and Figure 2-8 depict the typical cross-sections of the below-grade portion of the alignment. During construction of the below-grade alignment, shoofly tracks would be provided to support Metrolink operations. The proposed shoofly tracks would be aligned between Hollywood Way and Buena Vista Street outside the existing right-of-way and would result in temporary roadway impacts to Vanowen Street.

The HSR tracks would transition from the trench and emerge to at grade within the existing railroad right-of-way near Beachwood Drive in the city of Burbank. Near Beachwood Drive, the HSR tracks would curve south out of the existing railroad right-of-way and cross Victory Place on a new railroad bridge, which would be directly south of the existing Victory Place bridge. South of Burbank Boulevard, the HSR tracks would re-enter the railroad right-of-way and run parallel to the Metrolink Antelope Valley Subdivision tracks. Between Burbank Boulevard and Magnolia Boulevard, several UPRR industry tracks west of the right-of-way would be removed.

Continuing south, the HSR alignment would pass the Downtown Burbank Metrolink Station, which would be modified. HSR tracks would be placed within the existing parking lot west of the southbound platforms, and new pedestrian connections and relocated parking would be provided. Section 2.6.1 provides more details on design modifications for the Downtown Burbank Metrolink station.

Source: California High-Speed Rail Authority, 2019

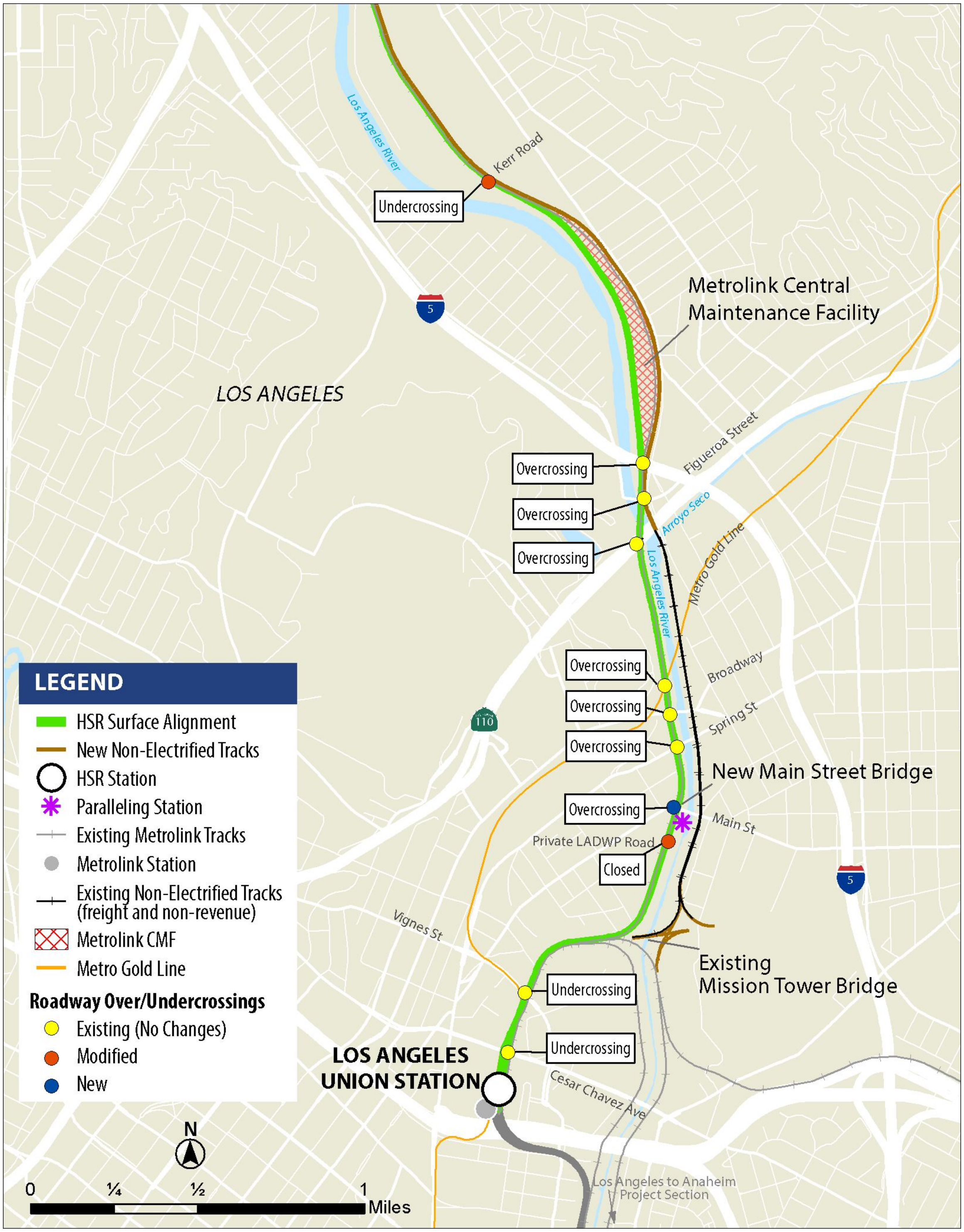
Figure 2-5 HSR Build Alternative Overview

(Sheet 1 of 3)

Source: California High-Speed Rail Authority, 2019

Figure 2-5 HSR Build Alternative Overview

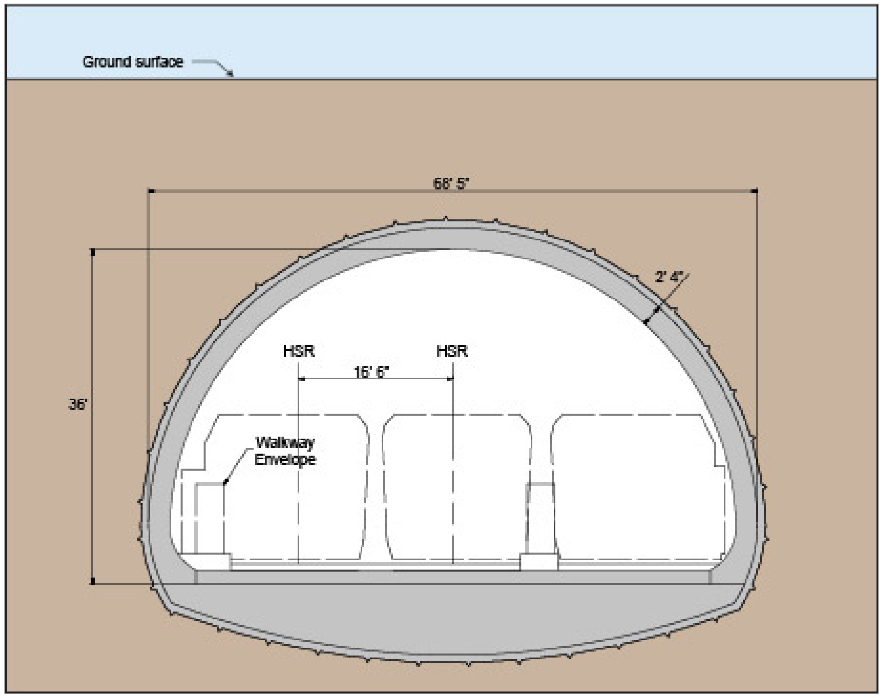
(Sheet 2 of 3)



Source: California High-Speed Rail Authority, 2019

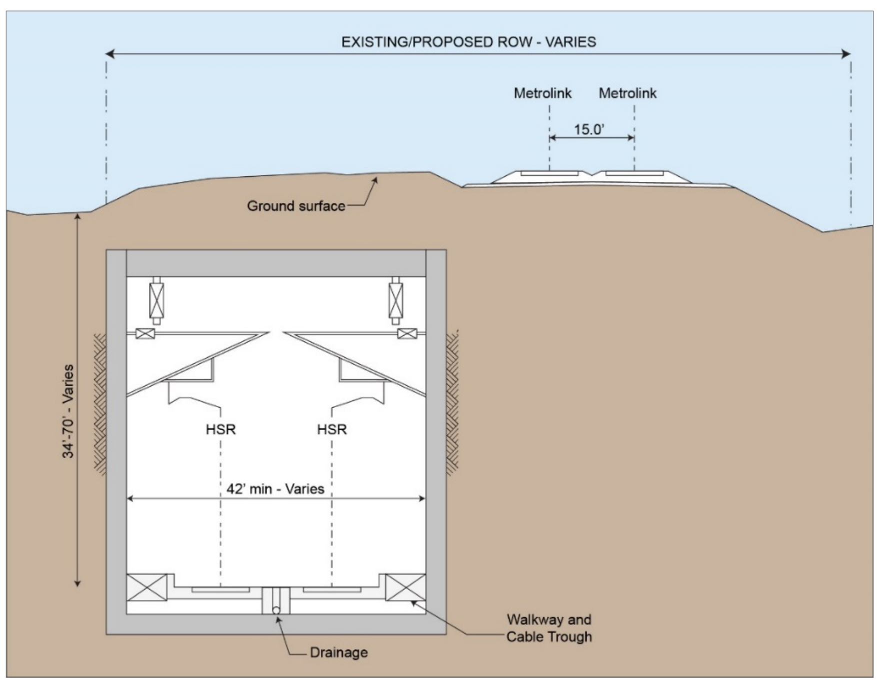
Figure 2-5 HSR Build Alternative Overview

(Sheet 3 of 3)



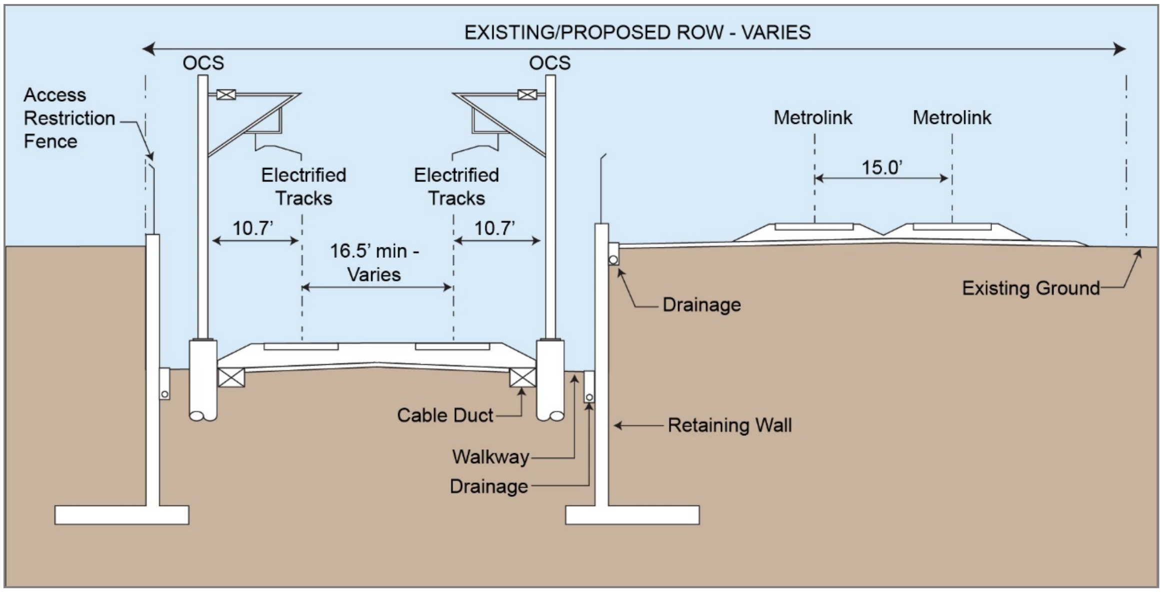
Source: California High-Speed Rail Authority, 2019

Figure 2-6 Typical Tunnel Cross-Section



Source: California High-Speed Rail Authority, 2019

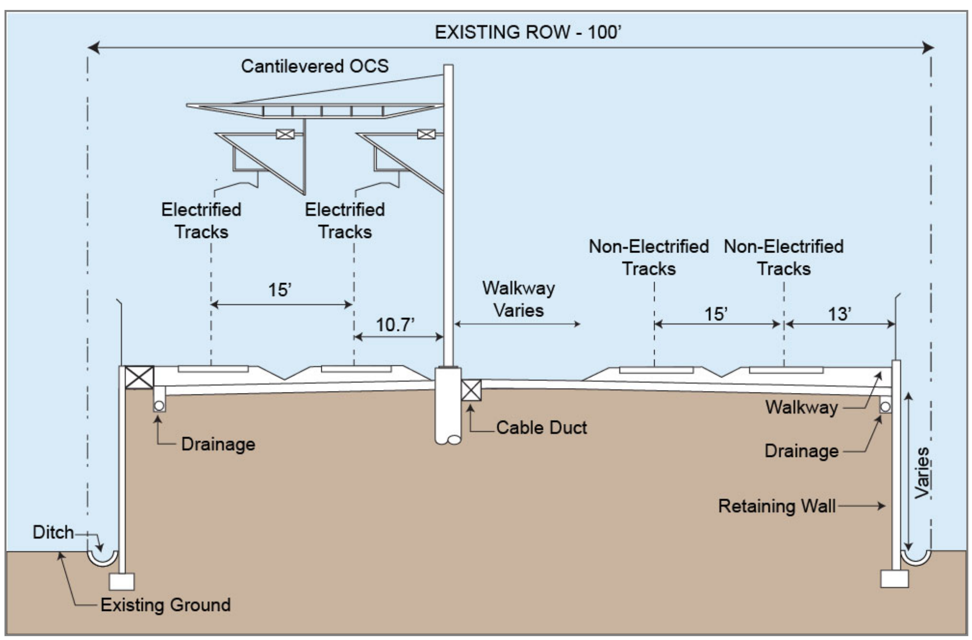
Figure 2-7 Typical Cut-and-Cover Tunnel Cross-Section



Source: California High-Speed Rail Authority, 2019

Figure 2-8 Typical Trench Cross-Section

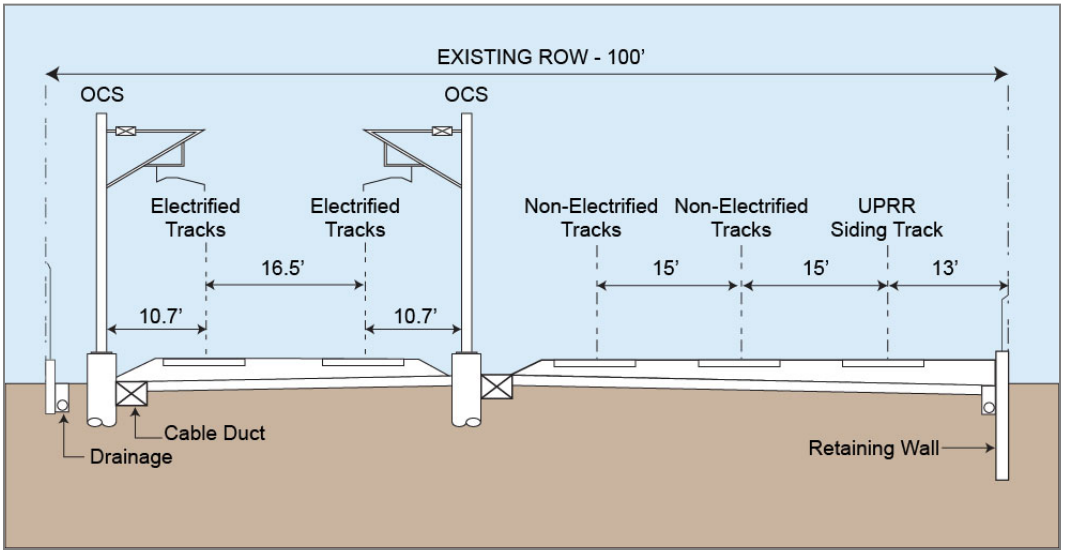
Between Olive Avenue to the north end of the Metrolink Central Maintenance Facility (CMF), the existing non-electrified tracks would be shifted east within the right-of-way to accommodate the addition of the electrified tracks within the right-of-way. Throughout this area, both sets of tracks would be at-grade, with a retained fill segment between Western Avenue and SR 134. Figure 2-9 shows a typical cross-section of the alignment on retained fill.



Source: California High-Speed Rail Authority, 2019

Figure 2-9 Typical Retained-Fill Cross-Section

The alignment would cross Verdugo Wash, where an existing railroad bridge would be rebuilt as a new clear-span structure, to accommodate the additional set of electrified tracks. The alignment would continue south within the existing railroad right-of-way, which follows the Glendale and Los Angeles city borders. Between SR 134 and Chevy Chase Drive, a UPRR siding track would be realigned to the east of the non-electrified tracks, for a total of five tracks within the right-of-way through this area. This siding track is currently located at the Metrolink Central Maintenance CMF but would need to be relocated to accommodate HSR at the CMF. Figure 2-10 shows the typical cross-section for this area.



Source: California High-Speed Rail Authority, 2019

Figure 2-10 Typical Cross-Section Between State Route 134 and Chevy Chase Drive

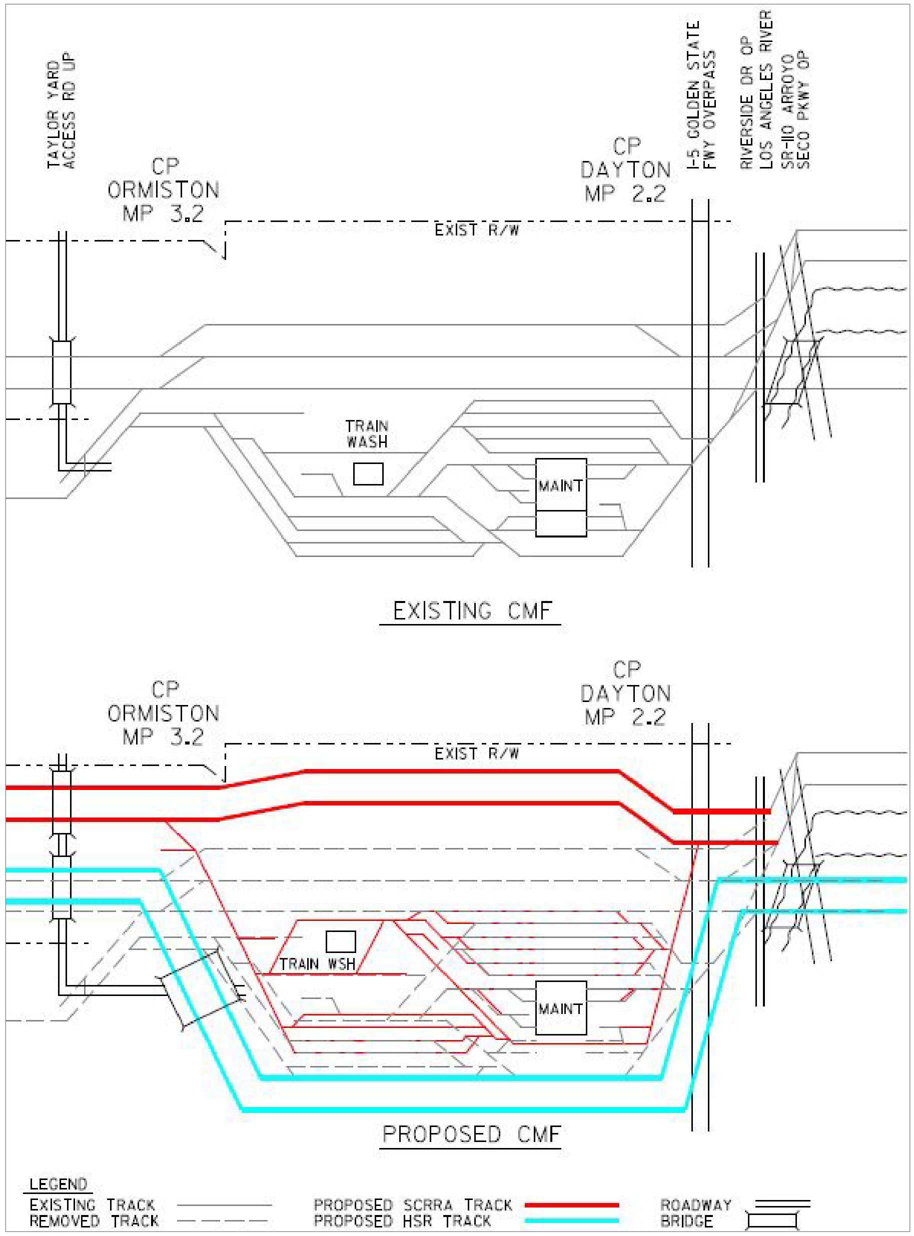
The alignment would pass by the Glendale Metrolink Station (originally known as the Southern Pacific Railroad Depot), a known historical resource listed on the National Register of Historic Places and located north of Glendale Boulevard. No modifications would be needed for the Glendale Metrolink Station. At Tyburn Street, the alignment would enter the city of Los Angeles. Continuing south, the two sets of tracks would diverge at the north end of the Metrolink CMF. The electrified tracks would travel along the west side of the CMF, and the non-electrified, mainline tracks would travel along the east side of the facility.

The CMF is Metrolink's major daily servicing location and maintenance facility in the region. The Burbank to Los Angeles Project Section proposes reconfiguring the various yard and maintenance facilities within the CMF to accommodate HSR, while maintaining as many of the existing yard operations as possible. Figure 2-11 displays a schematic diagram of the existing CMF and the proposed changes, which include new mainline-to-yard track connections, partial demolition of the existing maintenance shop, a revised roadway network with reconfigured parking areas, track relocation shifts, and construction to provide additional storage capacity. Additionally, several facilities would need to be relocated or reconstructed within the CMF, including a train washing/reclamation building, a yard pumphouse, and two service and inspection tracks. Utilities would also need to be relocated with the CMF, including domestic and fire water, underdrains and reconstructed catch basins, power facilities, fueling facilities and storage tanks, and sanitary sewer systems. The proposed design would not be able to accommodate wheel truing operations or progressive maintenance bays; these would relocate to another Metrolink facility. All other facilities and infrastructure would remain in place. The construction work at the CMF would be phased to minimize the disruption to the existing operations and to maintain the key operational facilities.

At the south end of the CMF, the two electrified and two non-electrified tracks would converge briefly within the right-of-way and then diverge again south of Figueroa Street. The electrified tracks would cross over to the west bank of the Los Angeles River on the existing Metrolink Downey Bridge. The existing tracks on the Downey Bridge would be electrified, which would allow for both HSR and passenger rail operations. The non-electrified tracks would remain on the east bank of the Los Angeles River and cross the Arroyo Seco on an existing railroad bridge, which would not require modifications. These non-electrified tracks would connect with the existing tracks on the east bank, which currently serve UPRR and nonrevenue trains. An illustrative cross-section for this area is shown on Figure 2-12.

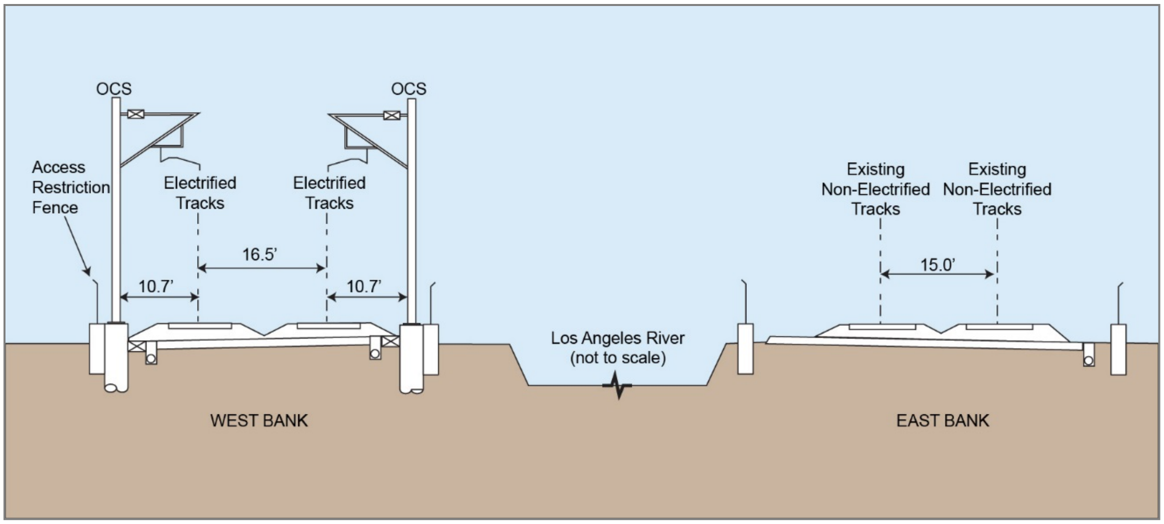
South of Main Street, on the east bank of the river, the existing tracks would be modified at Mission Junction to be used by freight and passenger rail. They would cross the Los Angeles River on the existing Mission Tower bridge to join the electrified tracks within the railroad right-of-way. The existing Mission Tower bridge has two tracks, but currently only one track is functional and used by Metrolink. The HSR Build Alternative would replace the trackwork to conform to the most current design standards and specifications, which may require a retrofit to the bridge.

The two sets of tracks would continue south to terminate at LAUS. The electrified tracks and HSR station platforms would be on the west side of the station, while the non-electrified tracks would merge with the Metrolink and Amtrak tracks. The configuration at LAUS is described in further detail in Section 2.3.2.



Source: Burbank to Los Angeles Draft Preliminary Engineering for Project Description Design Submittal (2019)

Figure 2-11 Diagram of Existing and Proposed Metrolink Central Maintenance Facility



Source: California High-Speed Rail Authority, 2019
The electrified tracks would cross the Los Angeles River just north of State Route 110 and run along the west bank of the river. The non-electrified tracks would run along the east bank of the river. (Figure not to scale.)

Figure 2-12 Typical Cross-Section from State Route 110 to Mission Junction

2.2.2 Roadway Crossings

The HSR Build Alternative would cross a total of 34 roadways, 15 of which would require modifications. Figure 2-5 shows the crossings throughout the project section, and Table 2-1 lists their configurations before and after the introduction of the HSR Build Alternative.

Modifications to existing crossings

- Victory Place: A new bridge for the HSR tracks would be constructed directly south of the existing railroad bridge over Victory Place, and the roadway would be lowered to cross under the new bridge.
- Burbank Boulevard: The roadway bridge would be reconstructed to cross over the tracks, and Burbank Boulevard would be raised in elevation on the west side.
- Alameda Avenue: The railroad bridge would be reconstructed to be wider.
- Colorado Street: The railroad bridge would be reconstructed to be wider.
- Los Feliz Boulevard: The railroad bridge would be reconstructed to be wider, and the roadway would be lowered slightly.
- Glendale Boulevard: The railroad bridge would be reconstructed to be wider, and the roadway would be lowered slightly.
- Kerr Road: The railroad bridge would be reconstructed to be wider, and the roadway would be lowered slightly.

New grade separations

- Buena Vista Street: The crossing would be modified and remain at-grade for Metrolink and UPRR tracks, but a new undercrossing would be constructed to grade-separate the HSR tracks only from the roadway.
- Sonora Avenue: A new roadway undercrossing would be constructed, with the tracks slightly raised on retained fill and the roadway slightly lowered (see Section 2.6).
- Grandview Avenue: A new roadway undercrossing would be constructed, with the tracks slightly raised on retained fill and the roadway slightly lowered (see Section 2.6).

- Flower Street: A new roadway undercrossing would be constructed, with the tracks slightly raised on retained fill and the roadway slightly lowered (see Section 2.6).
- Goodwin Avenue: The road currently does not cross the railroad right-of-way, but the project would grade-separate it as a new roadway undercrossing (see Section 2.6).
- Main Street: A new roadway bridge would be constructed north of the existing Main Street bridge, which would cross the railroad right-of-way and the Los Angeles River (see Section 2.6).

Closures

- Chevy Chase Drive: The roadway would be closed, and a new pedestrian undercrossing would be provided (see Section 2.6).
- Private driveway: A driveway that currently provides access to a Los Angeles Department of Water and Power facility parking lot would be closed, and the Los Angeles Department of Water and Power parking would be relocated to a new facility on Main Street.

Table 2-1 Roadway Crossings within the Burbank to Los Angeles Project Section

Roadway	Current Crossing Configuration	Proposed Crossing Configuration[1]
Buena Vista Street	At-Grade*	**At-Grade* (modified)** **Undercrossing** (new)**
Victory Place	Undercrossing"	Undercrossing* **Undercrossing (new)**
Burbank Boulevard	Overcrossing	**Overcrossing (modified)**
Magnolia Boulevard	Overcrossing	Overcrossing
Olive Avenue	Overcrossing	Overcrossing
Interstate 5	Overcrossing	Overcrossing
Alameda Avenue	Undercrossing	**Undercrossing (modified)**
Western Avenue	Overcrossing	Overcrossing
Sonora Avenue	At-Grade	**Undercrossing (new)**
Grandview Avenue	At-Grade	**Undercrossing (new)**
Flower Street	At-Grade	**Undercrossing (new)**
Fairmont Avenue	Overcrossing	Overcrossing
SR 134	Overcrossing	Overcrossing
Salem/Sperry St[2]	No Crossing	Overcrossing (Metro project)
Colorado Street	Undercrossing	**Undercrossing (modified)**
Goodwin Avenue	No Crossing	**Undercrossing (new)**
Chevy Chase Drive	At-Grade	**Closed**
Los Feliz Boulevard	Undercrossing	**Undercrossing (modified)**
Glendale Boulevard	Undercrossing	**Undercrossing (modified)**
Fletcher Drive	Undercrossing	Undercrossing
SR 2	Overcrossing	Overcrossing
Kerr Road	Undercrossing	**Undercrossing (modified)**
Interstate 5	Overcrossing	Overcrossing
Figueroa Street	Overcrossing	Overcrossing

Roadway	Current Crossing Configuration	Proposed Crossing Configuration[1]
SR 110	Overcrossing	Overcrossing
Metro Gold Line	Overcrossing	Overcrossing
Broadway	Overcrossing	Overcrossing
Spring Street	Overcrossing	Overcrossing
Main Street	At-Grade	**Overcrossing (new)**
Private LADWP road	At-Grade	**Closed**
Vignes Street	Undercrossing	Undercrossing
Cesar Chavez Avenue	Undercrossing	Undercrossing

Source: California High-Speed Rail Authority, 2019
[1] All proposed grade crossing configurations are pending Public Utilities Commission approval.
[2] Salem/Sperry Street would be grade-separated as a part of the Metro Doran Street and Broadway/Brazil Grade Separation Project. The project also proposes closing the existing at-grade railroad crossings at Doran Street and Broadway/Brazil Street. As the Metro project would be completed before the introduction of HSR service, the crossing configurations are considered part of the existing conditions for the HSR project.
**Crossings apply to Metrolink and/or UPRR tracks only*
***Crossing applies to HSR tracks only*
***Bold** denotes change from existing condition under the HSR Build Alternative.*
Overcrossing = Road over train tracks Undercrossing = Road under train tracks
HSR = High-Speed Rail
LADWP = Los Angeles Department of Water and Power
Metro = Los Angeles County Metropolitan Transportation Authority
SR = State Route

2.3 Station Sites

The HSR stations for the Burbank to Los Angeles Project Section would be in the vicinity of Hollywood Burbank Airport and at LAUS. Stations would be designed to optimize access to the California HSR System, particularly to allow for intercity travel and connections to local transit, airports, highways, and the bicycle and pedestrian network. Both stations would include the following elements:

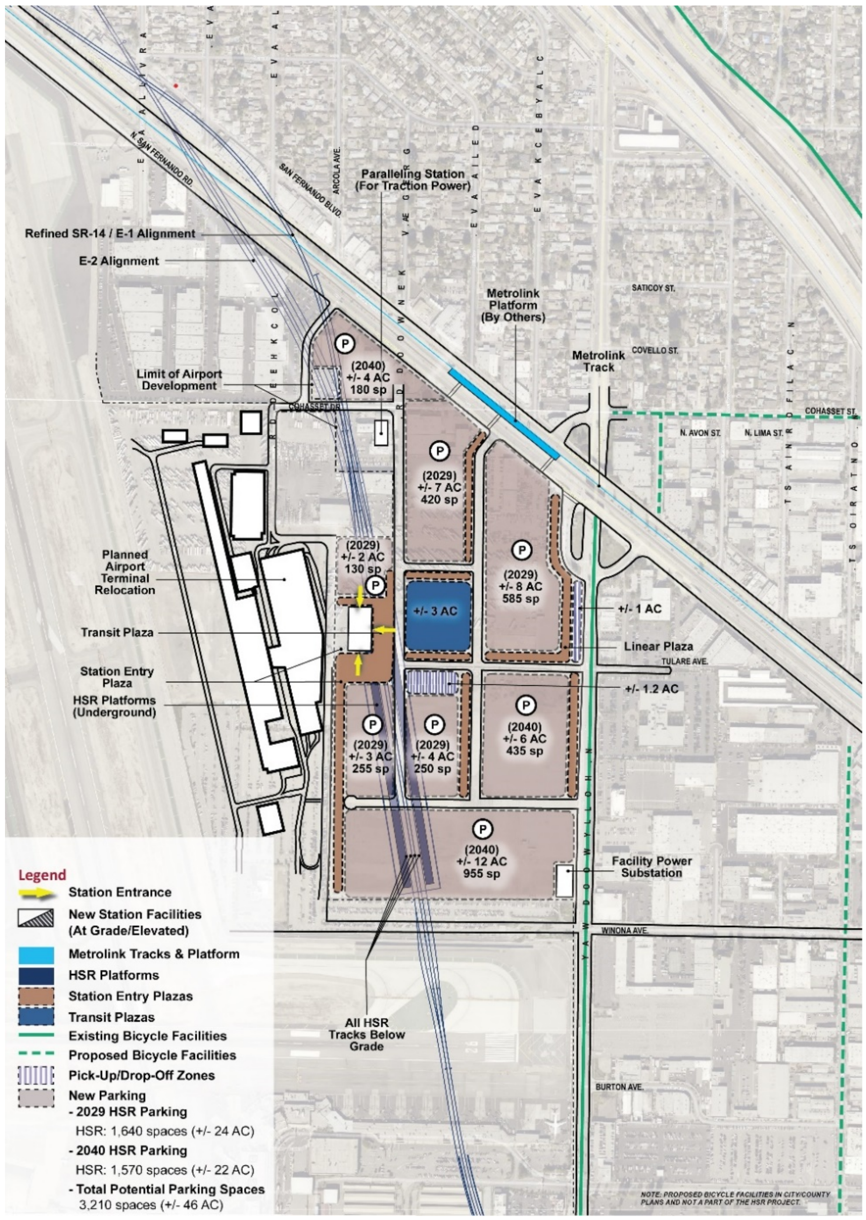
- Passenger boarding and alighting platforms
- Station head house with ticketing, waiting areas, passenger amenities, vertical circulation, administration and employee areas, and baggage and freight-handling service
- Vehicle parking (short-term and long-term)
- Pick-up and drop-off areas
- Motorcycle/scooter parking
- Bicycle parking
- Waiting areas and queuing space for taxis and shuttle buses
- Pedestrian walkway connections

2.3.1 Burbank Airport Station

The Burbank Airport Station site would be west of Hollywood Way and east of Hollywood Burbank Airport. The airport and ancillary properties occupy much of the land south of the Burbank Airport Station site, while industrial and light industrial land uses are to the east and residential land uses are found north of the Burbank Airport Station site. Interstate 5 runs parallel to the station site, approximately 0.25 mile north of the proposed Metrolink platform.

The Burbank Airport Station would have both underground and above-ground facilities that would span approximately 70 acres. Station facilities would include train boarding platforms, a station building (that would house ticketing areas, passenger waiting areas, restrooms, and related facilities), pick-up/drop-off facilities for private autos, a transit center for buses and shuttles, and surface parking areas. Underground portions of the station would be beneath Cohasset Street, along which runs the boundary between the city of Los Angeles to the north and the city of Burbank to the south. There would be two HSR tracks at the station.

The Burbank Airport Station would have up to 3,200 surface parking spaces. About 2,980 spaces would be located between the proposed Replacement Terminal and N Hollywood Way. An additional 220 spaces would be in surface lots in the area bounded by Lockheed Drive to the west, Cohasset Street to the south, and N San Fernando Boulevard to the north and east. The preliminary station layout concept plan is shown on Figure 2-13. The Burbank to Los Angeles Project Section EIR/EIS analyzes the Burbank Airport Station project footprint displayed on Figure 2-13 as permanently impacted because no additional temporary construction easements are identified beyond the permanent area required to construct, operate, and maintain the station. This is the assumption based on the current level of design.



Source: California High-Speed Rail Authority, 2019

Figure 2-13 Preliminary Station Concept Layout Plan, Burbank Airport Station

2.3.2 Los Angeles Union Station

The existing LAUS campus and surrounding tracks are being reconfigured as a part of the Metro Link Union Station (Link US) [5] Project as shown in Figure 2-14. The Metro Link US Project would reconfigure the station entry tracks from north of Mission Junction and construct an elevated structure through the station arrival and boarding area, which would extend south over U.S. Route 101 and come back to grade near First Street. Reconfiguration would take place over two construction phases. The first phase would include an elevated structure for non-HSR passenger rail operators between Vignes Street and First Street. The second phase would add additional tracks to the structure for use by HSR. The Metro Link US EIR/EIS, on which the Authority is a cooperating agency, would evaluate these changes, along with an expanded passenger concourse area and changes to the Metro Gold Line. These changes would be completed prior to the introduction of HSR service.

While Metro would environmentally clear and construct the trackwork and new passenger concourse, the HSR project would require additional modifications within the Link US area. HSR improvements include raising the platform heights and installing an overhead contact system. The Burbank to Los Angeles Project EIR/EIS evaluates these modifications, as well as potential increases in traffic associated with the introduction of HSR service.

The proposed HSR station at LAUS would include up to four HSR tracks and two 870-foot platforms (with the possibility of extending to 1,000 feet). The HSR system would share passenger facilities, such as parking and pick-up/drop-off, with other operators. HSR would require 1,180 parking spaces in 2029 and 2,010 spaces in 2040. This new demand may be met by existing underutilized parking supply within 0.5 mile of LAUS. This parking would be shared with other LAUS service providers and businesses.

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[5] Link US will transform LAUS from a “stub-end” station to a “run-through” station by extending tracks south over U.S. Route 101. The project will add a new passenger concourse that will provide improved operational flexibility for rail service. The Draft FIR is available at: https://www.metro.net/projects/link-us/final-ei-report/.

Sources: California High-Speed Rail Authority, 2019; Los Angeles Metropolitan Transportation Authority, 2018

Figure 2-14 Preliminary Station Elements Plan, Los Angeles Union Station

2.4 Maintenance of Infrastructure

The California HSR System includes four types of maintenance facilities: maintenance of infrastructure facilities (MOIF), Maintenance of infrastructure siding facilities (MOIS), heavy maintenance facilities, and light maintenance facilities (LMF).[6] The California HSR System would require one heavy maintenance facility for the system, located in the Central Valley. The design and spacing of maintenance facilities along the HSR system do not require the Burbank to Los Angeles Project Section to include any of the maintenance facilities within the limits of the project section.

For purposes of environmental analysis, the FRA and the Authority have defined each project section to have the capability to operate as a stand-alone project in the event that other project

[6] Maintenance facilities are described in the Authority's *Summary of Requirements for O&M Facilities* (2013).

sections of the HSR system are not constructed. Because this project section does not provide a heavy maintenance facility or an MOIF, an independent contractor would need to be retained to handle all maintenance functions for vehicles and infrastructure if this project section were built as a stand-alone project for purposes of independent utility. Independent utility is discussed further in Section 2.8.

2.4.1 Maintenance of Infrastructure Facilities

The HSR system infrastructure will be maintained from regional MOIFs located at approximately 150-mile intervals. Each MOIF is estimated to be approximately 28 acres in size and would provide a location for regional maintenance machinery servicing storage, materials storage, and maintenance and administration. The MOIFs could be co-located with the MOIS within each 75-mile segment. The MOIFs would be outside of the Burbank to Los Angeles Project Section.

2.4.2 Maintenance of Infrastructure Sidings

The MOISs would be centrally located within the 75-mile maintenance sections on either side of each MOIF. Each MOIS would support MOIF activities by providing a location for the layover of maintenance of infrastructure equipment and temporary storage for materials. The MOIS is estimated to be about 4 acres in size. The MOISs would be outside of the Burbank to Los Angeles Project Section.

2.4.3 Heavy Maintenance Facility

Only one heavy maintenance facility is required for the HSR system, and it would be within either the Merced to Fresno Project Section or the Fresno to Bakersfield Project Section. The heavy maintenance facility would include all activities associated with train fleet assembly, disassembly, and complete rehabilitation; all on-board components of the trainsets; and overnight layover accommodations and servicing facilities. The site would include a maintenance shop, a yard Operations Control Center building, one traction power substation (TPSS), other support facilities, and a train interior cleaning platform.

2.4.4 Light Maintenance Facility

An LMF would be used for all activities associated with fleet storage, cleaning, repair, overnight layover accommodations, and servicing facilities. The LMF closest to the Burbank to Los Angeles Project Section would be sited in proximity to LAUS but within the Los Angeles to Anaheim Project Section, and would likely support the following functions:

- **Train Storage:** Some trains would be stored at the LMF prior to start of revenue service.
- **Examinations in Service:** Examinations would include inspections, tests, verifications, and quick replacement of certain train components on the train.
- **Inspection:** Periodic inspections would be part of the planned preventive maintenance program requiring specialized equipment and facilities.

The LMF site will be sized to support the level of daily revenue service dispatched by the nearby terminal at the start of each revenue service day. The Authority defines three levels of maintenance that can be performed at an LMF:

- **Level I:** Daily inspections, pre-departure cleaning, and testing
- **Level II:** Monthly inspections
- **Level III:** Quarterly inspections, including wheel truing

A Level I LMF is proposed on the west bank of the Los Angeles River at the existing Amtrak Railroad Yard. The facility would be where the current BNSF Railway storage tracks are and would require their relocation.

2.5 Ancillary and Support Facilities

2.5.1 Electrification

Trains on the California HSR System would draw power from California's existing electricity grid distributed via an overhead contact system. The Burbank to Los Angeles Project Section would not include the construction of a separate power source, although it would include the extension of power lines from potential TPSSs to a series of independently owned power substations positioned along the HSR corridor if necessary. The transformation and distribution of electricity would occur in three types of stations:

- TPSSs transform high-voltage electricity supplied by public utilities to the train operating voltage. TPSSs would be adjacent to existing utility transmission lines and the right-of-way, and would be located approximately every 30 miles along the HSR system route.
- Switching stations connect and balance the electrical load between tracks, and switch overhead contact system power on or off to tracks in the event of a power outage or emergency. Switching stations would be midway between, and approximately 15 miles from, the nearest TPSSs. Each switching station would be 120x80 feet and would be adjacent to the HSR right-of-way.
- Paralleling stations, or autotransformer stations, provide voltage stabilization and equalize current flow. Paralleling stations would be located approximately every 5 miles between the TPSSs and the switching stations. Each paralleling station would approximately be 100x80 feet and adjacent to the right-of-way.

Table 2-2 lists the proposed switching station and paralleling station sites within the Burbank to Los Angeles Project Section. A TPSS is not required for the Burbank to Los Angeles Project Section because of the HSR system's facility spacing requirements. The Burbank to Los Angeles Project Section would be able to use the TPSSs within the Palmdale to Burbank Project Section and/or Los Angeles to Anaheim Project Section. In the event the other project sections of the HSR system are not constructed, a standalone TPSS would be required within the Burbank to Los Angeles Project Section for purposes of independent utility. Independent utility is discussed further in Section 2.8.

Table 2-2 Traction Power Facility Locations for the Burbank to Los Angeles Project Section

Type of Facility	Location
Paralleling Station	Los Angeles, south of Main Street between railroad right-of-way and Los Angeles River
Switching Station	Los Angeles, south of Verdant Street and west of railroad right-of-way

Source: California High-Speed Rail Authority, 2019

2.5.2 Signaling and Train-Control Elements

To reduce the safety risks associated with freight and passenger trains, the National Transportation Safety Board, the FRA, and other agencies have mandated Positive Train Control (PTC). PTC is a train safety system designed to automatically implement safety protocols and provide communication with other trains to reduce the risk of a potential collision. The U.S. Rail Safety Improvement Act of 2008 requires the implementation of PTC technology across most railroad systems; in October 2015, Congress extended the deadline for implementation to December 31, 2018. The FRA published the Final Rule regarding PTC regulations on January 15, 2010.

Communication towers and ancillary facilities are included in the Burbank to Los Angeles Project Section to implement the FRA PTC requirements. PTC infrastructure consists of integrated command, control, communications, and information systems for controlling train movements that improve railroad safety by significantly reducing the probability of collisions between trains, casualties to roadway workers and equipment, and over-speed accidents. PTC is especially important in "blended"[7] corridors, such as in the Burbank to Los Angeles Project Section, where passenger and freight trains need to share the same tracks safely.

PTC for the HSR project would use a radio-based communications network that would include a fiber-optic backbone and communications towers approximately every 2 to 3 miles, depending on the terrain and selected radio frequency. The towers would be in the fenced HSR corridor in a fenced area of approximately 20x15 feet, including a 10x8-foot communications shelter and a 6- to 8-foot-diameter, 100-foot-tall communications pole. These communications facilities could be co-located within the TPSSs. Where communications towers cannot be located with TPSSs or other HSR facilities, the communications facilities would be near the HSR corridor in a fenced area of approximately 20x15 feet.

2.6 Early Action Projects

As described in the *Connecting and Transforming California::2016 Business Plan* (Authority, 2016c), the Authority has made a commitment to invest in regionally significant connectivity projects in order to provide early benefits to transit riders and local communities while laying a solid foundation for the HSR system. These early actions will be made in collaboration with local and regional agencies. These types of projects include grade separations and improvements at regional passenger rail stations, which increase capacity, improve safety, and provide immediate benefits to freight and passenger rail operations. Local and regional agencies may take the lead on coordinating the construction of these early action projects. Therefore, they are described in further detail below and are analyzed within the Burbank to Los Angeles Project Section EIR/EIS to allow the agencies, as Responsible Agencies under CEQA, to adopt the findings and mitigation measures as needed to construct these projects.

2.6.1 Downtown Burbank Metrolink Station

Although the HSR system will not serve the Downtown Burbank Metrolink Station, modifications at the station would be required to ensure continued operations of existing operators. The HSR tracks would be located within the existing parking lot west of the southbound platforms; the platforms and existing Metrolink tracks would not change. The parking would be relocated to between Magnolia Boulevard and Olive Avenue, and Flower Street would be extended from where it currently ends at the south side of the Metrolink Station. Pedestrian bridges would be provided for passengers to cross over the HSR tracks to access the Metrolink platforms. Other accessibility improvements would include additional vehicle parking, bus parking, and bicycle pathways. Figure 2-15 shows the proposed site plan for the Downtown Burbank Metrolink Station.

2.6.2 Sonora Avenue Grade Separation

Sonora Avenue is an existing at-grade crossing. The existing roadway configuration consists of two traffic lanes in both the eastbound and westbound directions. The Burbank to Los Angeles Project Section proposes a "hybrid" grade separation, with Sonora Avenue slightly depressed and the HSR alignment and non-electrified tracks raised on a retained-fill structure. A 10-foot-wide median would be added and the lanes would be narrowed so the overall width of Sonora Avenue would not change. Sonora Avenue would be lowered in elevation between Air Way and San Fernando Road, and the lowest point of the undercrossing would be approximately 10 feet below the original grade. The height of the new retained-fill structure would be approximately 28 feet. Figure 2-16 shows the temporary and permanent project footprint areas.

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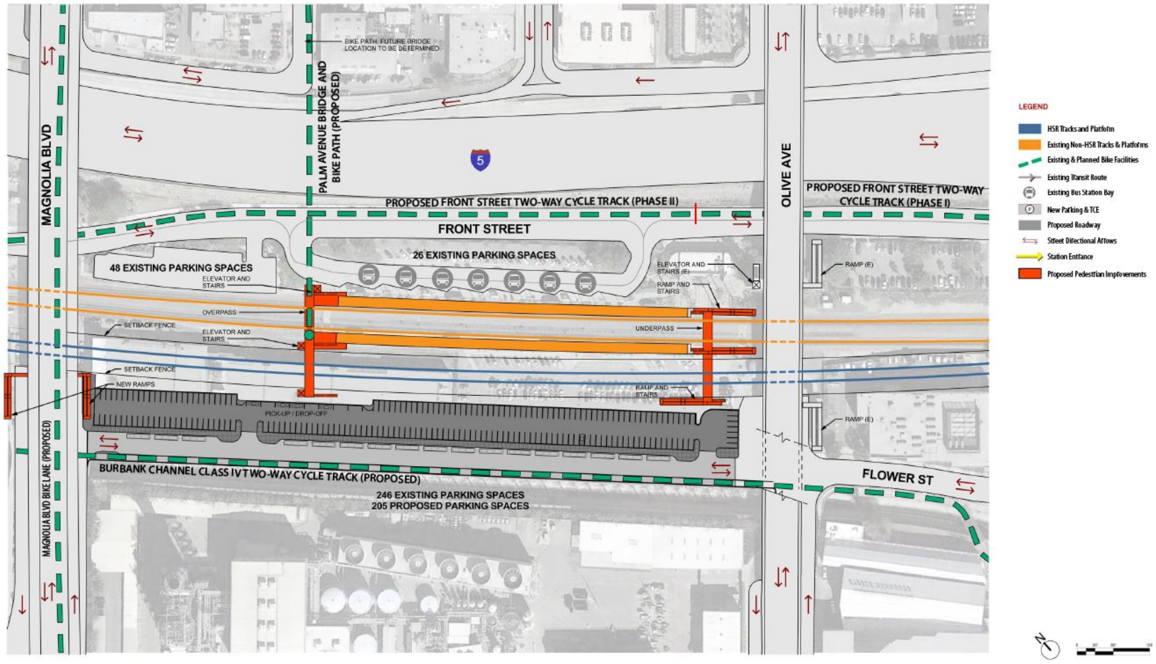
[7] California HSR Project Business Plans (http://www.hsr.ca.gov/About/Business_Plans/) suggest blended railroad systems and operations. These terms refer to integrating the HSR system with existing intercity, and commuter and regional rail systems through coordinated infrastructure (blended systems) and scheduling, ticketing, and other means (blended operations).



Source: California High-Speed Rail Authority, 2019

Figure 2-15 Downtown Burbank Metrolink Station Site Plan

Source: California High-Speed Rail Authority, 2019

Figure 2-16 Sonora Avenue Grade Separation Footprint

2.6.3 Grandview Avenue Grade Separation

Grandview Avenue is an existing at-grade crossing. The existing roadway configuration consists of three traffic lanes in both the eastbound and westbound directions. The Burbank to Los Angeles Project Section proposes a “hybrid” grade separation, with Grandview Avenue slightly depressed and the HSR alignment and non-electrified tracks raised on retained fill. Grandview Avenue would be lowered in elevation between Air Way and San Fernando Road, and the lowest point of the undercrossing would be approximately 3 feet below original grade. The lanes and overall width of Grandview Avenue would not change. The height of the new retained-fill structure would be approximately 30 feet. Figure 2-17 shows the temporary and permanent project footprint areas.

Source: California High-Speed Rail Authority and, 2019

Figure 2-17 Grandview Avenue Grade Separation Footprint

2.6.4 Flower Street Grade Separation

Flower Street is an existing at-grade crossing, with Flower Street ending in a T-shaped intersection with San Fernando Road, which runs parallel on the east side of the railroad right-of-way. Existing Flower Street consists of two traffic lanes in both the westbound and eastbound directions, with a right-turn-only lane in the westbound direction. The Burbank to Los Angeles Project Section proposes a “hybrid” grade separation, with Flower Street and San Fernando Road slightly depressed, and the HSR alignment and non-electrified tracks raised on a retained-fill structure. Flower Street would be lowered in elevation between Air Way and San Fernando Road, and the lowest point of the undercrossing would be approximately 10 feet below original grade. The existing median would be modified on Flower Street, and the overall width of Flower Street would remain the same. San Fernando Road would be lowered in grade between Norton Avenue and Alma Street, and Pelanconi Avenue would be extended to connect to San Fernando Road. The height of the new retained-fill structure would be approximately 28 feet. Figure 2-18 shows the temporary and permanent project footprint areas.

Source: California High-Speed Rail Authority, 2019

Figure 2-18 Flower Street Grade Separation Footprint

2.6.5 Goodwin Avenue/Chevy Chase Drive Grade Separation

There is currently no crossing at Goodwin Avenue, which ends in a cul-de-sac on the west side of the railroad right-of-way. The Burbank to Los Angeles Project Section proposes a grade separation, with Goodwin Avenue realigned and depressed to cross under a new railroad bridge supporting the HSR and non-electrified tracks. A new roadway bridge would also be required to carry Alger Street over the depressed Goodwin Avenue, connecting to W San Fernando Road. The new depressed roadway would curve north from Brunswick Avenue, cross under the new roadway and railroad bridges, and connect with Pacific Avenue on the east side of the railroad right-of-way. The lowest point of the undercrossing would be approximately 28 feet below original grade.

Chevy Chase Drive is an at-grade crossing. With the construction of a new grade separation at Goodwin Avenue, Chevy Chase Drive would be closed on either side of the rail crossing and a pedestrian undercrossing would be provided. Figure 2-19 shows the temporary and permanent project footprint areas for Goodwin Avenue and Chevy Chase Drive.

Source: California High-Speed Rail Authority, 2019

Figure 2-19 Goodwin Avenue Grade Separation

2.6.6 Main Street Grade Separation

Main Street is an existing at-grade crossing. It crosses the existing tracks at grade on the west bank of the Los Angeles River, crosses over the river on a bridge, and then crosses the existing tracks at grade on the east bank of the river. The existing bridge carries two traffic lanes in both directions. The Burbank to Los Angeles Project Section proposes a grade separation, with a new Main Street bridge spanning the tracks on the west bank, the Los Angeles River, and the tracks on the east bank. The new Main Street bridge would be 86 feet wide and 75 feet high at its highest point over the Los Angeles River and would place three columns within the river channel. Main Street would be raised in elevation, starting from just east of Sotello Street on the west side of the Los Angeles River. The new bridge would come down to grade at Clover Street on the east side of the Los Angeles River. Several roadways on the east side of the Los Angeles River would be reconfigured, including Albion Street, Lamar Street, Avenue 17, and Clover Street. The existing Main Street bridge would not be modified, but it would be closed to public access. Figure 2-20 shows the temporary and permanent project footprint areas.

Source: California High-Speed Rail Authority, 2019

Figure 2-20 Main Street Grade Separation Footprint

2.7 Project Construction

For the Burbank to Los Angeles Project Section of the California HSR System, specific construction elements would include at-grade and underground track, grade-separated roadway crossings, retaining walls, and installation of a PTC system. Surface track sections would be built using conventional railroad construction techniques. A typical construction sequence includes clearing, grubbing, grading, and compacting the railbed; applying crushed rock ballast; laying track; and installing electrical and communications systems. The at-grade track would be laid on an earthen railbed topped with rock ballast approximately 3 feet off the ground. Fill and ballast for the railbed would be obtained from permitted borrow sites and quarries.

Retaining walls are used when it is necessary to transition between an at-grade and elevated profile. In this project section, retained fill would be used between Western Avenue and SR 134. The tracks would be raised in elevation on a retained-fill platform made of reinforced walls, much like a freeway ramp. Short retaining walls would have a similar effect and would protect the adjacent properties from a slope extending beyond the proposed rail right-of-way.

The preferred construction method for the tunnel alignment underneath the Burbank Airport runway is sequential excavation method. The tunnel alignment south of the airport would be constructed using cut-and-cover.

Pre-construction activities would be conducted during final design and would include geotechnical investigations, interpretation of anticipated ground behavior and ground support requirements, identification of staging areas, initiation of site preparation and demolition, relocation of utilities, and implementation of temporary, long-term, and permanent road closures. Additional studies and investigations to develop construction requirements and worksite traffic control plans would be conducted as needed.

Major construction activities for the Burbank to Los Angeles Project Section would include earthwork and excavation support, systems construction, bridge and aerial structure construction, and railway systems construction (including trackwork, traction electrification, signaling, and communications).

During peak construction periods, work is envisioned to be underway at several locations along the route simultaneously, with overlapping construction of various project elements. Working hours and the number of workers present at any time would vary depending on the activities being performed but could be expected to extend to 24 hours per day, 7 days per week.

2.8 Independent Utility of the Burbank to Los Angeles Project Section

The Burbank to Los Angeles Project Section would have independent utility if it is able to operate as a standalone project in the event the other project sections of the HSR system are not constructed. As none of the four types of maintenance facilities would be located within the limits of the Burbank to Los Angeles Project Section, all maintenance functions for vehicles and infrastructure would be handled through an independent contractor to achieve independent utility. For power, one potential location for a TPSS has been preliminarily identified within the project section. Because the addition of a TPSS would alter the spacing of the other systems facilities, further design and environmental study would be required to environmentally clear the TPSS site and the alteration of the other systems facilities in the absence of the Palmdale to Burbank and Los Angeles to Anaheim project sections being built and operated.

Any electrical interconnections between a potential future TPSS site and existing utility providers would also have to be environmentally evaluated and cleared in subsequent documentation.

2.9 Operations of the Burbank to Los Angeles Project Section

The conceptual HSR service plan for Phase 1, starting in 2029, begins with service between Los Angeles/Anaheim running through the Central Valley from Bakersfield to Merced, and traveling northwest into the Bay Area. Subsequent sections in Phase 2 of the HSR system include a southern extension from Los Angeles to San Diego and an extension from Merced to north of Sacramento. These extensions do not have an anticipated implementation date.

Currently, the Metrolink Ventura and Antelope Valley Lines, Amtrak Pacific Surfliner and Coast Starlight, and UPRR freight trains operate within the Burbank to Los Angeles Project Section. As the proposed HSR Build Alternative is within the active Los Angeles-San Diego-San Luis Obispo passenger and freight rail corridor, all existing operators would have to change their operation patterns and frequency. New and realigned tracks would change the tracks on which the various users operate, with passenger rail and freight trains shifted closer to the east side of the right-of-way. With the introduction of HSR service, the proposed general operational characteristics are shown in Table 2-3.

Table 2-3 Existing and Future Trains per Day in the Los Angeles–San Diego–San Luis Obispo Rail Corridor Within the Burbank and Los Angeles Project Section

Operator	2016 Existing Conditions	2029 Opening Day	2040 Horizon Year
California High-Speed Rail Authority[1]	N/A	196	196
Metrolink[2]	61	99	99
Amtrak[3]	12	16	18
UPRR[4]	11	18	23

[1] 2029 Opening Day and 2040 Horizon Year projections are from the California High-Speed Rail Authority's "Year 2029 and Year 2040 Concept Timetable for EIR/EIS Analysis."
[2] Existing Conditions data are from the 2016 Metrolink Schedule (effective October 3, 2016); 2029 Opening Day projections are extrapolated from the 2016 Metrolink 10-Year Strategic Plan, "Growth Scenario 2: Overlay of Additional Service Patterns."
[3] Existing Conditions data are from the 2016 LOSSAN Corridor Schedule; 2029 Opening Day projections are extrapolated from 2012 LOSSAN Corridorwide Strategic Implementation Plan "Long-Term Operations Analysis" (increase of approximately one train every four years for the Amtrak Pacific Surfliner and no growth for the Amtrak Coast Starlight between Hollywood Burbank Airport and LAUS).
[4] Existing Conditions data are from the 2012 LOSSAN Corridorwide Strategic Implementation Plan "Long-Term Operations Analysis"; 2029 Opening Day projections are extrapolated from the 2012 LOSSAN Corridorwide Strategic Implementation Plan "Long-Term Operations Analysis" (increase of approximately one train every 2 years for UPRR between Hollywood Burbank Airport and LAUS).
Amtrak = National Railroad Passenger Corporation
LAUS = Los Angeles Union Station
LOSSAN = Los Angeles-San Diego-San Luis Obispo Corridor
N/A = not applicable
UPRR = Union Pacific Railroad

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3 LAWS, REGULATIONS, ORDERS

3.1 Noise

3.1.1 Federal

3.1.1.1 Noise Control Act of 1972 (49 United States Code 4910)

The Noise Control Act of 1972 (42 U.S. Code 4910) was the first comprehensive statement of national noise policy. The Noise Control Act declared, "It is the policy of the U.S. to promote an environment for all Americans free from noise that jeopardizes their health or welfare." Although the Noise Control Act, as a funded program, was ultimately abandoned at the federal level, it served as the catalyst for comprehensive noise studies and the generation of noise assessment and mitigation policies, regulations, ordinances, standards, and guidance for many states, counties, and even municipal governments. For example, the "noise elements" of community general plan documents and local noise ordinances studied as part of this report were largely created in response to passage of the Noise Control Act.

3.1.1.2 United States Environmental Protection Agency Railroad Noise Emission Standards (40 Code of Federal Regulations Part 201)

Interstate rail carriers must comply with U.S. Environmental Protection Agency noise emission standards, which are enumerated as maximum measured noise levels in these federal regulations and summarized, with applicability to the project section and for locomotives manufactured after 1979, as follows (40 Code of Federal Regulations [C.F.R.] Part 201):

- 100 feet from geometric center of stationary locomotive, connected to a load cell and operating at any throttle setting except idle – 87 A-weighted decibels (dBA) (at idle setting, 70 dBA)
- 100 feet from geometric center of mobile locomotive – 90 dBA
- 100 feet from geometric center of mobile railcars, at speeds of up to 45 miles per hour (mph) – 88 dBA; or speeds greater than 45 mph – 93 dBA

Whether or not this standard applies to high-speed trainsets, the analysis in the EIR/EIS does not assume that Authority trainsets will comply with it because the Authority is not aware of any high-speed trainsets manufactured in the world today that meet this standard at all speeds. A noise-generation standard specific to high-speed trains does exist in Europe (European TSI Standard), and a trainset manufactured to that standard complies with the U.S. Environmental Protection Agency standard (if applicable) generally at speeds below 190 to 200 mph. Above that speed, airflow over the trainset and its pantograph and related apparatus is the main source of noise, which presently-known technology cannot resolve to comply with the U.S. Environmental Protection Agency standard (if applicable). The analysis in the EIR/EIS—both prior to mitigation and after mitigation—assumes a trainset generating noise in compliance with the European TSI standard, because trainsets currently in manufacture and operation in Europe can meet this standard; the analysis does not assume a trainset that meets the U.S. Environmental Protection Agency standard.

3.1.1.3 Federal Railroad Administration Railroad Noise Emission Compliance Regulations (49 Code of Federal Regulations Part 210)

FRA's Railroad Noise Emission Compliance Regulations (49 C.F.R. Part 210) adopt and enforce the U.S. Environmental Protection Agency's railroad noise emission standards (40 C.F.R. Part 201). The FRA regulations include a process for requesting a waiver from Part 210, pursuant to a process set forth in 23 C.F.R. Part 211.2.

3.1.1.4 Procedures for Considering Environmental Impacts (64 Federal Register 28545)

On May 26, 1999, the FRA released Procedures for Considering Environmental Impacts (FRA 1999). These FRA procedures supplement the Council on Environmental Quality Regulations (40 C.F.R. Part 1500 et seq.) and describe FRA's process for assessing the environmental impacts of actions and legislation proposed by the agency and for the preparation of associated documents (42 U.S. Code 4321 et seq.). The FRA Procedures for Considering Environmental Impacts states that "the EIS should identify any significant changes likely to occur in the natural environment and in the developed environment. The environmental document should also discuss the consideration given to design quality, art, and architecture in project planning and development as required by U.S. Department of Transportation Order 5610.4. These FRA procedures state that an EIS should consider possible impacts on noise and vibration.

3.1.1.5 Federal Railroad Administration Guidelines

The FRA guidelines for assessing noise impacts from high-speed train operations (FRA 2012) are adapted from the same sources used to develop the Federal Transit Administration (FTA) guidelines for rail projects and their associated stationary facilities (FTA 2018). These criteria are discussed in the following section.

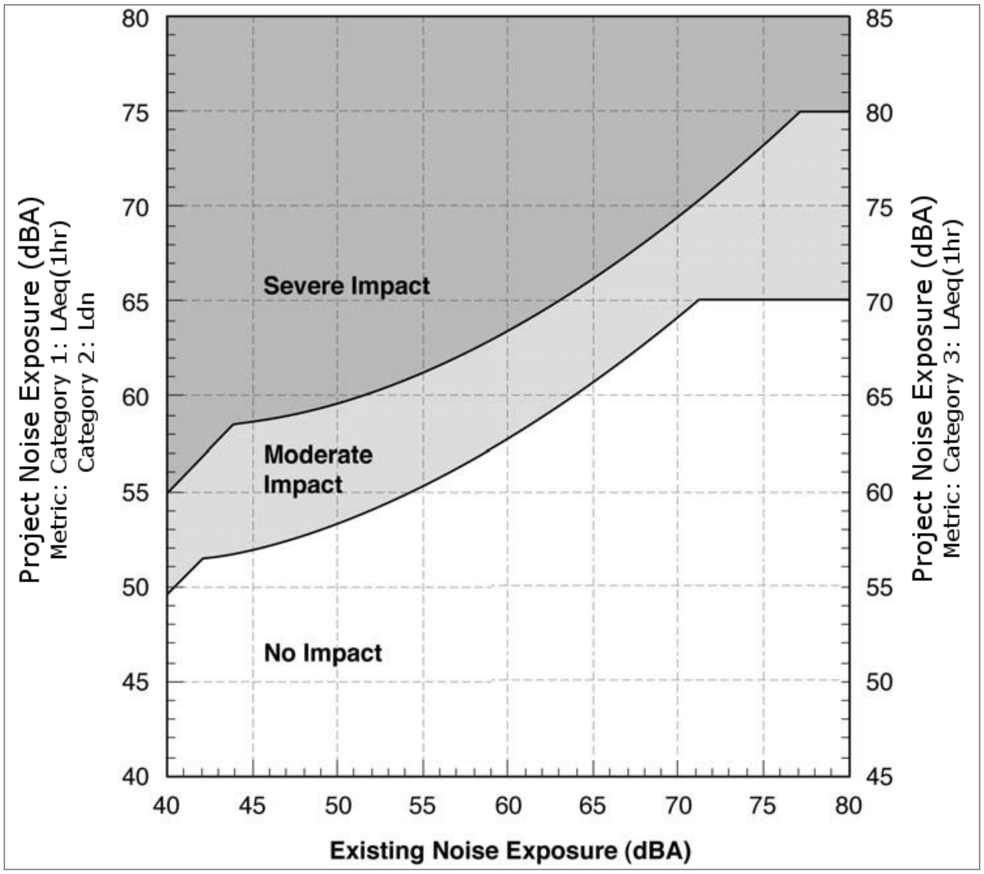
Noise impacts on wildlife and livestock are not found in the FTA guidance document, but are addressed in the FRA guidelines. Similarly, FRA provides guidelines for identifying noise-sensitive locations where increased annoyance can occur because of the sudden increase in noise (the startle effect) from the rapid approach of high-speed trains. Criteria for these effects are presented in Section 4, Methods for Evaluating Effects. In addition, FRA provides guideline criteria for assessing the impact of project construction noise. These criteria, presented in Section 4, are similar to FTA criteria.

3.1.1.6 Federal Transit Administration Guidelines

The noise impact criteria for rail projects and their associated fixed facilities, such as storage and maintenance yards, passenger stations and terminals, parking facilities, and substations are shown graphically on Figure 3-1. The land use categories (1, 2, 3) shown on Figure 3-1 are defined in Table 3-1.

For noise exposures below the lower of the two curves on Figure 3-1, a proposed project is considered to have no noise impact because, on average, the introduction of the project would result in an insignificant increase in the number of people highly annoyed by the new noise. The curve defining the onset of noise effects stops increasing at 65 dBA for Category 1 and Category 2 land uses, a standard limit for an acceptable living environment defined by a number of federal, state, and local agencies. Project noise above the upper curve is considered to cause a severe impact because a substantial percentage of people would be highly annoyed by the new noise.

The upper curve on Figure 3-1 flattens out at 75 dBA for Category 1 and Category 2 land uses, a level associated with an unacceptable living environment. As indicated by the right-hand scale on Figure 3-1, the project noise criteria are 5 decibels (dB) higher for Category 3 land uses because these types of land uses are considered to be slightly less sensitive to noise than the types of land uses in Category 1 and Category 2.



Sources: Federal Transit Administration, 2018; Federal Railroad Administration, 2012

Figure 3-1 Noise Impact Criteria for Transit and High-Speed Rail Projects

Table 3-1 Land Use Categories and Metrics for Transit Noise Impact Criteria

Land Use Category	Noise Metric (dBA)	Land Use Category
1	Outdoor $L_{eq}(h)$[1]	Tracts of land where quiet is an essential element in their intended purpose. This category includes lands set aside for serenity and quiet, and such land uses as outdoor amphitheaters and concert pavilions, as well as National Historic Landmarks with substantial outdoor use.
2	Outdoor L_{dn}	Residences and buildings where people normally sleep. This category includes homes, hospitals, and hotels where nighttime sensitivity to noise is assumed to be of utmost importance.
3	Outdoor $L_{eq}(h)$[1]	Institutional land uses with primarily daytime and evening use. This category includes schools, libraries, and churches, where it is important to avoid interference with such activities as speech, meditation, and concentration. Buildings with interior spaces where quiet is important, such as medical offices, conference rooms, recording studios, and concert halls, fall into this category, as well as places for meditation or study associated with cemeteries, monuments, and museums. Certain historical sites, parks, and recreational facilities are also included.

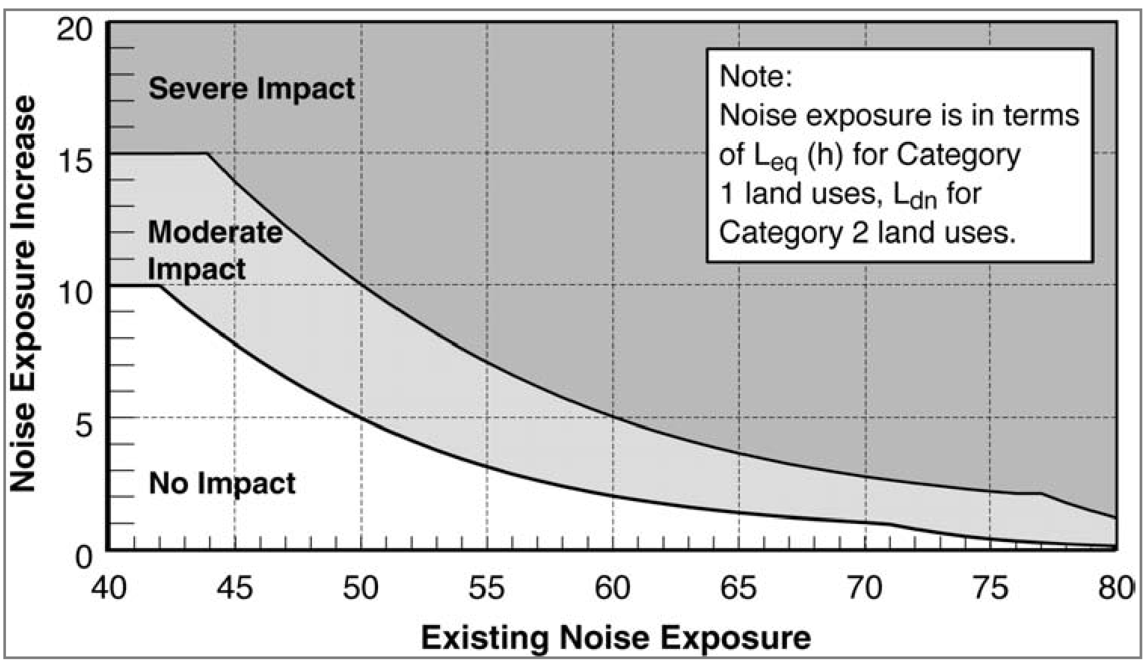
Source: Federal Transit Administration, 2018
[1] L_{eq} for the noisiest hour of transit-related activity during hours of noise sensitivity.
dBA = A-weighted decibels
L_{eq} = equivalent sound level
L_{dn} = day-night sound level
$L_{eq}(h)$ = hourly equivalent sound level

Between the two curves, a project is judged to have a moderate effect. The change in the cumulative noise level is noticeable to most people, but may not be sufficient to cause strong, adverse reactions from the community. In this transitional area, other project-specific factors must be considered to determine the magnitude of the effect and the need for mitigation, such as the existing noise level, predicted level of increase over existing noise levels, and the types and numbers of noise-sensitive land uses affected.

Although the curves on Figure 3-1 are defined in terms of the project noise exposure and the existing noise exposure, the increase in the cumulative noise—when project-generated noise is added to existing noise levels—is the basis for the criteria. To illustrate this point, Figure 3-2 shows the noise impact criteria for Category 1 and Category 2 land uses in terms of the allowable increase in the cumulative noise exposure. Because day-night sound level (L_{dn}) and equivalent sound level (L_{eq}) are measures of total acoustic energy, any new noise source in a community will cause an increase, even if the new source level is lower than the existing level. On Figure 3-2, the criterion for a moderate effect allows a noise exposure increase of 10 dBA if the existing noise exposure is 42 dBA or less, but only a 1 dBA increase when the existing noise exposure is 70 dBA.

As the existing level of ambient noise increases, the allowable level of transit noise increases, but the total amount that community noise exposure is allowed to increase is reduced. This accounts for the unexpected result that a project noise exposure that is lower than the existing noise exposure can still cause an effect. This is clearer from the examples given in Table 3-2, which indicate the level of transit noise allowed for different existing levels of exposure.

With respect to construction noise, no standard criteria apply at the federal level. However, Section 12.1.3 of the FTA guidelines does offer suggested threshold values for two levels of analysis (general and detailed) that can help identify potential noise impacts from construction equipment (FTA 2018).



Sources: Federal Transit Administration, 2018; Federal Railroad Administration, 2012

Figure 3-2 Allowable Increase in Cumulative Noise Levels (Categories 1 and 2)

Table 3-2 Noise Impact Criteria: Effect on Cumulative Noise Exposure

L_{dn} or L_{eq} in dBA (rounded to nearest whole decibel)			
Existing Noise Exposure	Allowable Project Noise Exposure	Allowable Combined Total Noise Exposure	Allowable Noise Exposure Increase
45	51	52	7
50	53	55	5
55	55	58	3
60	57	62	2
65	60	66	1
70	64	71	1
75	65	75	0

Source: Federal Transit Administration, 2018
dBA = A-weighted decibels
L_{dn} = day-night sound level
L_{eq} = equivalent sound level

3.1.1.7 Federal Highway Administration Procedures for Abatement of Highway Traffic Noise and Construction Noise (23 Code of Federal Regulations 772)

The Federal Highway Administration (FHWA) stipulates procedures and criteria for noise assessment studies of highway projects (23 C.F.R Part 772). The FHWA requires that noise abatement measures be considered on federal-aid highway projects if the project would cause a substantial increase in noise levels, or if projected noise levels approach or exceed the noise abatement criteria (NAC) level for activities occurring on adjacent lands. These FHWA regulations apply to projects funded or approved by FHWA, and thus would not apply to this project (because FHWA funds are not expected to be used); however, the criteria in these regulations have been considered in assessing noise impacts associated with motor vehicles.

FHWA NAC for various land use activity categories are presented in Table 3-3. These noise criteria are assigned to exterior and interior activities. Noise attenuation provided by most residential structures leads to compliance with the interior design noise level if the exterior criterion is attained (FHWA 2011).

Table 3-3 Federal Highway Administration Noise Abatement Criteria in A-Weighted Decibels

Activity Category	Activity Criteria[1] $L_{eq}(h)$	Evaluation Location	Activity Description
A	57	Exterior	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose
B[3]	67	Exterior	Residential
C[3]	67	Exterior	Active sport areas, amphitheaters, auditoriums, campgrounds, cemeteries, daycare centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, recreation areas, Section 4(f) sites, schools, television studios, trails, and trails crossings

Activity Category	Activity Criteria[1] $L_{eq}(h)$	Evaluation Location	Activity Description
D	52	Interior	Auditoriums, daycare centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, schools, and television studios
E[2]	72	Exterior	Hotels, motels, offices, restaurants/bars, and other developed lands, properties, or activities not included in activity categories A through D or F.
F	--	--	Agriculture, airports, bus yards, emergency services, industrial, logging, maintenance facilities, shipyards, utilities (water resources, water treatment, electrical), and warehousing
G	--	--	Undeveloped lands that are not permitted

Source: Federal Highway Administration, 2011
[2] The $L_{eq}(h)$ Activity Criteria values are for effect determination only, and are not design standards for noise abatement measures.
[3] Includes undeveloped lands permitted for this activity category.
dBA = A-weighted decibels
$L_{eq}(h)$ = hourly sound equivalent level

For projects subject to these regulations, noise abatement measures must be considered and, if found to be reasonable and feasible, they must be incorporated as part of the project if these NAC are predicted to be approached or exceeded during the noisiest 1-hour period of a day. Consistent with FHWA guidelines, the California Department of Transportation (Caltrans) defines “approach” as a worst-hour noise level/sound level that is within 1 dB of an NAC. As an example, 66 dBA L_{eq} approaches the 67 dB L_{eq} activity category B criterion, whereas 65 dB L_{eq} does not. While the regulations do not apply to this project, the Authority will consider these criteria in assessing noise impacts and determining appropriate mitigation.

These criteria are used in Section 6.4, Operational Traffic Noise, where a detailed analysis is conducted for the change in peak hour noise from increased traffic related to the project.

3.1.1.8 Occupational Health and Safety Administration Occupational Noise Exposure (29 Code of Federal Regulations Part 1910.95)

The Occupational Safety and Health Administration regulates worker noise exposure to a time-weighted-average of 90 dBA over an 8-hour work shift (29 C.F.R. Part 1910.95). Areas where levels exceed 85 dBA must be designated and labeled as high-noise-level areas where hearing protection is required. This noise exposure criterion applies to construction activities associated with the project section. Noise from the project section may also elevate noise levels at nearby construction sites to levels that exceed 85 dBA and thus trigger the need for administrative/engineering controls and hearing conservation programs, as detailed by the Occupational Safety and Health Administration.

3.1.2 State

3.1.2.1 California Noise Control Act (California Health and Safety Code, § 46010 et seq.)

At the state level, the California Noise Control Act of 1973 (California Health and Safety Code, § 46010 et seq.) provides for the Office of Noise Control in the Department of Health Services to assist communities in developing local noise control programs and to work with the Office of Planning and Research to provide guidance for the preparation of the required noise elements in city and county general plans, pursuant to California Government Code, Section 65302(f). In preparing the noise element, a city or county must identify local noise sources and analyze and quantify, to the extent practicable, current and projected noise levels for various sources, including highways and freeways, passenger and freight railroad operation, ground rapid transit systems, commercial, general, and military aviation and airport operation, and other ground stationary noise sources (these would include HSR alignments). Noise-level contours must be mapped for these sources, using both community noise equivalent level (CNEL) and L_{dn}, and are to be used as a guide in land use decisions to minimize the exposure of community residents to excessive noise.

3.1.2.2 California Environmental Quality Act (California Code of Regulations, Title 14, § 15000 et seq.)

Environmental concerns (e.g., clean air, noise) and thresholds of significance (e.g., parts per million of particulate matter, decibel level of noise) are not legislated under CEQA (Cal. Code Regs., tit. 14, § 15000 et seq.) at the state level but are left to the local jurisdictions to determine. For example, if a local authority believes that pedestrian safety is an environmentally significant concern, then pedestrian safety can be added to the list of significance thresholds evaluated in the environmental review, as long as the local legislation establishes a meaningful measure and threshold of significance, and substantial evidence of the environmental concern can be developed and cataloged.

With respect to noise and vibration, the questions in Table 3-4 must be answered and a reasonable and sufficient justification must be provided for each answer.

Table 3-4 California Environmental Quality Act Noise Impact Assessment

XI. NOISE – Would the project result in:	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
a) Generation of a substantial temporary of permanent increase in ambient noise levels in the vicinity of the project excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	❐	❐	❐	❐
b) Ggeneration of excessive ground-borne vibration or ground-borne noise levels?	❐	❐	❐	❐
c) For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	❐	❐	❐	❐

Source: CEQA, 2018

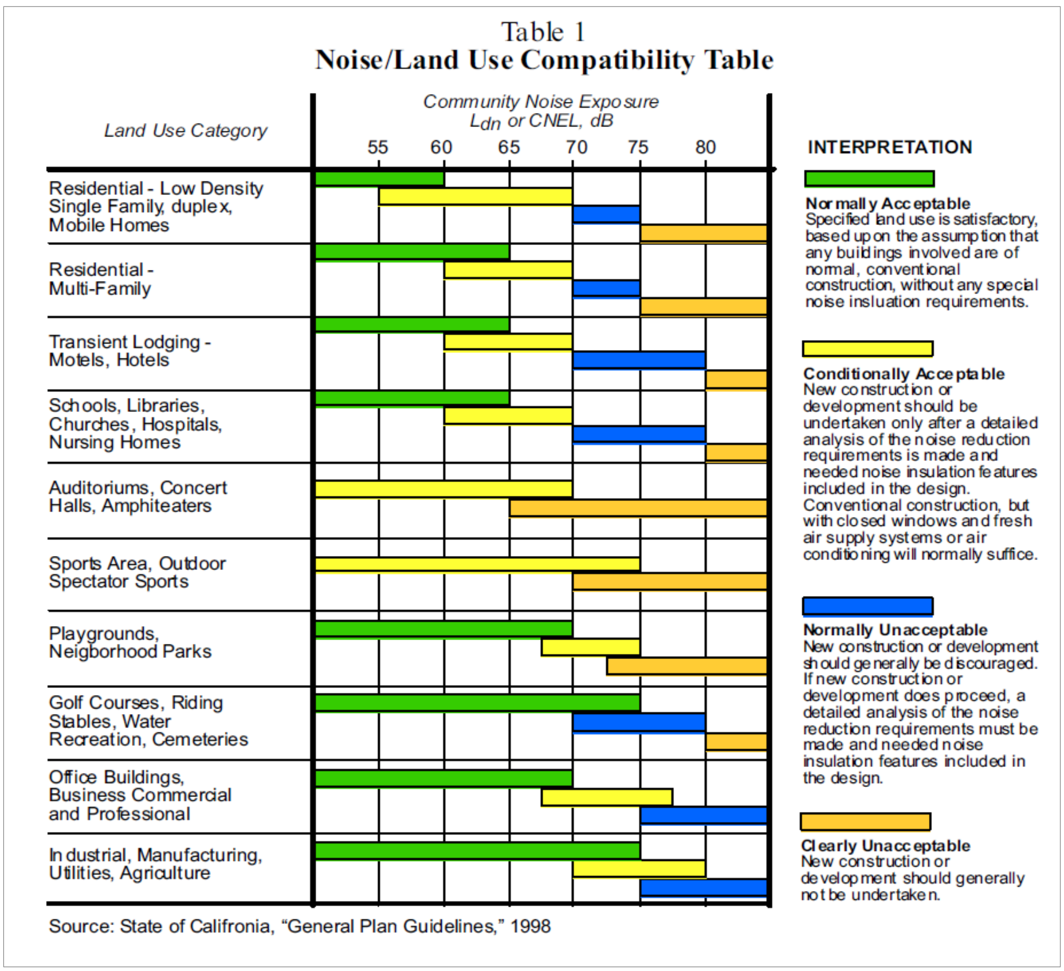
3.1.2.3 Title 21, Chapter 2.5, Subchapter 6, California Code of Regulations

The Caltrans Division of Aeronautics defines a 65 dBA CNEL noise criterion as part of its noise standards with respect to aviation traffic as measured at potentially affected residences near an airport. Quarterly reports of measured noise levels near an airport (prepared and submitted to determine where these requirements are satisfied) can offer insight about the surrounding ambient acoustical environment, which may help describe and model current existing noise levels as part of HSR noise impact assessment.

3.1.2.4 Title 24, Part 2, California Code of Regulations

The California Noise Insulation Standard (California Administrative Code, Part 2, Title 24, Appendix Chapter 35, Section 3501) limits interior noise exposure levels within multifamily (not single-family detached houses) residential developments to 45 dB CNEL or 45 dB L_{dn}.

The Governor's Office of Planning and Research has published general plan guidelines for cities and counties in California. The guidelines provide recommended land use compatibility standards for noise. These standards, expressed as ranges, are presented on Figure 3-3.



Source: Governor's Office of Planning and Research, 2003

Figure 3-3 State of California Land Use Compatibility Guidelines

3.1.2.5 California Department of Transportation Traffic Noise Analysis Protocol

The Caltrans *Traffic Noise Analysis Protocol for New Highway Construction, Reconstruction, and Retrofit Barrier* (Caltrans 2011) is California's policy document for applying 23 C.F.R. Part 772 in California. These policies address the timing and applicability of noise abatement measures as part of a roadway project and identify project conditions that trigger the requirement to assess traffic noise impacts. The FHWA/Caltrans noise regulations only apply at locations with a significant change in the horizontal or vertical alignment or location of an existing highway or roadway or where traffic volumes are anticipated to increase by a substantial amount (a double of volume) under the HSR Build Alternative. There were no locations in the project corridor near noise sensitive locations where either of these conditions were met.

3.1.3 Regional and Local

3.1.3.1 County

The Los Angeles County General Plan Noise Element and Municipal Code are designed to limit the exposure of the community to excessive noise levels by specifying noise standards at noise-sensitive land uses. The Los Angeles County General Plan Noise Element uses the Noise Ordinance in the Municipal Code as a reference to define noise standards. Table 3-5 shows the exterior noise standards in Los Angeles County for each different type of noise zone land use for noise-receiving properties.

Table 3-5 Los Angeles County Exterior Noise Standards

Noise Zone	Designated Noise Zone Land Use (receptor property)	Time Interval	Exterior Noise Level (dB)
I	Noise-sensitive area	Anytime	45
II	Residential properties	10:00 p.m. to 7:00 a.m. (nighttime)	45
II	Residential properties	7:00 a.m. to 10:00 p.m. (daytime)	50
III	Commercial properties	10:00 p.m. to 7:00 a.m. (nighttime)	55
III	Commercial properties	7:00 a.m. to 10:00 p.m. (daytime)	60
IV	Industrial properties	Anytime	70

Source: Los Angeles County Municipal Code, 1987
Note: Levels are reduced by 5 dBA for impact noise.
dB = decibel(s) dBA = A-weighted decibel(s)

Section 12.08.390 of the Los Angeles County Municipal Code establishes exterior noise standards for noise zones listed in Table 3-5 from nontransportation noise sources based on time restrictions within a 1-hour period. The five exterior noise standards are defined below. As shown in Table 3-5, the exterior noise level is established for each noise zone.

- **Standard No. 1** is the exterior noise level that cannot be exceeded for a cumulative period of more than 30 minutes in any hour. Standard No. 1 is the applicable noise level; if the ambient L_{50} exceeds the foregoing level, the ambient L_{50} becomes the exterior noise level for Standard No. 1.
- **Standard No. 2** is the exterior noise level that cannot be exceeded for a cumulative period of more than 15 minutes in any hour. Standard No. 2 is the applicable noise level plus 5 dB; if the ambient L_{25} exceeds the foregoing level, the ambient L_{25} becomes the exterior noise level for Standard No. 2.
- **Standard No. 3** is the exterior noise level that cannot be exceeded for a cumulative period of more than 5 minutes in any hour. Standard No. 3 is the applicable noise level plus 10 dB; if the ambient $L_{8.3}$ exceeds the foregoing level, the ambient $L_{8.3}$ becomes the exterior noise level for Standard No. 3.

- **Standard No. 4** is the exterior noise level that cannot be exceeded for a cumulative period of more than 1 minute in any hour. Standard No. 4 is the applicable noise level plus 15 dB; if the ambient $L_{1.7}$ exceeds the foregoing level, the ambient $L_{1.7}$ becomes the exterior noise level for Standard No. 4.
- **Standard No. 5** is the exterior noise level that cannot be exceeded for any period of time. This noise level is known as the maximum instantaneous noise level (L_{max}). Standard No. 5 is the applicable noise level plus 20 dB; if the ambient L_{max} exceeds the foregoing level, the ambient L_{max} becomes the exterior noise level for Standard No. 5.

In addition, Section 12.08.400 of the County of Los Angeles Municipal Code establishes interior noise standards for multifamily residential land uses from nontransportation noise sources based on time restrictions within a 1-hour period. The three interior noise standards are defined below. As shown in Table 3-6, the interior noise level is established for multifamily residential land uses. Pure-tone noises or impulsive noises are penalized by a reduction of 5 dBA for each noise standard.

Table 3-6 Los Angeles County Interior Noise Standards

Noise Zone	Designated Noise Zone Land Use (receptor property)	Time Interval	Interior Noise Level (dB)
All	Multifamily Residential	10:00 p.m. to 7:00 a.m. (nighttime)	40
		7:00 a.m. to 10:00 p.m. (daytime)	45

Source: Los Angeles County Municipal Code, 1987
Note: Levels reduced by 5 dBA for impact noise.
dB = decibel(s) dBA = A-weighted decibel(s)

- **Standard No. 1** is the applicable interior noise level for a cumulative period of more than 5 minutes in any hour.
- **Standard No. 2** is the applicable interior noise level plus 5 dBA for a cumulative period of more than 1 minute in any hour.
- **Standard No. 3** is the applicable interior noise level plus 10 dBA or the maximum measured ambient noise level for any time period.

Section 12.08.440 of the Los Angeles County Municipal Code limits construction at the exterior of residential structures (versus the property line for nonconstruction noise activities) to between the hours of 7:00 a.m. and 7:00 p.m. on weekdays. It prohibits construction on Sundays and holidays.

In Section 12.08.4440 of the Los Angeles County Municipal Code delineates construction activity from mobile and stationary construction equipment. The construction noise level limitations from mobile construction equipment are defined as “maximum noise levels for nonscheduled, intermittent, short-term operation (less than 10 days),” and the construction noise level limitations from stationary construction equipment are defined as “maximum noise levels for repetitively scheduled and relatively long-term operation (periods of 10 days or more).” Table 3-7 shows the noise level standards for mobile construction equipment, and Table 3-8 shows the noise level standards for stationary construction equipment at single-family, multifamily, and semi-residential areas as well as commercial areas. The maximum noise level thresholds shown in Table 3-7 and Table 3-8 apply to residential and commercial structures. All mobile or stationary internal-combustion-engine-powered equipment or machinery is required to be equipped with suitable exhaust and air-intake silencers in proper working order.

Table 3-7 Los Angeles County Maximum Construction Noise Levels for Mobile Sources

Time/Hours	Single-Family Residential	Multifamily Residential	Semi-Residential/ Commercial
Daily, except Sundays and legal holidays, 7:00 a.m. to 8:00 p.m.	75	80	85
Daily, 8:00 p.m. to 7:00 a.m., and all day Sunday and legal holidays	60	64	70

Source: Los Angeles County Municipal Code, 1987

Table 3-8 Los Angeles County Maximum Construction Noise Levels for Stationary Equipment

Time/Hours	Single-Family Residential	Multifamily Residential	Semi-Residential/ Commercial
Daily, except Sundays and legal holidays, 7:00 a.m. to 8:00 p.m.	60	65	70
Daily, 8:00 p.m. to 7:00 a.m., and all day Sunday and legal holidays	50	55	60

Source: Los Angeles County Municipal Code, 1987

3.1.3.2 Cities

City of Burbank

The City of Burbank Noise Element establishes goals and policies that include, but are not limited to, the following:

> **GOAL 1: Noise Compatible Land Uses:** Burbank's diverse land use pattern is compatible with current and future noise levels.
>
> > **Policy 1.1:** Ensure the noise compatibility of land uses when making land use planning decisions.
> >
> > **Policy 1.2:** Provide spatial buffers in new development projects to separate excessive noise-generating uses from noise-sensitive uses.
> >
> > **Policy 1.3:** Incorporate design and construction features into residential and mixed-use projects that shield residents from excessive noise.
> >
> > **Policy 1.4:** Maintain acceptable noise levels at existing noise-sensitive land uses.
> >
> > **Policy 1.5:** Reduce noise from activity centers located near residential areas, in cases where noise standards are exceeded.
> >
> > **Policy 1.6:** Consult with movie studios and residences that experience noise from filming activities to maintain a livable environment.
>
> **GOAL 4: Train Noise:** Burbank's train service network reduces noise levels affecting residential areas and noise-sensitive land uses.
>
> > **Policy 4.1:** Support noise-compatible land uses along rail corridors.
> >
> > **Policy 4.2:** Require noise-reducing design features as part of transit-oriented, mixed-use development near rail corridors.
> >
> > **Policy 4.3:** Support Promote the use of design features, such as directional warning horns or strobe lights, at railroad crossings that reduce noise from train warnings.

City of Burbank Noise Standards

Burbank has developed land use compatibility standards, based on recommended parameters from the California Governor's Office of Planning and Research, that rate compatibility using the terms "normally acceptable," "conditionally acceptable," "normally unacceptable," and "clearly unacceptable." Using these land use compatibility guidelines, the city has established interior and exterior noise standards.

The City of Burbank's noise standards are intended to apply to land uses exposed to noise levels generated by transportation sources (e.g., traffic, railroad operations, and aircraft). Noise exposure limits for land use compatibility are generally established as 60 dBA CNEL/L_{dn} for exterior spaces in most sensitive land use designations (e.g., single-family residential uses, nursing homes, and hospitals). Higher exterior noise levels (65 dBA CNEL/L_{dn}) are permitted for multifamily housing and housing in mixed-use contexts than for single-family homes. This is because multifamily residential complexes are generally located in transitional areas between single-family neighborhoods and commercial districts, or near major arterials served by transit, and a more integrated mix of residential and commercial activity (accompanied by higher noise levels) is often desired in such locations. These standards also establish maximum interior noise levels for new residential development, requiring that sufficient insulation be provided to reduce interior ambient noise levels to 45 dBA CNEL/L_{dn}.

The City of Burbank's land use compatibility standards are based on the existing or intended future use of the property. The standards are purposefully general, and not every specific land use is identified. Application of the noise standards will vary on a case-by-case basis according to location, development type, and associated noise sources.

Nontransportation Sources

When stationary noise is the primary noise source, and to ensure that noise producers do not adversely affect noise-sensitive land uses, the city applies a second set of standards. These hourly daytime and nighttime performance standards (expressed in L_{eq}) for stationary noise sources are designed to protect noise-sensitive land uses adjacent to stationary sources from excessive noise. Table 3-9 summarizes stationary-source noise standards for various land use types, which represent acceptable noise levels at exterior spaces of the sensitive receptor.

Table 3-9 Burbank Maximum Allowable Noise Exposure—Stationary Noise Sources

Noise Source	Noise Level Descriptor	Exterior Spaces[2]—Daytime (7:00 a.m. to 10:00 p.m.)	Exterior Spaces[2]—Nighttime (10:00 p.m. to 7:00 a.m.)
Typical	Hourly dBA L_{eq}	55[1]	45[1]
Tonal, impulsive, repetitive, or consisting primarily of speech or music	Hourly dBA L_{eq}	50[1]	40[1]
Any	dBA L_{max}	75	65

Source: City of Burbank, 2013

[1] The city may impose noise level standards that are more or less restrictive than those specified above based on determination of existing low or high ambient noise levels.

[2] Where the location of exterior spaces (i.e., outdoor activity areas) is unknown, the exterior noise level standard shall be applied to the property line of the receiving land use. Where it is not practical to mitigate exterior noise levels at patios or balconies of apartment complexes, a common area such as a pool or recreation area may be designated as the exterior space.

dBA = A-weighted decibel(s)

L_{max} = maximum instantaneous noise level

L_{eq} = equivalent continuous sound level

The City of Burbank General Plan Noise Element establishes noise standards for cumulative impacts related to the introduction of new projects in the area. The Noise Element states:

> An increase in ambient noise levels is assumed to be a significant noise impact if a project causes ambient noise levels to exceed the following:

- Where the existing ambient noise level is less than 60 dBA CNEL/L_{dn}, a project-related permanent increase in ambient noise levels of 5 dBA CNEL/L_{dn} or greater.
- Where the existing ambient noise level is greater than 60 dBA CNEL/L_{dn}, a project-related permanent increase in ambient noise levels of 3 dBA CNEL/L_{dn} or greater.

The City of Burbank Noise Element also provides regulations related to construction. Construction is a necessary part of community development. Construction noise typically occurs intermittently; the amount of noise depends on the nature or phase of construction (e.g., demolition/land clearing, grading and excavation, and erecting structures). Activities such as site preparation, hauling of materials by trucks, pouring of concrete, and use of power tools can temporarily generate noise. Construction equipment, such as earthmovers, material handlers, and portable generators, also creates noise that reaches high levels for brief periods.

The Noise Element references the City of Burbank Municipal Code, which states that construction noise occurring between the hours of 7:00 a.m. and 7:00 p.m., Monday through Friday, and 8:00 a.m. to 5:00 p.m. on Saturday is exempt from applicable noise standards. With this regulatory exemption, the city acknowledges that construction noise is an acceptable public nuisance when conducted during the least noise-sensitive hours of the day. The city also acknowledges that construction noise could cause a substantial temporary increase in the ambient noise environment at nearby noise-sensitive receptors if construction occurs during the more noise-sensitive hours (i.e., evening, nighttime, or early morning), or if construction equipment is not properly equipped with noise control devices.

City of Glendale

The City of Glendale Noise Element establishes goals and policies that include, but are not limited to, the following:

GOAL 1: Reduce noise impacts from transportation noise sources

Policy 1.1: *Coordinate with the California Department of Transportation (Caltrans) and the Metropolitan Transportation Authority (MTA) to reduce noise impacts from existing or proposed freeway projects with respect to existing noise sensitive land uses.*

Program 1.1: Investigate the opportunity for Caltrans or the MTA to construct barriers to mitigate existing sound emissions where necessary and where feasible.

Responsibility: Public Works Department to coordinate with Caltrans and MTA

Program 1.2: Actively pursue with Caltrans or the MTA the potential for noise barriers for the apartments west of Paula Avenue and the residential areas along the Ventura Freeway near Isabel.

Responsibility: Public Works Department to coordinate with Caltrans and MTA

Program 1.3: Include noise mitigation measures in the design or improvement of freeways and arterial roadways consistent with funding capability and support efforts by Caltrans, the MTA, and the City to provide for acoustical protection for existing noise sensitive land uses affected by these projects.

Responsibility: Public Works Department to coordinate with Caltrans and MTA

GOAL 3: Continue incorporating noise considerations into land use planning decisions

Policy 3.1: *Ensure that land uses comply with adopted standards.*

Program 3.1: Use the criteria in Table 1 and standards in Table 2 to assess the compatibility of proposed land uses with the noise environment. New land uses, as described in the Land Uses column of Table 2, in a 60 CNEL or higher noise contour, as shown on the map of the 2030 Noise Contours, Exhibit 2, may be subject to potentially significant environmental impacts that must be addressed by a noise study. The study, prepared by a qualified consultant (to the satisfaction of the City), shall address the noise environment and propose appropriate conditions of approval or mitigation measures to comply with the interior and exterior noise standards as shown in Table 2. Interior tenant improvements, signs, and exterior remodeling will not normally be subject to review under this Program.

Responsibility: Planning Department, Development Services and/or Public Works Department

Policy 3.2: *Encourage acoustical mitigation design in new construction when necessary.*

Program 3.2: Continue to enforce the State of California Building Code that specifies that the indoor noise levels for residential living spaces not exceed 45 dB CNEL due to the combined effect of all noise sources.

Responsibility: Public Works Department

GOAL 4: Enhance measures to control construction noise impacts

Policy 4.1: *Amend the Noise Ordinance to address construction noise problems.*

Program 4.1: Change the permitted hours of construction to Monday through Friday, 7 a.m. to 7 p.m. and on Saturday from 9 a.m. to 5 p.m. Maintain the ban on construction on Sundays and Holidays. Continue to allow emergency repair work, and work to correct safety hazards, at any time.

Responsibility: Public Works Department

City of Glendale Noise Standards

Noise standards are designed to ensure that new sensitive land uses are designed and constructed so that the noise environment will be acceptable for that land use. For example, most cities have an outdoor noise standard of 65 CNEL for rear yards of single-family residential uses. This requires that sound walls, berms, setbacks or other features be used in the construction of new residences so that the rear yards meet a 65 CNEL noise level now and in future traffic projections. Currently, the city does not have any noise standards, which are normally contained in the Noise Element of the General Plan. The city enforces the State building code (Chapter 12, Section 1208A) which requires that “new hotels, motels, dormitories, apartment houses and dwellings other than detached single-family dwellings” be designed and constructed so as to achieve an indoor noise level of 45 CNEL or less when constructed and at least 10 years into the future. The standard protects these dwellings from exterior noise sources such as highways, county roads, city streets, railroads, rapid transit lines, airports, and industrial areas. Cities are allowed to develop noise standards for other uses as they deem necessary.

In addition to protecting new construction from obtrusive noise levels, city noise standards also provide a criterion by which to evaluate the impact of new projects on existing residential areas and other noise-sensitive areas. For example, assume that the city adopts a 65 CNEL for residential land uses. If a new project is proposed that will generate significant traffic, it can be determined whether the 65 CNEL level will or will not be exceeded at existing residential areas. If exceeded, then the project would be determined to have a significant impact without further mitigation.

Nontransportation Sources

Residential land uses and areas identified as noise-sensitive must be protected from excessive noise from nontransportation sources, including commercial activities, construction noise, late-night entertainment, spa and pool equipment, and air-conditioner noise. These impacts are most effectively controlled through the enforcement of an effective city noise ordinance. A noise ordinance is designed to control noise generated on private property and impacting another parcel of property. A noise ordinance is not designed to control traffic on public streets, aircraft noise, train noise, or other public transportation noise. The noise ordinance is part of the city code and is not contained in the noise element of the general plan. However, as part of a noise element update, the noise ordinance is often reviewed and recommendations made for changes if needed. The key noise ordinance-related issues are discussed below.

The City of Glendale’s Noise Ordinance is contained in the Glendale Municipal Code, Title 8, Chapter 36 – Noise Control. The ordinance was updated in 1991. To be enforceable, the courts have ruled that a noise ordinance must have specific noise limits and protocols for noise measurements. The Glendale Noise Ordinance contains these requirements, and the protocols for measurement of potentially offending noise sources are clear. In general, the City of Glendale Noise Ordinance is an excellent tool for controlling noise generated on private property throughout the city. Because of concerns expressed by residents about disturbing noise from construction activities on the weekends, the Noise Ordinance proposes to revise the allowable hours for construction. Construction is currently allowed from 7:00 a.m. to 7:00 p.m. Monday through Saturday and prohibited on Sundays. The proposed change is to restrict the hours of construction on Saturday from 9:00 a.m. to 5:00 p.m., with other days remaining unchanged. This change would not affect the authority of the Director of Public Works and the Building Official to authorize other hours.

City of Los Angeles

Noise Element

The City of Los Angeles has adopted local guidelines based in part on the community noise compatibility guidelines established by the State Department of Health Services for use in assessing the compatibility of various land use types with a range of noise levels. These guidelines are set forth in the city’s General Plan Noise Element and the city’s *CEQA Thresholds Guide* (2006) in terms of the CNEL.

In accordance with the Noise Element of the City of Los Angeles’ General Plan, a noise exposure of up to 60 dBA CNEL is considered the most desirable target for the exterior of noise-sensitive land uses or sensitive receptors (e.g., homes, schools, churches, and libraries). It is also recognized that such a level may not always be possible in areas of substantial traffic noise intrusion. Exposures up to 70 dBA CNEL for noise-sensitive uses are considered conditionally acceptable if all measures to reduce such exposure have been taken. Noise levels above 70 dBA CNEL are normally unacceptable for sensitive receptors except in unusual circumstances.

Municipal Code

The Los Angeles Municipal Code (LAMC), Chapter XI, Article 2, Section 112.03, Construction Noise, states that noise due to construction or repair work shall be regulated as provided by Chapter IV, Article 1, Section 41.40 of the LAMC. Chapter XI, Article 2, Section 112.05, Maximum Noise Level of Powered Equipment or Powered Hand Tools, states that between the hours of 7:00 a.m. and 10:00 p.m., in any residential zone of the city or within 500 feet thereof, no person shall operate or cause to be operated any powered equipment or powered hand tool that produces a maximum noise level exceeding the following noise limits at a distance of 50 feet therefrom:

(a) 75 dB(A) for construction, industrial, and agricultural machinery including crawler-tractors, dozers, rotary drills and augers, loaders, power shovels, cranes, derricks, motor graders, paving machines, off-highway trucks, ditchers, trenchers, compactors, scrapers, wagons, pavement breakers, compressors and pneumatic or other powered equipment

(b) 75 dB(A) for powered equipment of 20 HP or less intended for infrequent use in residential areas, including chain saws, log chippers and powered hand tools

(c) 65 dB(A) for powered equipment intended for repetitive use in residential areas, including lawn mowers, backpack blowers, small lawn and garden tools and riding tractors

The noise limits for particular equipment listed above in (a), (b), and (c) shall be deemed to be superseded and replaced by noise limits for such equipment from and after their establishment by final regulations adopted by the U.S. Environmental Protection Agency and published in the *Federal Register.*

However, the noise limitations above would not apply where compliance is deemed to be technically infeasible, which means that said noise limitations cannot be complied with despite the use of mufflers, shields, sound barriers, and/or other noise reduction device or techniques during the operation of the equipment. The aforementioned limitations apply only to uses in residential zones or within 500 feet thereof.

Chapter IV, Article 1, Section 41.40. Noise Due to Construction, Excavation Work – When Prohibited, states:

(a) No person shall, between the hours of 9:00 p.m. and 7:00 a.m. of the following day, perform any construction or repair work of any kind upon, or any excavating for, any building or structure, where any of the foregoing entails the use of any power driven drill, riveting machine excavator or any other machine, tool, device or equipment which makes loud noises to the disturbance of persons occupying sleeping quarters in any dwelling hotel or apartment or other place of residence. In addition, the operation, repair or servicing of construction equipment and the job-site delivering of construction materials in such areas shall be prohibited during the hours herein specified. Any person who knowingly and willfully violates the foregoing provision shall be deemed guilty of a misdemeanor punishable as elsewhere provided in this Code.

(b) The provisions of Subsection (a) shall not apply to any person who performs the construction, repair, or excavation work involved pursuant to the express written permission of the Board of Police Commissioners through its Executive Director. The Executive Director, on behalf of the Board, may grant this permission, upon application in writing, where the work proposed to be done is in the public interest, or where hardship or injustice, or unreasonable delay would result from its interruption during the hours mentioned above, or where the building or structure involved is devoted or intended to be devoted to a use immediately related to public defense. The provisions of this section shall not in any event apply to construction, repair, or excavation work done within any district zoned for manufacturing or industrial uses under the provisions of Chapter I of this Code, or to emergency work necessitated by any flood, fire or other catastrophe.

(c) No person, other than an individual homeowner engaged in the repair or construction of his single-family dwelling shall perform any construction or repair work of any kind upon, or any earth grading for, any building or structure located on land developed with residential buildings under the provisions of Chapter I of this Code, or perform such work within 500 feet of land so occupied, before 8:00 a.m. or after 6:00 p.m. on any Saturday or national holiday nor at any time on any Sunday. In addition, the operation, repair or servicing of construction equipment and the job-site delivering of construction materials in such areas shall be prohibited on Saturdays and on Sundays during the hours herein specified. The provisions of this subsection shall not apply to persons engaged in the emergency repair of:

1. Any building or structure.
2. Earth supporting or endangering any building or structure.
3. Any public utility.
4. Any public way or adjacent earth.

In addition, Chapter IX, Article 1, Division 12, Section 91.1207.11.2, of the LAMC requires that interior noise levels attributable to exterior sources shall not exceed 45 dB in any habitable room. The LAMC further states that the noise metric to be used with regard to this standard shall be either the L_{dn} or the CNEL.

Thresholds of Significance

A project will normally have a significant effect on the environment related to noise if it will substantially increase the ambient noise levels for adjoining areas or conflict with adopted environmental plans and goals of the community in which it is located. The applicable noise standards governing the project site are the criteria in the Noise Element of the City of Los Angeles' General Plan and the LAMC.

In accordance with the LAMC, a noise level increase of 5 dBA over the existing average ambient noise level at an adjacent property line is considered a noise violation. This standard applies to (1) radios, television sets, and similar devices as defined in LAMC Chapter XI, Article 2, Section 112.01; (2) air-conditioning, refrigeration, heating, pumping, and filtering equipment as defined in LAMC Chapter XI, Article 2, Section 112.02; (3) powered equipment intended for repetitive use in residential areas and other machinery, equipment, and devices as defined in LAMC Section 112.04; and (4) motor vehicles driven on-site as defined in LAMC Chapter XI, Article 2, Section 114.02. These standards apply regardless of the off-site land use.

The ambient noise, as defined by the LAMC, is the measured noise level averaged over a period of at least 15 minutes (L_{eq}). For purposes of determining whether or not a violation of the noise regulations is occurring, the sound level measurements of an offending noise are averaged over a minimum duration of 15 minutes and compared with the baseline ambient noise levels. The baseline ambient noise level is the actual measured ambient noise level (without the offending noise source), as shown in Table 5-2 and Table 5-3 of this report, or the city's presumed ambient noise level, whichever is greater. As presented in Chapter XI, Article 1, Section 111.03, of the LAMC, the presumed daytime (7:00 a.m. to 10:00 p.m.) ambient noise level for residential uses is 50 dBA L_{eq}, while the nighttime (10:00 p.m. to 7:00 a.m.) presumed ambient noise level is 40 dBA L_{eq}.

3.2 Vibration

3.2.1 Federal

Vibratory motion of the ground at a specific location caused by the passage of high-speed trains may result in two forms of human annoyance that are discussed above under FTA and FRA guidelines (Section 3.1.1, Federal). Ground-borne vibration is tactile movement of the ground or structures, whereas ground-borne noise is the radiation of acoustical energy from ground and structural surfaces excited by ground-borne vibration. Broadly speaking, vibration impact criteria levels are influenced by land-use category and vibration event frequency (i.e., how often a train passage occurs within a given time period).

As with train passage events, construction activity can also be considered on the basis of vibration occurrence frequency, so the same vibration criteria (in the absence of standardized construction vibration compliance criteria) may be used to help determine vibration impacts during project construction.

3.2.1.1 Federal Railroad Administration Guidelines

The FRA guidelines (FRA 2012), which acknowledge the FTA guidance document (FTA 2018) as their basis, provide ground-borne vibration and noise criteria for a general assessment as shown in Table 3-10. These levels represent the maximum root mean square (RMS) level of an event. In addition, the guidelines provide criteria for special buildings that are very sensitive to ground-borne noise and vibration. The impact criteria for these special buildings are shown in Table 3-11.

Table 3-10 Ground-Borne Vibration and Noise Impact Criteria

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

Source: Federal Railroad Administration, 2012
[1] Frequent events are defined as more than 70 vibration events of the same kind per day.
[2] Occasional events are defined as between 30 and 70 vibration events of the same kind per day.
[3] Infrequent events are defined as fewer than 30 vibration events of the same kind per day.
[4] This criterion limit is based on levels that are acceptable for most moderately sensitive equipment such as optical microscopes. For vibration-sensitive manufacturing or research equipment, a detailed vibration analysis must be performed.
[5] Vibration-sensitive equipment is generally not sensitive to ground-borne noise.
VdB = vibration decibels
dBA = A-weighted decibels
N/A = not applicable

Table 3-11 Ground-Borne Vibration and Noise Impact Criteria for Special Buildings

Type of Building or Room	Ground-Borne Vibration Impact Levels (VdB re 1 micro-inch per second)		Ground-Borne Noise Impact Levels (dBA re 20 micro-Pascals)	
	Frequent Events[1]	Occasional or Infrequent Events[2]	Frequent Events[1]	Occasional or Infrequent Events[2]
Concert Halls	65 VdB	65 VdB	25 dBA	25 dBA
Television Studios	65 VdB	65 VdB	25 dBA	25 dBA
Recording Studios	65 VdB	65 VdB	25 dBA	25 dBA
Auditoriums	72 VdB	80 VdB	30 dBA	38 dBA
Theaters	72 VdB	80 VdB	35 dBA	43 dBA

Source: Federal Railroad Administration, 2012
[1] Frequent events are defined as more than 70 vibration events per day.
[2] Occasional or infrequent events are defined as fewer than 70 vibration events per day.

VdB = vibration decibels
dBA = A-weighted decibels
N/A = not applicable

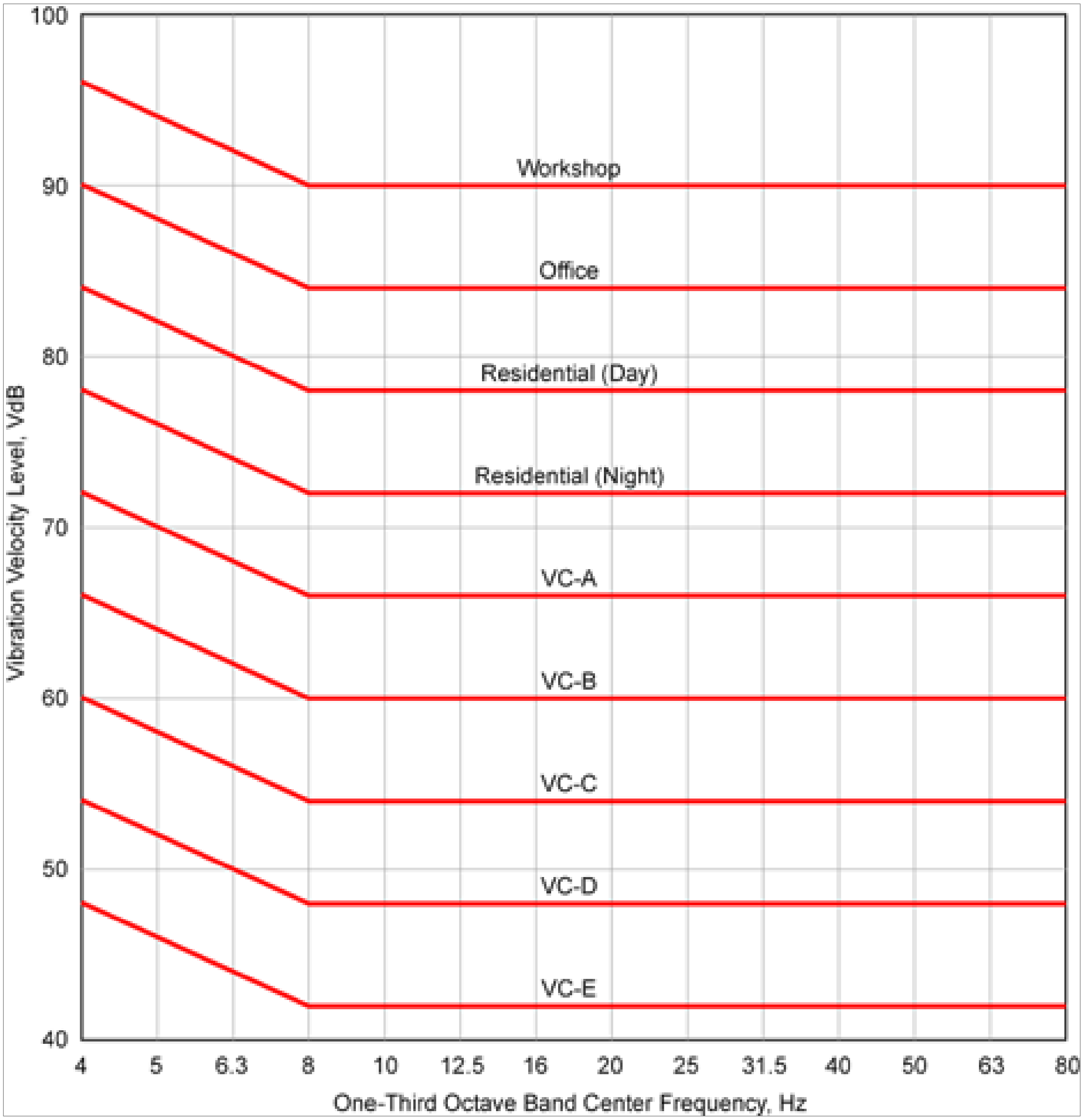
Both Table 3-10 and Table 3-11 differentiate the vibration impact threshold depending on the number of vibration events per day, with fewer than 30 vibration events per day considered “infrequent,” between 30 and 70 vibration events considered “occasional,” and more than 70 events considered “frequent” for Table 3-10. For Table 3-11, fewer than 70 vibration events per day are considered “occasional or infrequent” and more than 70 events are considered “frequent.” This dividing line was originally selected so that most commuter rail or intercity rail projects would fall into the “infrequent” category and most urban transit projects (subway and light rail transit) would more typically be in the “frequent” category.

For a detailed vibration analysis, more refined impact criteria are required than for a general assessment. Therefore, the criteria for a detailed vibration assessment are expressed in terms of one-third octave band frequency spectra, based on international and industry standards. The FRA criteria for a detailed vibration assessment are shown on Figure 3-4 and descriptions of the curves are shown in Table 3-12. The curves of Figure 3-4 are applied to the projected vibration spectrum for the project section. If the vibration level at any one frequency exceeds the criteria, there would be an effect. Conversely, if the entire proposed vibration spectrum of the project section were below the curve, there would be no effect.

Table 3-12 Interpretation of Vibration Criteria for Detailed Analysis

Criterion Curve (Figure 3-4)	Max Lv (VdB)[1]	Description of Use
Workshop	90	Distinctly feelable vibration. Appropriate to workshops and nonsensitive areas.
Office	84	Feelable vibration. Appropriate to offices and nonsensitive areas.
Residential Day	78	Barely feelable vibration. Adequate for computer equipment and low-power optical microscopes (up to 20X).
Residential Night, Operating Rooms	72	Vibration not feelable, but ground-borne noise may be audible inside quiet rooms. Suitable for medium-power optical microscopes (100X) and other equipment of low sensitivity.
VC-A	66	Adequate for medium- to high-power optical microscopes (400X), microbalances, optical balances, and similar specialized equipment.
VC-B	60	Adequate for high-power optical microscopes (1000X), inspection and lithography equipment to 3-micron line widths.
VC-C	54	Appropriate for most lithography and inspection equipment to 1-micron detail size.
VC-D	48	Suitable in most instances for the most demanding equipment, including electron microscopes operating to the limits of their capability.
VC-E	42	The most demanding criterion for extremely vibration-sensitive equipment.

Source: Federal Railroad Administration, 2012
[1] As measured in 1/3-octave bands of frequency over the frequency range 8 to 80 Hertz
Lv = velocity level in decibels
VdB = vibration decibels



Source: FRA, 2012

Figure 3-4 Federal Railroad Administration Detailed Ground-Borne Vibration Impact Criteria

3.2.1.2 Existing Vibration Conditions

One factor not incorporated in the criteria is how to account for existing vibration. In most cases, except near railroad tracks, the existing environment does not include a substantial number of perceptible ground-borne vibration or noise events. However, HSR projects commonly use parts of existing rail routes. The criteria given in Table 3-10 and Table 3-11 do not indicate how to account for existing vibration, a common situation for HSR projects using existing rail rights-of-way. Methods of handling representative scenarios include the following:

- **Infrequently Used Rail Route:** Use the vibration criteria from Table 3-10 and Table 3-11 when the existing rail traffic consists of four or fewer trains per day.

- **Moderately Used Rail Route:** If the existing rail traffic consists of 5 to 12 trains per day with vibration that substantially exceeds the impact criteria, there would be no effect as long as the project vibration levels estimated using the procedures outlined in either Chapters 8 or 9 of the FRA guidelines are at least 5 vibration decibels (VdB) less than the existing vibration. Vibration from existing trains could be estimated using the General Assessment procedures in Chapter 8 of the FRA guidelines; however, measuring vibration from existing train traffic is usually preferable.
- **Heavily Used Rail Route:** If the existing traffic exceeds 12 trains per day and if the project would not substantially increase the number of vibration events (less than doubling the number of trains is usually considered not substantial), there would be no additional effect unless the project vibration, estimated using the procedures of Chapters 8 or 9 of the FRA guidelines, would be higher than the existing vibration. In locations where the new trains would be operating at much higher speeds than the existing rail traffic, the high-speed trains would likely generate substantially higher levels of ground-borne vibration. When the project would cause vibration more than 5 VdB greater than the existing source, the existing source can be ignored and the vibration criteria in Table 3-10 and Table 3-11 can be applied to the project.
- **Moving Existing Tracks:** Another scenario where existing vibration can be substantial is a new HSR line within an existing rail right-of-way that requires shifting the location of existing tracks. Where the track relocation would cause higher vibration levels at sensitive receptors, the projected vibration levels from both rail systems must be compared to the appropriate impact criterion to determine if there would be a new effect. If an effect were judged to have existed prior to moving the tracks, new effects would be assessed only if the relocation would result in more than a 3 VdB increase in vibration level. Although the impact thresholds given in Table 3-10 and Table 3-11 are based on experience with vibration from rail transit systems, the thresholds can be applied to freight train vibrations as well. However, locomotive and rail car vibration should be considered separately. Because locomotive vibration only lasts for a few seconds, the infrequent-event limit is appropriate, but for a typical line haul freight train where the rail car vibration lasts for several minutes, the frequent-event limits should be applied to the rail car vibration. Some judgment must be exercised to make sure that the approach is reasonable. For example, some spur rail lines carry very little rail traffic (sometimes only one train per week) or have short trains, in which case the infrequent-event limits are appropriate.

3.2.1.3 Federal Transit Administration Guidelines

The FTA guidelines (FTA 2018) form the basis of the FRA guidelines (FRA 2012) and use the same criteria for ground-borne vibration and noise described above in Section 3.1.2.3, Title 21, Chapter 2.5, Subchapter 6, California Code of Regulations.

3.2.2 State and Local

Appendix G, Section XI, Item b, of the *CEQA Guidelines* refers to potential vibration impacts. CEQA does not list specific standards, but it allows the use of standards developed for a given industry. In this case, the most detailed vibration criteria and impacts are included in the FTA methodology; these criteria and impacts are listed in Table 3-10 through Table 3-12.

3.2.2.1 County of Los Angeles

The County of Los Angeles Noise Ordinance, Section 12.08.350, states, “operating or permitting the operation of any device that creates vibration that is above the vibration perception threshold of any individual at or beyond the property boundary of the source if on private property, or at 150 feet (46 meters) from the source if on a public space or public right-of-way is prohibited. The perception threshold shall be a motion velocity of 0.01 in/sec over the range of 1 to 100 Hertz.”

3.2.2.2 City of Burbank

The City of Burbank has not adopted specific thresholds for ground-borne vibration impacts. The city defers to the FTA vibration impact thresholds for sensitive buildings to determine whether ground-borne vibration would be excessive. Ground-borne vibration of more than 100 VdB is considered to have the potential to cause structural damage.

4 METHODS FOR EVALUATING EFFECTS

The evaluation of impacts on noise and vibration resources is a requirement of NEPA and CEQA. Evaluation of noise and vibration effects is a requirement of the Noise Emission Compliance Regulation adopted by U.S. Environmental Protection Agency, the California Noise Control Act of 1973 (California Health and Safety Code, § 46010 et seq.), CEQA, NEPA, and the following procedures:

- The methods and criteria for evaluating high-speed ground transportation noise and vibration impacts are found in FRA's *High-Speed Ground Transportation Noise and Vibration Impact Assessment* (FRA 2012).
- The methods and criteria for evaluating non-high-speed transit noise and vibration impacts (e.g., ancillary facilities, stations, maintenance facilities, and construction) are found in the FTA's *Transit Noise and Vibration Impact Assessments* (FTA 2018).
- The criteria for roadway noise impacts (relevant to the extent HSR causes changes in traffic patterns) are included in the FHWA's *Procedures for Abatement of Highway Traffic Noise and Construction Noise* (23 C.F.R. Part 772). The FHWA procedures are implemented as defined by the Caltrans *Traffic Noise Analysis Protocol for New Highway Construction, Reconstruction, and Retrofit Barrier* (Caltrans 2011). The FHWA requires each state to write its own noise policy, based upon the FHWA's *Highway Traffic Noise: Analysis and Abatement Guidance* (FHWA 2011). The state policy must address the issues of (1) required noise reduction needed for a wall to be reasonable, (2) cost of a reasonable wall, and (3) noise level reduction required for a receiver to be considered benefitted. The Caltrans *Traffic Noise Analysis Protocol for New Highway Construction, Reconstruction, and Retrofit Barrier* addresses these issues. Caltrans *Technical Noise Supplement to the Traffic Noise Analysis Protocol* (Caltrans 2013) gives guidance on how Caltrans requires noise measurements, modeling, and barrier analyses to be done. Caltrans Standard Environmental Reference Volume 1 on Noise gives an outline for the noise report.

Noise and vibration measurements collected within the RSA were used to characterize existing conditions at noise- and vibration-sensitive receiver locations, for the purpose of applying FRA and FTA criteria. Project section information was used in noise and vibration models.

Noise and vibration from construction and operation of the project section were analyzed quantitatively by using guidelines established by FRA and FTA. Project information on the proposed alignment and the conceptual HSR operations was used in noise and vibration models. Field noise and vibration measurements along with professional judgment supplemented the FTA and FRA model methodology.

The FRA guidance manual (FRA 2012) was used as the primary source of guidance for analysis of HSR noise and vibration effects; FTA guidance (FTA 2018) supplemented the FRA guidance. Chapter 5 (Detailed Noise Analysis) of the FRA guidance manual was followed for effects analyses of the project to be carried forward in the project-level EIR/EIS.

For the vibration effects analyses of the project carried forward for environmental analysis, the process presented in Chapter 9 (Detailed Vibration Assessment) of the FRA guidance manual was used at residences, schools, hotels/motels, medical facilities, and other vibration-sensitive receptors.

For non-HSR noise sources, such as stations, maintenance facilities, and construction, the methods described in the FTA guidance manual were used.

For effects analysis, the following thresholds were used in assessing locations with effects:

- FRA noise impact criteria for HSR operation, as shown on Figure 3-1 and Figure 3-2
- FRA detailed vibration analysis impact criteria for HSR operation, as defined in Table 3-10 and Table 3-11
- FRA construction noise impact criteria, as defined in Table 4-8

- FRA construction vibration impact criteria, as defined in Table 4-9
- FHWA NAC for traffic (on roadways affected by the project section)
- FTA noise impact criteria for ancillary and non-HSR noise sources, shown on Figure 3-1 and Figure 3-2

The following sections summarize the RSAs and the methods used to analyze noise and vibration impacts on noise-sensitive areas in the project section.

4.1 Definition of Resource Study Area

RSAs are the geographic boundaries in which the Authority conducted environmental investigations specific to each resource topic. For noise and vibration, the RSAs define the areas in which all environmental investigations specific to noise and vibration are conducted in order to determine the resource characteristics and potential effects of the project section. The boundaries of the RSA extend beyond the project footprint, as the effects analysis focuses on effects of source noise and vibration on sensitive receivers, which are assessed at the receiver. The same RSAs apply to both direct and indirect impacts. Direct impacts consist of increases in noise and vibration as a result of construction activities or HSR operation, while indirect impacts for noise include the HSR Build Alternative's impact on traffic patterns, which indirectly affect noise levels.

To identify potential noise impacts from the HSR Build Alternative, the locations of noise-sensitive receptors were determined by aerial photography, parcel data, and field recognizance. Analysts then conducted ambient noise measurements at 43 sites throughout the noise RSA along the proposed HSR alignment in the Burbank to Los Angeles Project Section. They collected long-term (24-hour) measurements at 26 sites and short-term measurements at 17 sites. They then used the measurement results at these locations to characterize the existing noise conditions at particular receptor locations, as noted in Section 5.3, Existing Noise Conditions.

To identify areas that could be affected by vibration from the HSR Build Alternative, the locations of vibration-sensitive areas (VSA) were determined. Analysts identified 25 VSAs and conducted vibration propagation measurements at nine sites throughout the vibration RSA along the project section to determine the spread of vibration from its source. Propagation measurements are used to determine the movement of sound. Analysts then used the measurement results at these locations to characterize the ground vibration propagation conditions at particular VSAs. Vibration test results are presented in Section 5.4, Existing Vibration Environment.

Table 4-1 provides general definitions and RSA boundary descriptions for noise and vibration resources within the Burbank to Los Angeles Project Section.

Table 4-1 Definition of Resource Study Areas

General Definition	Resource Study Area Boundary
Noise	
Construction and Operations	For direct and indirect noise effects on sensitive receivers, FRA defines the screening distance as 700 feet from the centerline of the rail corridor for steel-wheeled vehicles operating on new or existing track at any speed or frequency in a suburban or non-suburban setting with an unobstructed view (FRA 2012). This is used as the RSA for the noise analysis for rail operation, as elevated track sections may result in an unobstructed view of trains for receivers at this distance from the track. This RSA has been determined based on typical screening distances as defined by FRA and project-specific factors of the project section.
Vibration	
Construction and Operations	• Station RSA: 150 feet from the station boundary, which corresponds to light rail transit sources for residential (Category 2) land use (FTA 2018) • Alignment RSA, including existing railroads: up to 275 feet from the edge of the right-of-way, which corresponds to the maximum screening distance for more than 70 passbys per day in a residential area (FRA 2012)

FRA = Federal Railroad Administration
RSA = resource study area

4.2 Categories of High-Speed Trains

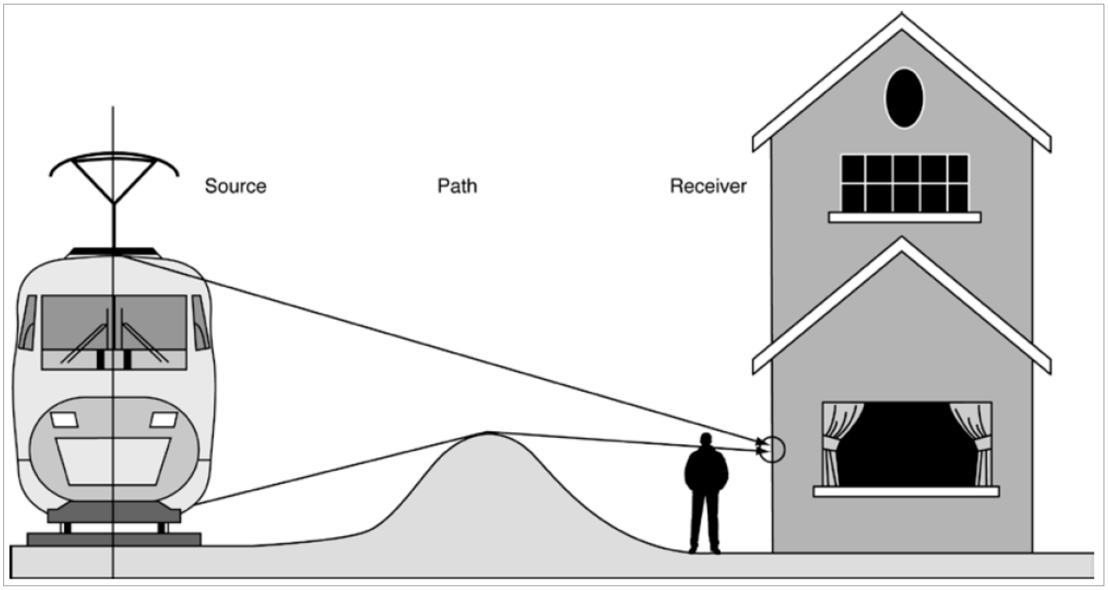
High-speed ground transportation systems include steel-wheeled, electrically powered, or fossil-fueled trains capable of maximum speeds of 90 to 250 mph, as well as magnetically levitated systems capable of maximum speeds of up to 300 mph. Because the noise characteristics of these trains vary considerably as speed increases, the FRA guidelines subdivide these systems into three categories:

- “High-speed,” with a maximum speed of 150 mph
- “Very high-speed,” with a maximum speed of 250 mph
- “Maglev,” magnetically levitated and powered systems representing the upper range of speed performance up to 300 mph

The project section would involve steel-wheeled, electrically powered trains. Maximum train speeds would approach 125 mph, thus, trains in this project section would be operating in the “high-speed” category.

4.3 Noise Prediction Components

Noise from high-speed trains can be evaluated in terms of a Source-Path-Receiver framework, as illustrated on Figure 4-1, in which the source of noise is a train moving on its tracks. The path describes the intervening course between the source and the receiver, wherein the noise levels are reduced by distance, topographical and built obstacles, reflections from surfaces, atmospheric effects, and other factors. At each receiver, the noise from all sources and source paths combines and composes the noise environment at that location.



Source: Federal Railroad Administration, 2012

Figure 4-1 Source-Path-Receiver Framework

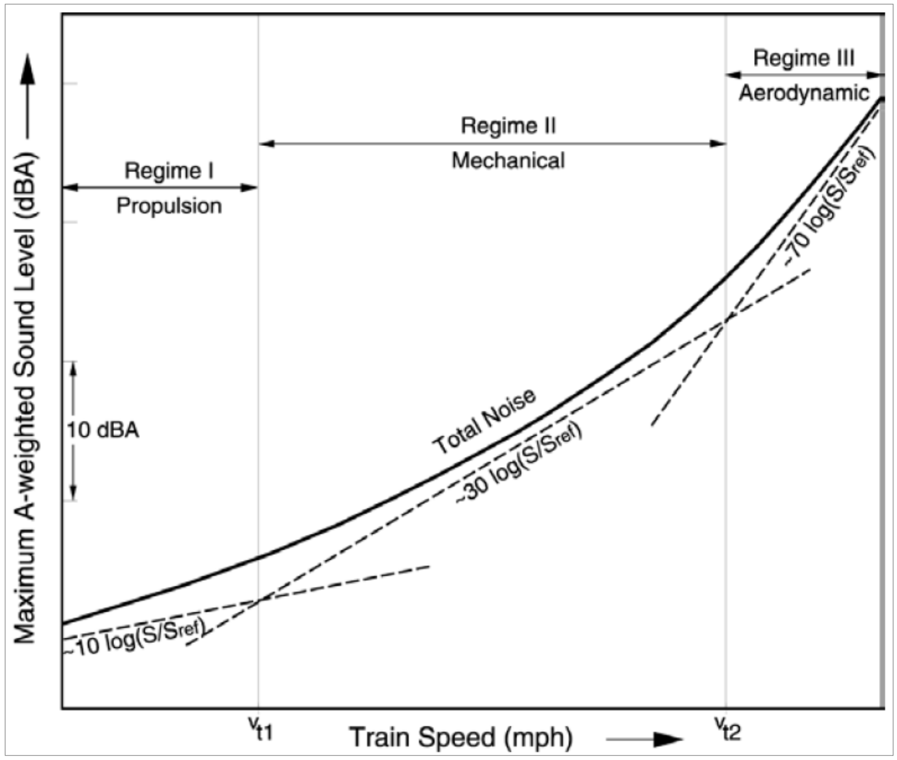
4.3.1 Sources of High-Speed Rail Noise

Three individual noise mechanisms generate noise levels at a nearby noise-sensitive receiver as the train passes by. The three mechanisms are all dependent on source location, noise level, frequency content, directivity, and speed. These three mechanisms are as follows:

- **Regime I:** Propulsion or machinery noise
- **Regime II:** Mechanical noise resulting from wheel/rail interactions or guideway vibrations
- **Regime III:** Aerodynamic noise resulting from airflow moving past the train

Three different regimes are involved in predicting noise levels because certain regimes dominate the overall noise level depending on the previously mentioned noise components and the speed of the train. For steel-wheeled trains, low speeds are dominated by mechanical noise sources that are involved with the propulsion of the train (Regime I). Internal cooling fans are located near the power units at approximately 10 feet above the rails and dominate noise levels around the frequency spectrum near 1,000 Hertz (kHz) when the train is in motion, while external cooling fans dominate the total noise level when the train is stopped at a station. Wheel interactions with the railway define Regime II. Noise is generated when the steel wheels roll along the rail. In Regime II, the majority of the noise falls into the frequency range from 2 kHz to 4 kHz. A majority of the vibratory effects from high-speed trains results from these interactions. Wheel-rail interactions tend to dominate the A-weighted overall noise levels up to about 160 mph (258 kilometers per hour). After the train reaches 160 mph (258 kilometers per hour), aerodynamic noise (Regime III) begins to become a part of the overall noise level. Substantial contributions to the overall noise level from aerodynamic noise begin at 180 mph (290 kilometers per hour). Noise is generated by the airflow around the train. Discontinuities in the surface along the length of the train and inter-coach gaps are a couple of the structural components that contribute to aerodynamic noise. However, because the maximum operating speed is 125 mph, aerodynamic noise would not be a contributing factor in this project section.

Figure 4-2 illustrates the generalized sound level dependence on speed for the three regimes. V_t represents the speed of the train where the dominant train noise source transitions to another dominant train noise source. V_{t1} is the speed where the dominant noise source transitions from propulsion to wheel-rail interaction. V_{t2} is the speed where the dominant noise source transitions from wheel-rail interaction to aerodynamic noise.



Source: Federal Railroad Administration, 2012

Figure 4-2 Regime Sound Level Dependence on Speed

4.3.2 Operating Conditions

Project implementation operating conditions are important in determining peak hour noise levels, hourly L_{eq} values, and L_{dn}/CNEL values at noise-sensitive receivers. The values from Table 4-2 are used only as reference values in helping to determine the predicted project section sound exposure level (SEL) values. Once the appropriate system category and reference quantities are established, the following input parameters are required to adjust each reference SEL to the appropriate project section operating conditions:

- Number of passenger cars in the train, N_{cars} = 0 for this project section (all cars are powered)
- Number of power units in the trains, N_{power} = 8 for this project section (high-speed electric-powered multiple unit power units)
- Length of one passenger car, $ulen_{car}$ (not applicable for this project section)
- Length of one power unit, $ulen_{power}$ = 82.5 feet (high-speed electric-powered multiple unit vehicles)
- Train speed in miles per hour, S (varies by location, with maximum of 90 mph)

Table 4-2 Source Reference Sound Exposure Levels at 50 Feet

System Category	Sub-Source Component	Sub-Source Parameters		Reference Quantities			
		Length Definition, len	Height Above Rails (feet)	SELref (dBA)	Lenref (feet)	Sref (mph)	K
HS EMU	Propulsion	len_{power}	2	86	634	--[1]	--[1]
	Wheel-rail	len_{train}	1	91	634	90	20
VHS EMU	Propulsion	len_{power}	2	86	634	--[1]	--[1]
	Wheel-rail	len_{train}	1	91	634	90	20
	Aero: train nose	len_{power}	10	89	73	180	60
	Aero: wheel region	len_{train}	5	89	634	180	60
	Aero: pantograph	--	15	86	--[2]	180	60

Source: Federal Railroad Administration, 2012

The SELref values provided in the table are for ballast tracks. For concrete slab tracks, SELref values for propulsion, wheel-rail, aero train nose, and aero wheel region are increased by 3 dBA, as provided by the Authority.

[1] Source level is not adjusted for train speed; hence, K=0.

[2] Source level is not adjusted for train length.

Aero = aerodynamic

dBA = A-weighted decibels

HS EMU = high-speed electric-powered multiple unit, maximum speed is 150 mph

K = speed adjustment factor

len_{power} = length of power car

len_{train} = length of train

Lenref = referenced source length

mph = miles per hour

SELref = sound exposure level reference value

Sref = referenced source speed

VHS EMU = very high-speed, steel-wheeled electric-powered multiple Unit, maximum speed is 250 mph

The following equation is used to adjust each sub-source, *n*, SEL to the project section operating conditions identified above:

$$SEL_n = \left(SEL_{ref}\right)_n + 10\log\left(\frac{len}{len_{ref}}\right)_n + K\log\left(\frac{S}{S_{ref}}\right)_n$$

The consistent adjustment in the above equation is reflected in the "10 log(len/len_{ref})" term, where *len* represents the sub-source length (len_{power}, len_{train}) specified in Table 4-2. These variables are defined as:

$$len_{power} = N_{power} \times ulen_{power}$$

and

$$len_{train} = \left(N_{power} \times ulen_{power}\right) + \left(N_{cars} \times ulen_{car}\right).$$

The speed adjustment is given by the "K log(S/S_{ref})" term, using the appropriate value for *K* in Table 4-2.

Finally, the hourly L_{eq} and L_{dn} values at a reference distance of 50 feet are calculated based on the reference SEL and the volume of train traffic. For this project section, the train volumes, hours of operation, and headways were based on the timetable information provided by the project team. In addition, the changes in noise caused by the project-related relocation of freight tracks within the right-of-way were evaluated based on the changes in distance between the freight tracks and nearby sensitive receptors using FRA methodology.

4.3.3 Propagation of Noise to Receivers

The propagation, or spread, of noise from the three HSR sub-sources depends on several key components, which pertain to the specific noise exposure versus distance relationship. The propagation characteristics between each sub-source and each receiver must be determined. Using these characteristics, an SEL-distance relationship for each sub-source is made. Final adjustments are then made to the SEL-distance relationship due to terrain, shielding, or any other propagation path intervening features.

The distance between each sub-source on the high-speed train and noise-sensitive receivers have a unique relationship pertaining to how the noise levels attenuate over a given distance. Sound levels naturally attenuate over distance. Figure 4-3 shows the attenuation over distance for both point sources and line sources from a high-speed train. For point sources, noise levels are attenuated by 6 dB per doubling of distance. Each sub-source on the HSR radiates individually as a point source. Most of the individual sub-sources on the high-speed train are in a linear arrangement and act as line sources. Noise levels from line sources attenuate by 3 dB per doubling of distance for L_{eq} values and L_{dn} values and 3 dB to 6 dB per doubling of distance for maximum sound level (L_{max}) values. The amount of attenuation for L_{max} values is dependent upon the length of the train. Once the distance from the noise source to the noise-sensitive receiver is equal to that of the length of the train, the L_{max} values attenuate by 6 dB per doubling of distance, as illustrated in Figure 4-3.

The cross-section geometry between the sub-source and the receiver is an important aspect in determining the SEL-distance relationship. More attenuation due to ground absorption will occur as the distance between the sub-source and receiver increases. The heights of both the receivers and the sub-sources, and their relation to each other and the ground, are all relevant to the propagation path and SEL-distance relationship. The amount of attenuation due to ground absorption from sub-source to noise-sensitive receiver is dependent upon the direct line of sight from one to the other and the average height between the two. As the average height decreases, the ground will absorb more noise generated by propulsion sub-sources and wheel-rail interaction. Ground absorption does little to attenuate aerodynamic noise. The following equations illustrate how to determine the effect of ground attenuation on the noise propagation path. H_{eff} represents the average path height between the sub-source and the noise-sensitive receiver. *G* represents the ground factor. For hard ground, there is no noise attenuation due to ground absorption.

For soft ground:

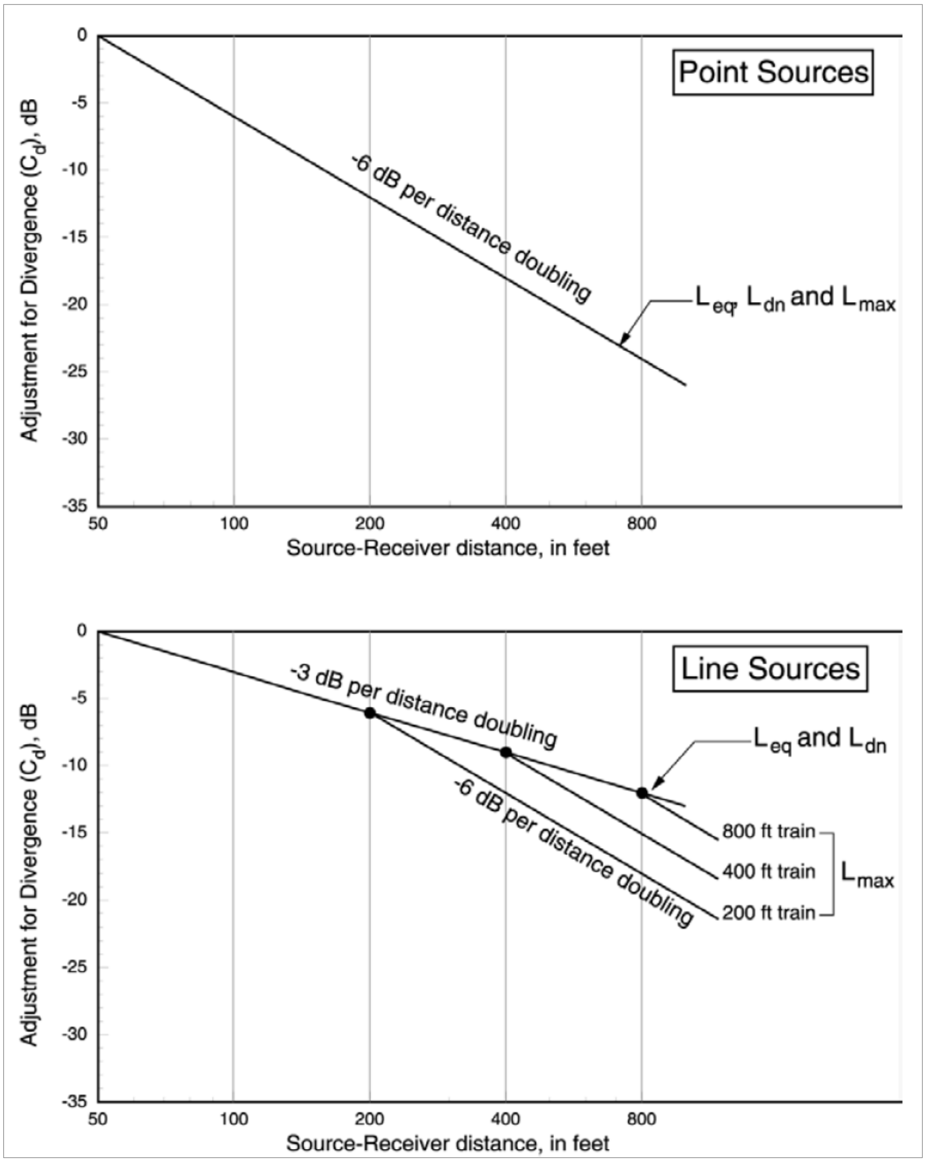
$$G = \begin{cases} 0.66 & H_{eff} < 5 \\ 0.75\left(1 - \dfrac{H_{eff}}{42}\right) & 5 < H_{eff} < 42 \\ 0 & H_{eff} > 42 \end{cases}$$

For hard ground:

$$G = 0$$

Shielding due to the terrain and due to the introduction of noise barriers are two important components in determining the propagation of noise to noise-sensitive receivers. If a line of sight exists from a sub-source on the HSR to a noise-sensitive receiver, the ground factor becomes more critical in determining the amount of attenuation over a given distance. Once the line of sight is broken, additional attenuation will be accrued. The line of sight may be broken because of intervening noise barriers and uneven terrain features in the natural topography, which allow for shielding along the noise propagation path.

An SEL versus distance relationship can be established for the three sub-sources from the HSR. Using the distance from each sub-source to the noise-sensitive receiver, the amount of ground absorption, the amount of attenuation provided by intervening noise barriers, and the amount of attenuation provided by shielding due to natural topography, the total noise exposure at specific noise-sensitive receivers can be determined.



Source: FRA, 2012

Figure 4-3 Attenuation Due to Distance (Divergence)

4.3.4 Benchmark Test to Validate Noise Prediction Modeling

In order to calculate the future noise level from proposed HSR operations, the noise parameters and equations within the protocol (FRA 2012) needed to be compiled into a useable, coded noise model. During the development of the noise model, the environmental program manager for the Authority distributed a series of input parameters and output results against which the noise model could be compared for accuracy. The input parameters included operational assumptions (length of train, number of trains during daytime and nighttime hours, and train speed) as well as a range of site conditions (height of source, height of receiver, and distance to receiver). The results of the analysis were compared to the sample results provided, and the results of these comparisons are presented in Table 4-3 and Table 4-4.

Table 4-3 Comparison of Modeled Results to Reference Results at 100 Miles per Hour (161 kilometers per hour)

100 mph Results and Model Input Parameters Using HS EMU					Modeled Barrier Height (feet)	Barrier to Near Track Distance (feet)	Reference Results			Modeled Results		
Test Case	Receiver Height (feet)	Building Floor	Receiver to Near Track Distance (feet)	Source Ground Height (feet)[1]			L_{dn} (dBA)	Peak-Hour L_{eq} (dBA)	L_{max} (dBA)	L_{dn} (dBA)	Peak-Hour L_{eq} (dBA)	L_{max} (dBA)
1	5	1	100	4	4	6	69.3	69.4	86.7	69.2	69.4	86.6
1	5	1	200	4	4	6	64.9	65.0	79.2	64.8	65.0	79.2
1	5	1	400	4	4	6	60.4	60.5	71.7	60.4	60.5	71.7
1	25	3	100	4	4	6	70.2	70.3	87.6	70.1	70.3	87.6
1	25	3	200	4	4	6	66.3	66.5	80.7	66.3	66.4	80.7
1	25	3	400	4	4	6	62.4	62.5	73.7	62.3	62.5	73.7
2	5	1	100	4	12	21.5	68.2	68.3	87.4	68.4	68.5	87.4
2	5	1	200	4	12	21.5	64.7	64.8	80.4	64.6	64.8	80.4
2	25	3	100	4	12	21.5	70.3	70.4	88.4	70.3	70.4	88.4
2	25	3	200	4	12	21.5	66.3	66.4	81.9	66.3	66.4	81.9
3	5	1	200	60	63	15.5	66.2	66.4	83.5	66.0	66.1	83.3
3	25	3	200	60	63	15.5	67.8	67.9	83.5	67.7	67.8	83.4
4	5	1	200	60	67	15.5	61.0	61.1	78.7	60.7	60.8	78.5
4	25	3	200	60	67	15.5	65.3	65.5	83.0	65.2	65.3	82.9

Source: Federal Railroad Administration, 2012
[1] Height added to each subsource height in Table 4-2.
mph = miles per hour
HS EMU = high-speed electric-powered multiple units
Ldn = day-night sound level
dBA = A-weighted decibels
Leq = equivalent sound level
Lmax = maximum sound level

Table 4-4 Comparison of Modeled Results to Reference Results at 200 Miles per Hour (322 kilometers per hour)

200 mph Results and Model Input Parameters Using VHS EMU					Modeled Barrier Height (feet)	Barrier to Near Track Distance (feet)	Reference Results			Modeled Results		
Test Case	Receiver Height (feet)	Building Floor	Receiver to Near Track Distance (feet)	Source Ground Height (feet)[1]			L_{dn} (dBA)	Peak Hour L_{eq} (dBA)	L_{max} (dBA)	L_{dn} (dBA)	Peak Hour L_{eq} (dBA)	L_{max} (dBA)
1	5	1	100	4	4	6	74.0	74.2	89.3	74.2	74.4	89.2
1	5	1	200	4	4	6	70.3	70.4	84.2	70.4	70.6	84.4
1	5	1	400	4	4	6	66.6	66.7	78.3	66.7	66.9	79.6
1	25	3	100	4	4	6	74.6	74.7	90.0	74.7	74.8	89.7
1	25	3	200	4	4	6	71.0	71.2	85.4	71.2	71.3	85.6
1	25	3	400	4	4	6	67.5	67.6	80.1	67.7	67.8	81.3
2	5	1	100	4	12	21.5	71.3	71.4	89.8	71.4	71.6	90.7
2	5	1	200	4	12	21.5	68.3	68.5	82.7	68.2	68.3	83.7
2	25	3	100	4	12	21.5	73.9	74.0	89.2	73.3	73.5	89.5
2	25	3	200	4	12	21.5	69.6	69.7	84.2	69.1	69.3	85.2
3	5	1	200	60	63	15.5	68.7	68.8	85.8	68.5	68.6	86.6
3	25	3	200	60	63	15.5	70.0	70.1	85.8	69.8	69.9	86.7
4	5	1	200	60	67	15.5	65.2	65.4	81.0	65.0	65.2	81.8
4	25	3	200	60	67	15.5	67.8	67.9	85.4	67.9	68.0	86.2

Source: Federal Railroad Administration, 2012
[1] Height added to each subsource height in Table 4-2
mph = miles per hour
VHS EMU = very high-speed, steel-wheeled electric-powered multiple unit
L_{dn} = day-night sound level, dBA
dBA = A-weighted decibels
L_{eq} = equivalent sound level
L_{max} = maximum sound level

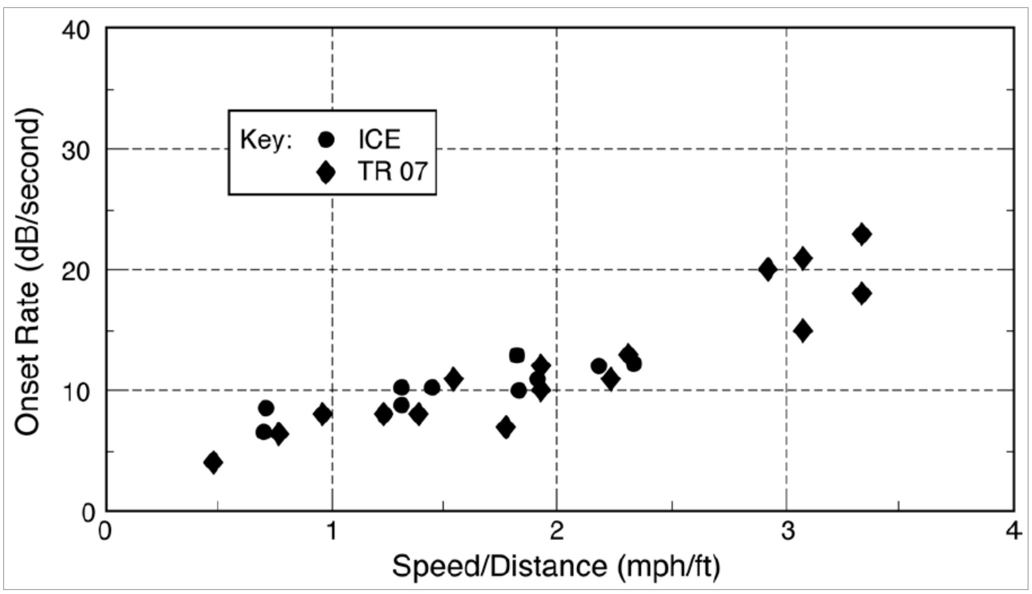
4.3.5 Cumulative Noise Exposure

Cumulative noise exposure refers to the noise exposure of the project section in combination with other past, present, and reasonably foreseeable future projects. Because the FRA project noise assessment is based on a comparison of the existing noise levels (see Section 3.1.1 for information on the noise impact criteria) and the project section noise levels, all past and current projects are already considered, on a cumulative basis, in the existing noise levels and are accounted for in the direct effects of the project section. Other future expansions of rail service are discussed in Section 6.11, Cumulative Effects.

4.4 Annoyance and Startle Effects Due to Rapid Onset Rates

Rapid onset rates due to train noise may cause annoyance and startle effects at human and wildlife noise-sensitive receivers. With very high onset rates, noise-sensitive receivers tend to be startled or surprised by the sudden approaching sound. The *onset rate* is defined as the average rate of change of increasing sound pressure level in decibels per second during a single noise event. The duration of such an event is short (a few seconds depending on the length of the train). For purposes of analyzing noise effects, a single noise event is a single train pass-by. As a high-speed train approaches a noise-sensitive receiver, the noise level will suddenly increase.

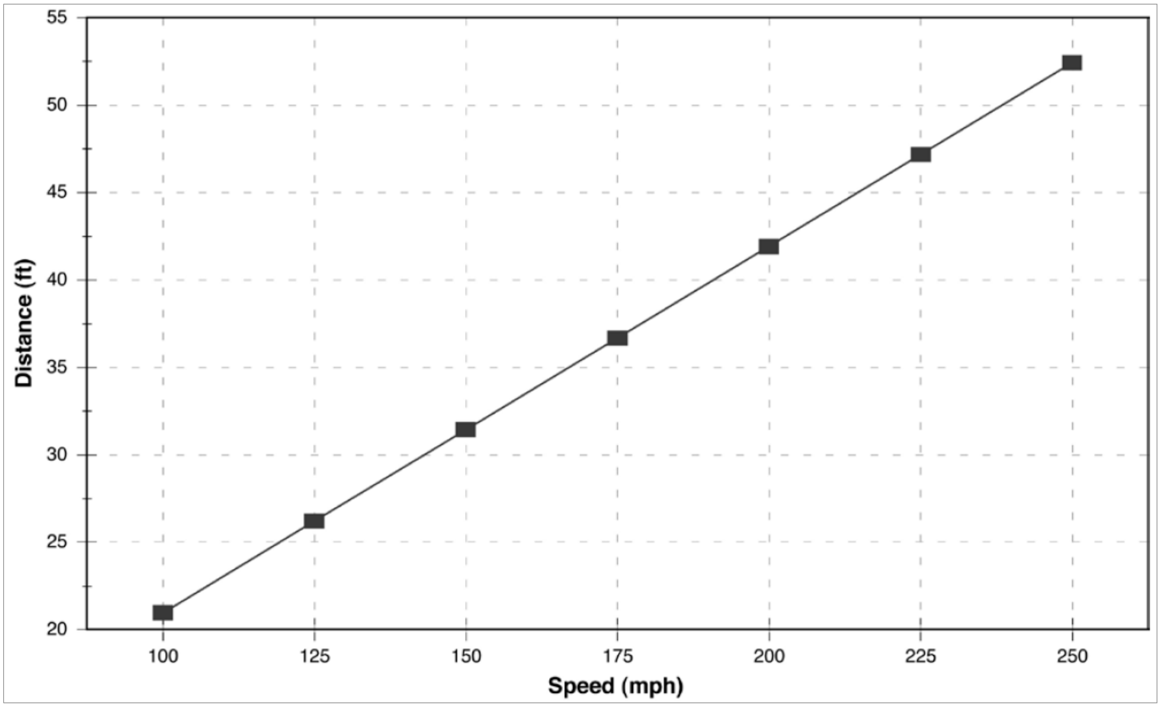
In 1992, the U.S. Air Force studied aircraft noise annoyance and startle response. FRA used the completed research to develop a distance versus level chart for which startle effects can occur. Figure 4-4 represents the collected data by the U.S. Air Force. The x-axis is calculated by dividing the speed of the HSR by the distance to the receiver. The y-axis is the onset rate with that speed-distance relationship. The “ICE” points represent Germany’s Inter-City Express and are measured steel-wheeled high-speed train events, and “TR 07” points represent Germany’s Transrapid and are measured magnetically levitated vehicle train events. Figure 4-4 shows that onset rates at noise-sensitive receivers increase as speeds increase and onset rates increase as the distance between the train and noise-sensitive receiver is reduced. For a given speed, onset rates decrease as the distances from the trains to the noise-sensitive receivers increase.



Source: Federal Railroad Administration, 2012

Figure 4-4 Measured High-Speed Rail Onset Rates

Figure 4-5 illustrates the distance versus speed relationship for rapid onset rates. The distance (in feet) represents the distance at which a startle response can occur at a human noise-sensitive receiver if the area being analyzed is open, flat terrain with an unobstructed view of the tracks.



Source: Federal Railroad Administration, 2012

Figure 4-5 Distance from Tracks within Which Human Surprise Can Occur for High-Speed Rail

There is no adopted onset rate at which wildlife will be annoyed by high-speed trains.

4.5 Noise Impacts on Wildlife Noise-Sensitive Receivers

The effect of noise on wildlife involves a number of parameters, but one of the most apparent is the potential for masking of communication. Wildlife depends on calls and song for species identification, mate attraction, and territorial defense. Hearing in all forms of wildlife is not analogous to hearing in mammals. For example, birds show a high degree of frequency selectivity and vocalize in a much higher frequency range than most rail noise produces.

Studies have evaluated the potential for masking of bird song by traffic noise and recommended that continuous noise levels above 60 dBA L_{eq} within habitat areas may affect the suitability of habitat use (SANDAG 1988). Many regulatory agencies recommend that 60 dBA L_{eq} hourly levels be considered an effect at the edge of suitable habitat.

Recent research has indicated that SEL values at wildlife noise-sensitive receivers are a very useful indicator of what type of response to expect from specific types of wildlife. Table 4-5 lists 100 dBA SEL for all domestic and wild birds and mammals as an effective criterion level for determining effects as the result of a train pass-by. All domestic and wild birds and mammals near the project section alignment may be affected by train passbys if the animals are subjected to SEL values of 100 dBA or higher.

Some animals may become habituated to higher noise levels and may exhibit reduced response to noise after prior exposure. There is no developed general criterion level or threshold for habituation.

Table 4-5 Federal Railroad Administration Interim Criteria for Train Noise Effects on Animals

Animal Category	Class	Noise Metric	Noise Level (dBA)
Domestic	Mammals (Livestock)	SEL	100
	Birds (Poultry)	SEL	100
Wild	Mammals	SEL	100
	Birds	SEL	100

Source: Federal Railroad Administration, 2012
SEL = sound exposure level
dBA = A-weighted decibels

Wildlife responses to noise are species dependent. Their responses to noise are dependent upon the same components as any other noise-sensitive receiver, but each animal's responses and thresholds are unique enough that noise standards cannot be established. The duration of the noise, type of noise, and level of existing ambient noise weigh differently upon the type of response to expect from individual species. The types and locations of wildlife along the proposed alignment have not been identified, but wildlife may be affected by the project section if the wildlife is near the project alignment.

4.6 Maintenance Facilities

As described above in Section 2.4, the California HSR System includes four types of maintenance facilities: MOIFs, MOISs, heavy maintenance facilities, and LMFs. The design and spacing of maintenance facilities along the HSR system do not require the Burbank to Los Angeles Project Section to include any of the maintenance facilities within the limits of the project section.

4.7 Stations

The FTA *Transit Noise and Vibration Impact Assessment* (FTA 2018) establishes screening distances for stations. Stations are proposed near Hollywood Burbank Airport and at LAUS, along with proposed modifications to the existing LAUS associated with the HSR. Only a General Noise Assessment can be made because the HSR operations at the stations have not been defined at this time.

Some of the major noise sources at the station would include signal horns, a public address system, locomotives idling, and other site-specific activities.

4.8 Detailed Vibration Assessment

The vibration effect analysis of the project section was conducted based on the methodology presented in Chapter 9 (Detailed Vibration Assessment) of the FRA guidance manual. A FRA Detailed Vibration Assessment consists of:

- Surveying the existing vibration conditions (vibration propagation testing only). The existing vibration levels are not included as a part of the assessment methodology for FRA. Additionally, access was not available to measure existing vibration levels for this project.
- Predicting future vibration and vibration effects
- Developing mitigation measures (mitigation measures are to be included as part of the Noise and Vibration section of the EIR/EIS)

4.8.1 Surveying the Existing Vibration Conditions

At the time of this study, access was limited to public rights-of-way; therefore, direct measurements of existing train vibration levels were not possible.

Ground-borne vibration tests were performed at representative locations adjacent to the project alignment to determine the vibration transmission characteristics of the ground near vibration-sensitive locations. The vibration propagation test procedure is shown schematically on Figure 4-6. An instrumented hammer was used to generate impulses at specific locations spaced 15 feet apart along a line on or parallel to the proposed alignment. A line of accelerometers was placed perpendicular to the line of impacts as shown in the figure. The relationship between the input force and the resulting vibration measured by the accelerometers, called the *transfer mobility*, was calculated from the measured data. The transfer mobility represents the vibration propagation characteristics of the ground at the measurement site and at other sites with similar geology.

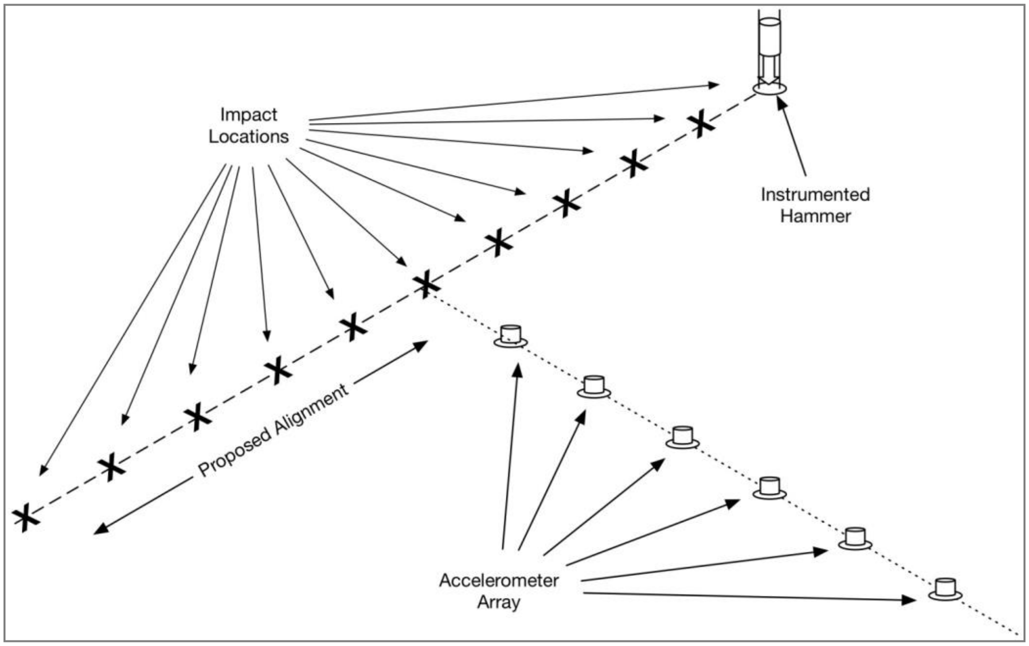


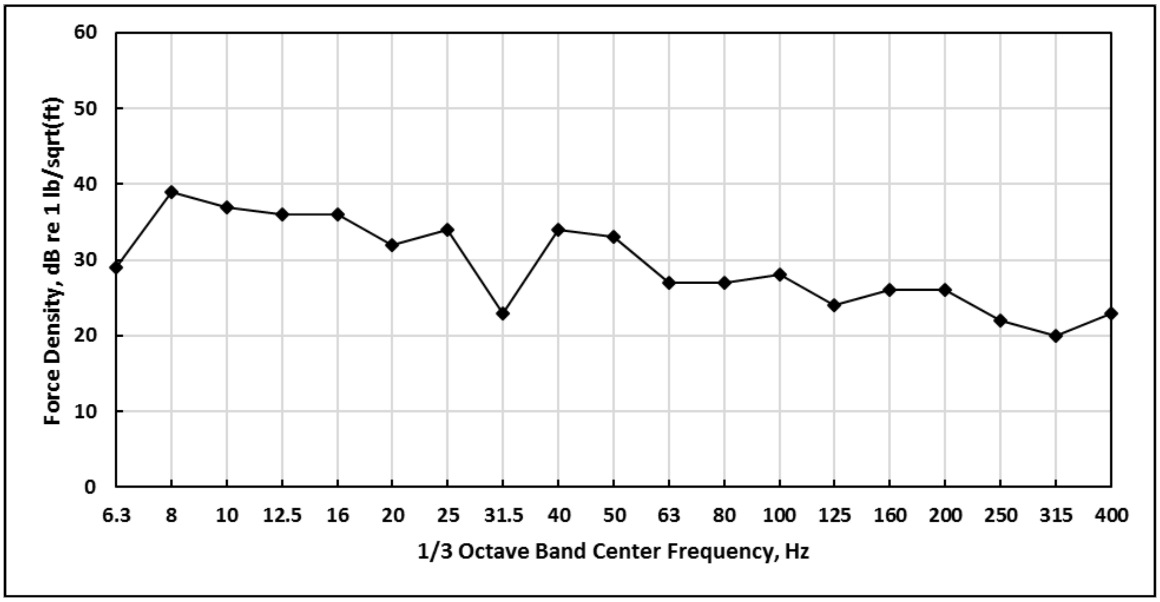
Figure 4-6 Vibration Propagation Measurement Schematic

For the data analysis, the following steps were used to calculate the transfer mobility at each measurement site:

- Narrow-band transfer functions for each accelerometer/force pair were computed using custom software. Numerical integration was used to convert the acceleration data into velocity.
- The narrow-band data were converted to one-third-octave band data.
- Numerical integration was used to convert the measured point-source transfer mobility data into line-source transfer mobilities.
- For each one-third-octave band, linear or quadratic regression was used to determine smoothed estimates for each line-source transfer mobility as a function of distance from the source.

4.8.2 Predicting Future Vibration and Vibration Impacts

Ground-borne vibration levels from HSR operations were projected using the detailed vibration assessment prediction methods included in the FRA guidance manual (Chapter 9, Detailed Vibration Assessment). The train vibration source level was based on the force density level for the Pendolino electric-powered multiple unit high-speed train as reported in Figure 9-5 of the FRA guidance manual and shown on Figure 4-7. This force density spectrum was combined with the line-source transfer mobility data at each vibration measurement site to project section ground vibration levels from future HSR operations using the FRA detailed vibration analysis methodology.



Source: Federal Railroad Administration, 2012

Figure 4-7 Force Density for Pendolino Electric-Powered Multiple Unit High-Speed Train at 150 Miles per Hour

4.9 Construction Noise and Vibration Methodology

Construction noise and effects are assessed using a combination of the methods and construction source data contained in the FRA manual and the FHWA Roadway Construction Noise Model (FHWA 2006). Typical noise levels generated by representative pieces of equipment are listed in Table 4-6.

The following equation calculates the L_{eq} noise level at a sensitive receiver for an individual piece of construction equipment. This formula was used to estimate the noise contours for all construction activities.

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

where:	$L_{eq}(equip)$	=	L_{eq} at a receiver resulting from the operation of a single piece of equipment over a specified time period
	E.L.	=	noise emission level of the particular piece of equipment at a reference distance of 50 feet
	G	=	constant that accounts for topography and ground effects
	D	=	distance from the receiver to the piece of equipment
	U.F.	=	usage factor that accounts for the fraction of time that the equipment is in use over the specified period of time

The combination of noise from several pieces of equipment operating during the same time period is obtained from decibel addition of the L_{eq} of each single piece of equipment calculated using the above equations.

Table 4-6 Construction Equipment Noise Emission Levels

Equipment	Typical Noise Level (dBA) 50 Feet from Source	Usage Factor, %
Air Compressor	80	40
Backhoe	80	40
Ballast Equalizer	82	50
Ballast Tamper	83	50
Compactor	82	20
Concrete Mixer	85	40
Concrete Pump	82	20
Concrete Vibrator	76	20
Crane, Derrick	88	16
Crane, Mobile	83	16
Dozer	85	16
Generator	82	50
Grader	85	40
Impact Wrench	85	50
Jack Hammer	88	20
Loader	80	40
Paver	85	50
Pile Driver (Impact)	101	20
Pile Driver (Vibratory)	95	20
Pneumatic Tool	85	50
Pump	77	50
Rail Saw	90	20
Rock Drill	85	20
Roller	85	20
Saw	76	20
Scarifier	83	20
Scraper	85	40
Shovel	82	40
Spike Driver	77	20

Equipment	Typical Noise Level (dBA) 50 Feet from Source	Usage Factor, %
Tie Cutter	84	20
Tie Handler	80	20
Tie Inserter	85	20
Truck	84	40

Sources: Federal Railroad Administration, 2012; Federal Highway Administration, 2006
dBA = A-weighted decibels

Construction vibration is assessed for areas where there is potential for effects from construction activities. Such activities include blasting, pile driving, demolition, and drilling or excavation close to sensitive structures. Typical vibration levels generated by representative pieces of equipment are listed in Table 4-7.

Table 4-7 Vibration Source Levels for Construction Equipment

Equipment		PPV at 25 Feet (in/sec)	Approximate Lv[1] at 25 Feet
Pile Driver (impact)	upper range	1.518	112
	typical	0.644	104
Pile Driver (vibratory)	upper range	0.734	105
	typical	0.170	93
Clam shovel drop (slurry wall)		0.202	94
Hydromill (slurry wall)	in soil	0.008	66
	in rock	0.017	75
Vibratory roller		0.210	94
Hoe ram		0.089	87
Large bulldozer		0.089	87
Caisson drilling		0.089	87
Loaded trucks		0.076	86
Jackhammer		0.035	79
Small bulldozer		0.003	58

Source: Federal Railroad Administration, 2012
[1] Root mean square velocity in vibration decibels re 1 micro-inch per second
PPV = peak particle velocity
in/sec = inch per second
Lv = velocity level in decibels

The following equation is used to determine if there would be vibration effects at sensitive receivers as a result of construction activities:

$$PPV_{equip} = PPV_{ref} \times \left(\frac{25}{D}\right)^{1.5}$$

where: PPV_{equip} = the peak particle velocity, in inches per second, of the equipment, adjusted for distance

PPV_{ref} = the reference vibration level in inches per second at 25 feet

D	=	the distance from the equipment to the receiver (in feet)

Vibration due to construction activities can also cause annoyance or interference with vibration-sensitive activities at sensitive receiver locations. The ground-borne vibration criteria for different land use categories are found in Table 3-11 and Table 3-12. Annoyance caused by vibration from construction activities can possibly occur at sensitive receivers.

In addition, the equation used to estimate the RMS vibration level (L_v) at any distance (D) is provided. The calculated level is then compared to the criteria found in Table 3-11 and Table 3-12 to determine if vibration levels would result in annoyance or interference with vibration-sensitive activities at sensitive receivers.

$$L_v(D) = L_v(25\,ft) - 30\log\left(\frac{D}{25}\right)$$

where:	$L_v(D)$	=	RMS vibration level at a given distance (in feet)
	Lv(25 feet)	=	RMS vibration level at 25 feet
	D	=	the distance from the equipment to the receiver (in feet)

4.9.1 Construction Noise Criteria

There are no standardized construction noise criteria from the FTA or FRA for assessing noise effects at sensitive receivers due to construction. The FTA and FRA Guidance Manuals do outline general assessment and detailed assessment criteria if local ordinances and standards are not adequate. The "reasonable guidelines" established by FRA are deliberately conservative in order to avoid adverse community reaction.

Table 4-8 shows the FRA noise guidelines for construction. The last column applies to construction activities that extend over 30 days near any given receiver. L_{dn} is used to assess effects in residential areas and 24-hour L_{eq} is used in commercial and industrial areas. The 8-hour L_{eq} and the 30-day average L_{dn} noise exposure from construction noise calculations use the noise emission levels of the construction equipment, their locations, and operating hours. The construction noise limits are normally assessed at the noise-sensitive receiver property line.

Table 4-8 Federal Railroad Administration Construction Noise Assessment Criteria

Land Use	8-Hour L_{eq} (dBA)		L_{dn} (dBA)
	Day	Night	30-Day Average
Residential	80	70	75
Commercial	85	85	80[1]
Industrial	90	90	85[1]

Source: Federal Railroad Administration, 2012
[1] 24-hour L_{eq}, not L_{dn}
dBA = A-weighted decibels
L_{eq} = equivalent sound level
L_{dn} = day-night sound level

4.9.2 Construction Vibration Criteria

Guidelines in the FRA guidance manual provide the basis for the construction vibration assessment. FRA provides construction vibration criteria designed primarily to prevent building damage, and to assess whether vibration might interfere with vibration-sensitive building activities or temporarily annoy building occupants during the construction period. The FRA criteria include two ways to express vibration levels: (1) RMS VdB for annoyance and activity interference, and

(2) PPV, which is the maximum instantaneous peak of a vibration signal used for assessments of damage potential.

To avoid temporary annoyance to building occupants during construction or construction interference with vibration-sensitive equipment inside special-use buildings, such as a magnetic resonance imaging machine, FRA recommends using the long-term vibration criteria provided above in Section 3.2, Vibration.

Table 4-9 shows the FRA building damage criteria for construction activity; the table lists PPV limits for four building categories. These limits are used to estimate potential problems that should be addressed during final design.

Table 4-9 Federal Railroad Administration Construction Vibration Damage Criteria

Building Category	PPV (inch per second)	Approximate Lv[1]
I. Reinforced concrete, steel, or timber (no plaster)	0.5	102
II. Engineered concrete and masonry (no plaster)	0.3	98
III. Nonengineered timber and masonry buildings	0.2	94
IV. Buildings extremely susceptible to vibration damage	0.12	90

Sources: Federal Transit Administration, 2018, Federal Railroad Administration, 2012
[1] Root mean square vibration level in vibration decibels relative to 1 micro-inch per second.
PPV = peak particle velocity
Lv = velocity level in decibels

4.10 Evaluating Impacts under the National Environmental Policy Act

For the purposes of analysis in this document, FRA and FTA guidelines were used to conduct a detailed assessment for noise and vibration effects at sensitive receivers. Exceedance of recommended limits in the FRA and FTA guidance were assessed to determine effects under NEPA.

Depending on the magnitude of the proposed project's noise increase, the FTA and FRA categorize effects as: (1) no impact, (2) moderate impact, or (3) severe impact. A severe impact is defined as the level at which a significant percentage of people would be highly annoyed by the project's noise. A moderate impact is defined as the point at which the change in the cumulative noise level would be noticeable to most people but may not be sufficient to generate strong, adverse reactions.

For HSR Build Alternative construction and operation actions that would result in severe noise impacts or vibration impacts, feasible mitigation measures are identified to avoid or minimize effects or to compensate for effects. Only after consideration of mitigation measures would NEPA effects be determined.

4.11 Determining Significance under the California Environmental Quality Act

CEQA requires that an EIR identify the significant environmental impacts of a project (State CEQA Guidelines § 15126). One of the primary differences between NEPA and CEQA is that CEQA requires a significance determination for each impact using a threshold-based analysis. By contrast, under NEPA, significance is used to determine whether an EIS will be required; NEPA requires that an EIS is prepared when the proposed federal action (project) as a whole has the potential to "significantly affect the quality of the human environment." The Authority is using the following thresholds to determine if a significant impact on noise and vibration would occur as a result of the HSR Build Alternative. A significant impact is one that would:

- Generate temporary or permanent noise levels in excess of FRA/FTA and FHWA standards for severe noise impacts.

- Generate temporary or permanent ground-borne vibration or ground-borne noise levels exceeding FRA/FTA standards.
- Be located within an airport land use plan area or where such a plan has not been adopted, within 2 miles of a private airstrip, public airport, or public use airport and expose people residing or working in the project area to excessive noise levels.

Of these guidelines, the first two items are applicable to the project and were considered in the analysis presented in this report. The last guideline is included because Hollywood Burbank Airport is located in the RSA. However, because the HSR would be in a tunnel near this small general aviation airport, there would be no increase in noise where the airport generates noise (i.e., at the end of the runway).

CEQA requires that an EIR identify the significant environmental impacts of a project (State CEQA Guidelines § 15126). The Authority is using the following thresholds to determine if a significant impact on noise and vibration would occur as a result of the project section. CEQA thresholds are adapted to applicable FRA and FTA criteria, as described above. Therefore, based on the State CEQA Guidelines, the proposed project would have a significant impact if it would result in either of the following:

- Expose persons to (or generate noise levels in excess of) impact standards for a severe impact established by the FRA for high-speed ground transportation and by the FTA for transit projects and other changes to non-HSR tracks. These standards cover both permanent and temporary/periodic increases in ambient noise levels in the project vicinity above levels existing without the proposed project.
- Expose persons to ground-borne vibration or ground-borne noise levels exceeding FRA standards.

5 AFFECTED ENVIRONMENT

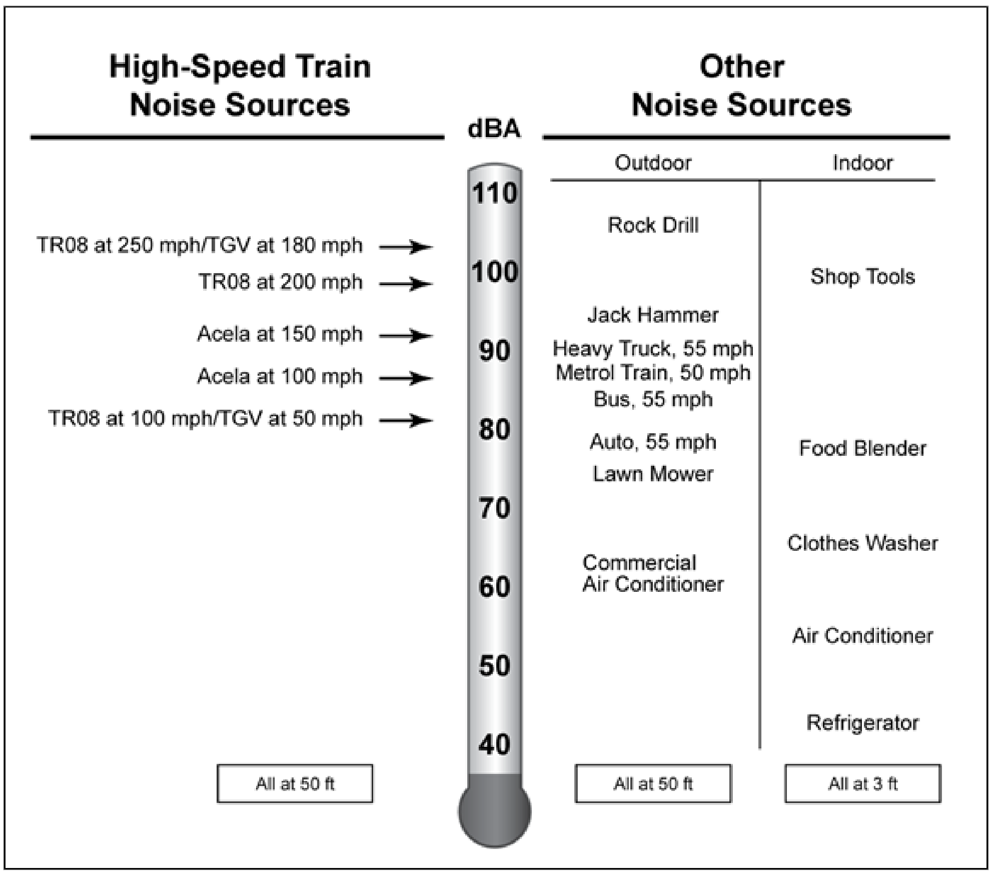
5.1 Key Terms

5.1.1 Noise and Vibration Descriptors

The following subsections identify the basic descriptors and metrics used in this report to quantify noise and vibration and to assess associated effects. Appendix A, Fundamental Concepts of Noise and Vibration for High-Speed Trains, provides further background information regarding the noise and vibration associated with the project section. Much of this information has been adapted from FRA's *High-Speed Ground Transportation Noise and Vibration Impact Assessment* manual (FRA 2012).

5.1.2 Noise Descriptors

The universal descriptor used for environmental noise is the A-weighted sound pressure level measured in decibels (dBA). It describes the level of noise measured at a receiver at any moment in time and is read directly from noise-monitoring equipment, with the weighting switch set on "A." Figure 5-1 shows typical A-weighted sound levels for high-speed ground transportation and other sources. The high-speed ground transportation sources are described further in Appendix A.



Source: FRA, 2012
Acela = Acela Express is Amtrak's high speed train service along the Northeast Corridor in the Northeastern United States between Washington, DC and Boston, MA via 14 intermediate stops including Baltimore, Philadelphia, and New York City.
dBA = A-weighted decibels
TGV = *Train à Grande Vitesse,* French for "High Speed Train"
TR08 = Transrapid International TR08 Maglev System, a transportation system employing magnetic levitation (maglev)

Figure 5-1 Typical A-Weighted Sound Pressure Levels

As shown on Figure 5-1, typical A-weighted sound levels range from 40 dBA to 90 dBA, where 40 dBA represents a quiet sound, like outdoor ambient noise in a rural environment, and 90 dBA represents a loud sound, like a jackhammer at 50 feet (15 meters). Decibels refer to the general strength of the noise. The scale in the figure is labeled “dBA” to denote the way A-weighted sound levels are typically written. The letters “dB” stand for “decibels,” and refer to the general strength of the noise. The letter “A” indicates that the sound has been filtered to reduce the strength of very low- and very high-frequency sounds, much as the human ear does. Without this A-weighting, noise-monitoring equipment would respond more readily to events that people could not hear, such as high-frequency dog whistles and low-frequency seismic disturbances. On average, each A-weighted sound level increase of 10 dB corresponds to an approximate doubling of subjective loudness. A summary of the fundamentals of noise related to high-speed transit is discussed in Appendix A.

This report uses the following single-number descriptors, all based on the A-weighted sound pressure level as the fundamental unit for environmental noise measurements, computations, and assessment:

- **Maximum Instantaneous Noise Level:** L_{max} refers to the maximum observed or recorded noise level during a single noise event or measurement period. There are two standard ways of obtaining the L_{max}: one uses the “fast” response setting on the sound level meter, or $L_{max,\ fast}$ (obtained by using a 0.125-second averaging time), and the other uses the “slow” setting, or $L_{max,\ slow}$ (obtained by using a 1-second averaging time). $L_{max,\ fast}$ can occur arbitrarily and is usually caused by a single component on a moving train, often a defective component such as a flat spot on a wheel. As a result, inspectors from FRA use $L_{max,\ fast}$ to identify excessively noisy locomotives and rail cars during enforcement of Railroad Noise Emission Compliance Regulations. $L_{max,\ slow}$, with a longer averaging time, tends to de-emphasize the effects of non-representative impacts and impulses and is generally better correlated with the SEL, defined below, which is the basis of effects assessment. Therefore, $L_{max,\ slow}$ is typically used for modeling train noise mathematically. In general, however, the L_{max} descriptor in either form is not recommended for noise effects assessment because L_{max} is used in vehicle noise specifications and is commonly measured for individual vehicles.
- **Sound Exposure Level:** SEL refers to a receiver’s cumulative noise exposure from a single noise event. SEL is represented by the total A-weighted sound energy during the event, normalized to a 1-second interval. SEL is the primary descriptor of HSR vehicle noise emissions and an intermediate value in the calculation of both L_{eq} and L_{dn} (defined below).
- **Equivalent Continuous Sound Level:** L_{eq} refers to a receiver’s energy-averaged noise exposure from all events over a specified period (e.g., 1 minute, 1 hour, 24 hours). The L_{eq} for a 1-hour period may be indicated as L_{eq}(1 h) or L_{eq}(h). The Leq value for the 15-hour daytime period (7:00 a.m. to 10:00 p.m.) is described as Lday and the 9-hour nighttime period (10:00 p.m. to 7:00 a.m.) as Lnight. L_{eq} is generally used in this document to report results of short-term noise measurements (usually ranging between 20 minutes and 1 hour). The measured or estimated L_{eq}(1 h) or Lday values are generally used to assess noise effects for nonresidential land uses with daytime-only uses.
- **Day-Night Equivalent Continuous Sound Level:** L_{dn} refers to a receiver’s energy-averaged noise exposure from all events over a 24-hour period with a penalty added for nighttime noise periods. The basic unit used in calculating L_{dn} is the L_{eq}(h) for each 1-hour period. L_{dn} may be thought of as a noise exposure, totaled after increasing all nighttime hourly A-weighted levels (between 10:00 p.m. and 7:00 a.m.) by 10 dB to take into account the increased sensitivity of most people to nighttime noise. Every noise event during the 24-hour period increases this exposure, with louder events increasing the value more than quieter events, and events that are of longer duration increasing the value more than brief events. In this report, L_{dn} is used to assess noise for residential land uses. Typical community L_{dn} values range from between 50 dBA and 70 dBA, where 50 dBA represents a quiet noise environment and 70 dBA a noisy one.

- **Community Noise Equivalent Level:** CNEL is a community noise descriptor frequently used in California. CNEL is calculated in a manner similar to L_{dn}, except with an additional 5 dBA penalty added for evening hours (between 7:00 p.m. and 10:00 p.m.), to take into account residential evening activities. CNEL values are generally within approximately 1 dBA of L_{dn} values measured for the same noise environments.

5.1.3 Vibratory Motion

Vibration is an oscillatory motion, which can be described in terms of displacement, velocity, or acceleration. Because the motion is oscillatory, no net movement of the vibration element happens and the average of any of the motion descriptors is zero. Displacement is the easiest descriptor to understand. For a vibrating floor, the displacement is simply the distance that a point on the floor moves away from its static position. The velocity represents the instantaneous speed of the floor movement and acceleration is the rate of change of the speed.

Although displacement is easier to understand than velocity or acceleration, it is rarely used to describe ground-borne vibration. This is because most transducers used for measuring ground-borne vibration use either velocity or acceleration, and, even more importantly, the response of humans, buildings, and equipment to vibration is more accurately described using velocity or acceleration.

5.1.4 Amplitude Descriptors

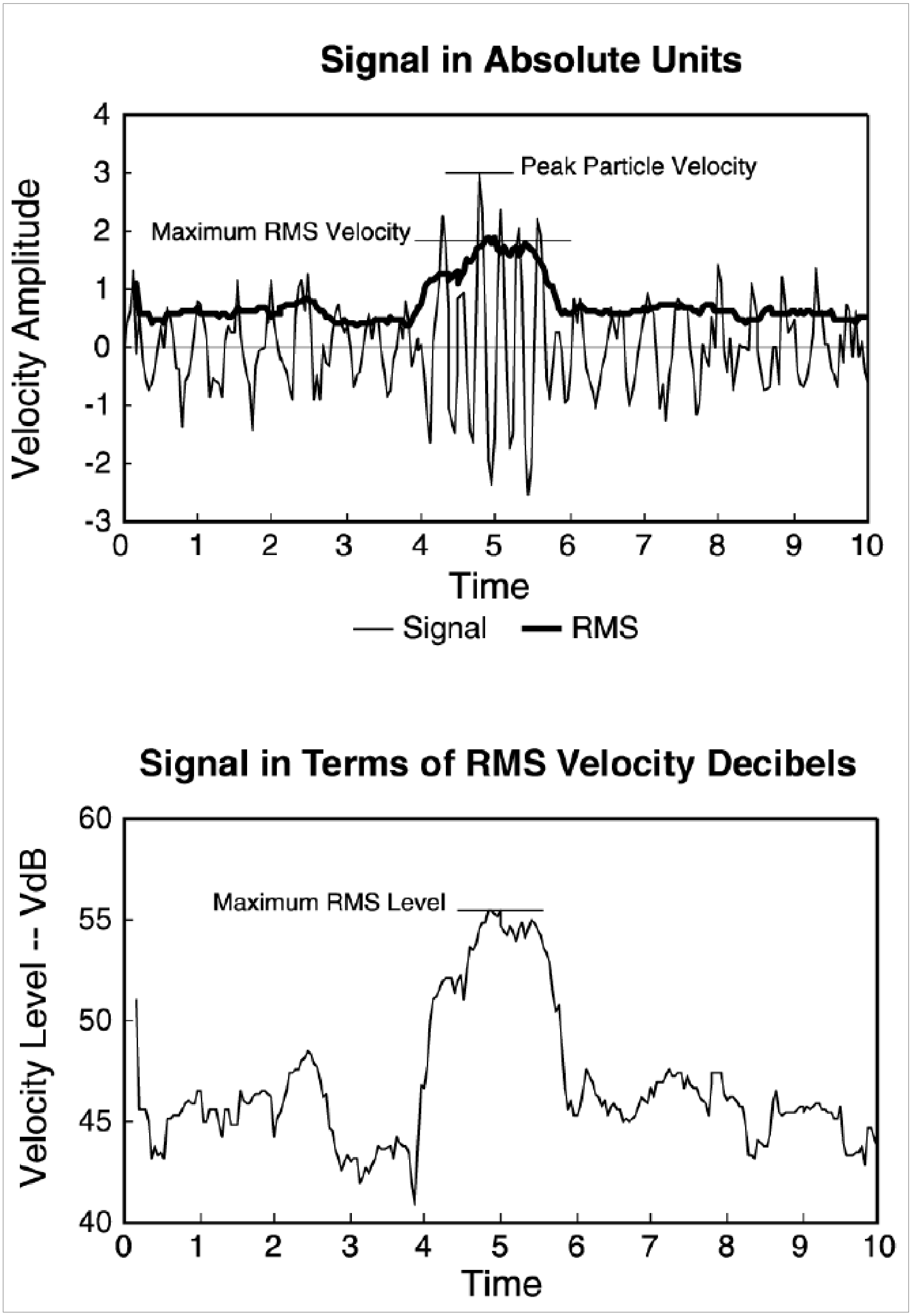
Vibration consists of rapidly fluctuating motions with an average motion of zero. The various methods used to quantify vibration amplitude are shown on Figure 5-2. The raw signal is the lighter-weight curve in the top graph of Figure 5-2. This is the instantaneous vibration velocity, which fluctuates about the zero point. The PPV is defined as the maximum instantaneous positive or negative peak of the vibration signal. PPV often is used in monitoring blasting vibration because PPV is related to the stresses that are experienced by buildings.

Although PPV is appropriate for evaluating the potential of building damage, it is not suitable for evaluating human response. The human body takes time to respond to vibration signals. In a sense, the human body responds to average vibration amplitude. Because the net average of a vibration signal is zero, the RMS amplitude is used to describe the “smoothed” vibration amplitude. The RMS of a signal is the square root of the average of the squared amplitude of the signal. The average is typically calculated over a 1-second period. The RMS amplitude is shown superimposed on the vibration signal on Figure 5-2. The RMS amplitude is always less than the PPV and is always positive. The ratio of PPV to maximum RMS amplitude is defined as the *crest factor* for the signal. The crest factor is always greater than 1.71, although a crest factor of 8 or more is not unusual for impulse signals. For ground-borne vibration from trains, the crest factor is usually 4 to 5.

In the United States, the PPV and RMS velocities are normally described in inches per second. Although not universally accepted, decibel notation is in common use for vibration. Decibel notation serves to compress the range of numbers required to describe vibration. The bottom graph on Figure 5-2 shows the RMS curve of the top graph expressed in decibels. The vibration velocity level in decibels is defined as follows:

$$L_v = 20 \times \text{Log}_{10} (v/v_{ref})$$

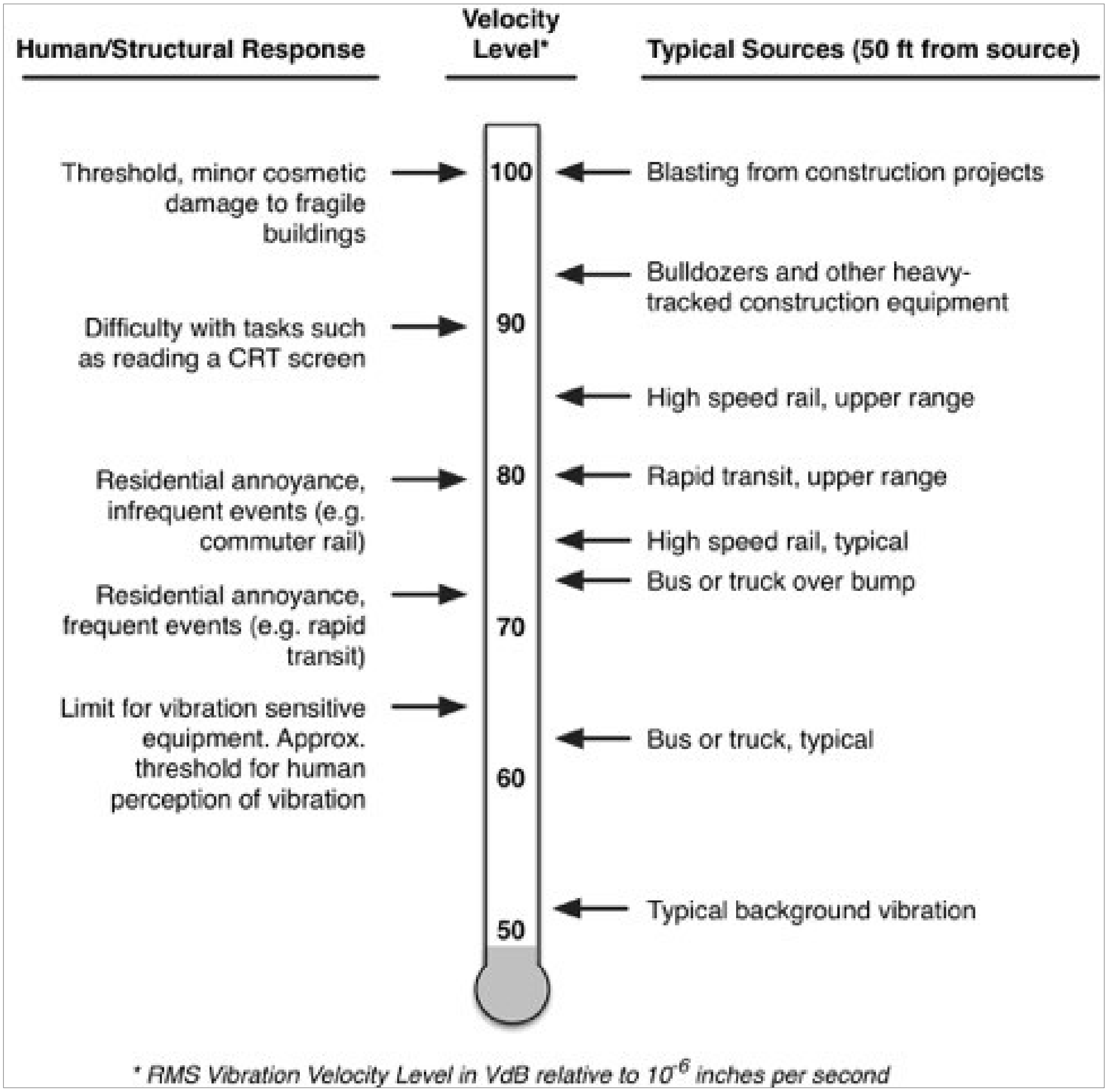
In the above equation, “L_v” is the velocity level in decibels, “v” is the RMS velocity amplitude, and “v_{ref}” is the reference velocity amplitude. A reference always must be specified whenever a quantity is expressed in terms of decibels. The accepted reference quantity for vibration velocity level in the United States is $1\text{x}10^{-6}$ inches per second. All vibration levels in this report are referenced to $1\text{x}10^{-6}$ inches per second. Although not a universally accepted notation, the abbreviation “VdB” (RMS vibration velocity level, decibels) is used in this document for vibration decibels to reduce the potential for confusion with sound decibels.



Source: FRA, 2012

Figure 5-2 Different Methods of Describing a Vibration Signal

Common vibration sources and human and structural response to ground-borne vibration are illustrated on Figure 5-3. Typical vibration levels can range from below 50 VdB to 100 VdB (0.000316 to 0.1 inch per second). The human threshold of perception is approximately 65 VdB.



Source: FRA, 2012

Figure 5-3 Typical Levels of Ground-Borne Vibration

5.1.5 Ground-Borne Noise

The rumbling sound caused by the vibration of room surfaces is called ground-borne noise. The annoyance potential of ground-borne noise is usually characterized using the A-weighted sound level. Although the A-weighted level is typically the only descriptor used for community noise, potential problems exist with characterizing low-frequency noise using A-weighting. This is because of the nonlinearity of human hearing, which causes sounds dominated by low-frequency components to seem louder than broadband sounds that have the same A-weighted level. The result is that a ground-borne noise level of 40 dBA sounds louder than 40 dBA broadband airborne noise. This anomaly is accounted for by setting the limits for ground-borne noise lower than would be the case for broadband noise.

Ground-borne noise is generally only an issue for trains operating underground. For systems where the train is operating either at or above grade, the airborne noise level is generally substantially louder than the ground-borne component, so that the ground-borne noise is masked by the airborne noise.

5.2 Existing Noise Environment

Sources of existing noise along the proposed alignment include passenger and freight trains, roadway traffic, aircraft, and local community sources.

5.2.1 Noise-Sensitive Receivers

Along the proposed right-of-way, noise-sensitive receivers within the RSA that could be affected by project-related noise needed to be identified. A series of screening distances were used to narrow the area within which noise-sensitive receivers may be located. FRA has established screening distances for potential noise effects based on existing land uses and the speed at which future railroad operations are expected to function. These screening distances are shown in Table 5-1. For the purposes of this analysis, the existing environment is more consistent with the "existing rail corridor, urban/noisy suburban – unobstructed category." Additionally, while the maximum planned speed within this project section is 125 mph, the more conservative screening distance of 700 feet that is associated with higher speed trains was utilized to be certain that all potential impacts were considered. Noise-sensitive receivers were found by identifying existing noise-sensitive land uses (e.g., residences, schools, parks, libraries, and hospitals) within the appropriate noise impact screening distances for the project alternative. In this case, the screening distances used to identify noise-sensitive receivers were developed in accordance with FRA guidance. These are shown in Table 5-1.

Table 5-1 Screening Distances for Noise Assessments

Existing Noise Environment	Screening Distance in Feet for High-Speed Rail[1]	
	90 to 170 mph	170 mph or More
Existing rail corridor, urban/noisy suburban – unobstructed	300 feet	700 feet
Existing rail corridor, urban/noisy suburban – obstructed[2]	200 feet	300 feet
Existing rail corridor, quiet suburban/rural	500 feet	1,200 feet
New rail corridor, urban/noisy suburban – unobstructed	350 feet	700 feet
New rail corridor, urban/noisy suburban – obstructed[2]	250 feet	350 feet
New rail corridor, quiet suburban/rural	600 feet	1,300 feet

Source: FRA, 2012
[1] Measured from the centerline of the guideway or rail corridor. Minimum distance is assumed to be 50 feet.
[2] Rows of buildings assumed to be 200, 400, 600, 800, and 1,000 feet parallel to the guideway.
mph = miles per hour

The noise impact screening distances for noise-sensitive receivers depend on the existing noise environment and speeds of the trains. Ambient noise level measurements were completed at specific noise-sensitive receiver locations within the appropriate noise impact screening distances for each existing noise environment to define the current ambient noise levels. For noise impact screening distance purposes, existing noise environments are defined by the existence of rail corridors, by the type of existing noise environment based on the nearby population density (urban, suburban, and rural), and by whether the noise-sensitive receiver is obstructed or unobstructed from view of the project alternative. Screening distances change based on the speeds of the trains. For example, trains moving up to 100 mph have a shorter screening distance than trains moving up to 200 mph. Existing noise environments where there is a current rail corridor have shorter screening distances than existing noise environments that lack a current rail corridor. Urban and noisy suburban existing noise environments have shorter screening distances than quiet suburban and rural areas. Unobstructed noise-sensitive receivers have larger screening distances than noise-sensitive receivers that have obstructed views of the potential noise source.

Ambient noise level measurements were conducted at representative noise-sensitive receiver locations within the RSA to document the existing noise environment for project noise effect assessment. A combination of 28 long-term (24 hours in duration) and 18 short-term (30 minutes in duration) noise level measurements were conducted to represent the noise-sensitive uses within the RSA. Short-term noise level measurements were selected based on the location of Category 1 and Category 3 receptors, as well as in areas not covered by the long-term noise level measurement. These sites are identified as “supplemental short term” (SST) in order to estimate the L_{dn}. Table 5-2 summarizes the measured long-term noise level results along with the start date, address/location, city/county, land use type, and noise sources.

Table 5-2 Summary of Long-Term 24-Hour Noise Level Measurements

Site	Start Date	Address/Location	City/County	Land Use Type	Noise Sources	Measured L_{dn}
PB-LT-28	4/15/16	1331 Sparks St	Burbank	Residential	Typical neighborhood noise and air traffic	58.0
PB-LT-30	4/15/16	431 Glenwood Pl	Burbank	Residential	Rail traffic, local traffic, and air traffic	60.0
LT-1	8/3/16	129 E Prospect Ave	Burbank	Residential	Traffic on San Fernando Rd and Prospect Ave	62.9
LT-2	8/3/16	1221 A/B S Flower St	Burbank	Residential	Traffic on Flower St and W Linden Ave, activity at the Home Depot store located across the street	67.9
LT-3	8/3/16	723 A/B Ruberta Ave	Glendale	Residential	Landscaping noise (leaf blower, grinding noise)	63.1
LT-4	8/3/16	1015 Grover Ave	Glendale	Residential	Trains, traffic on San Fernando Rd	60.3
LT-5	8/3/16	1021 Willard Ave	Glendale	Residential	Trains, traffic on San Fernando Rd	59.5
LT-6	8/3/16	6026 San Fernando Rd	Glendale	Residential	Trains, auto shop/machinery, traffic on San Fernando Rd	66.4
LT-7	8/3/16	5636 San Fernando Rd	Glendale	Residential	Trains, traffic on San Fernando Rd	73.5
LT-8	8/3/16	745 W California Ave	Glendale	Residential	Traffic on W California Ave and San Fernando Rd, trains	62.7
LT-9	8/3/16	945 Burchett St	Glendale	Residential	General ambient noise	59.9
LT-10	8/4/16	4615 Chevy Chase Dr	Los Angeles	Residential	Trains, traffic on Alger St, machinery from manufacturing and/or auto shops	62.7
LT-11	8/4/16	4417 La Clede Ave	Los Angeles	Residential	Trains, dogs	62.9
LT-12	8/4/16	3945 Seneca Ave	Los Angeles	Residential	Trains, traffic on Seneca Ave	57.7
LT-13	8/4/16	3932 Revere Ave	Los Angeles	Residential	Traffic on Revere Ave and neighborhood activity/noise	59.6
LT-14	8/4/16	1760 Gardena Ave	Glendale	Residential	Traffic on Glendale Blvd and Gardena Ave, neighborhood noise	68.0
LT-15	8/4/16	1951 Gardena Ave	Glendale	Residential	Traffic on Gardena Ave and Tyburn St, train noise, neighborhood noise	62.8

Site	Start Date	Address/Location	City/County	Land Use Type	Noise Sources	Measured L_{dn}
LT-16	8/4/16	3460 Casitas Ave	Los Angeles	Residential	Train, industrial uses, traffic on Casitas Ave	60.8
LT-17	8/4/16	3322 Silver Lake Blvd	Los Angeles	Residential	Traffic on Silver Lake Blvd, surrounding roads, train	59.4
LT-18	8/4/16	2915 Knox Ave	Los Angeles	Residential	Ambient, surrounding light industrial, bike path activities, trains	57.7
LT-19	8/8/16	2623 Roseview Ave	Los Angeles	Residential	Traffic on San Fernando Rd and Roseview Ave, train activity	65.4
LT-20	8/8/16	2449 Harwood St	Los Angeles	Residential	Bike path activities, existing train activity	61.8
LT-21	8/8/16	2615 Pepper Ave	Los Angeles	Residential	Traffic on Pepper Ave and N San Fernando Rd, existing trains, activity at adjacent park	66.7
LT-22	8/8/16	2600 Jeffries Ave	Los Angeles	Residential	Traffic on W Ave 26 and Jeffries Ave, existing train, Los Angeles River Center and Garden	70.1
LT-23	8/8/16	245 N Ave 18	Los Angeles	Residential	Existing trains, local traffic	62.8
LT-24	8/8/16	262 S Ave 17	Los Angeles	Park	Existing trains, nearby industrial uses, park activities, ambient traffic	62.5
LT-25	8/8/16	Intersection of Leroy St/Bolero Ln (William Mead Homes)	Los Angeles	Residential	Local traffic, operations on train tracks	69.9
LT-26	8/4/16	3460 Casitas Ave	Los Angeles	Residential	Train, industrial uses, traffic on Casitas Ave	73.1

Source: California High-Speed Rail Authority, 2018
L_{dn} = day-night average noise level SR = State Route LT = long-term

Table 5-3 summarizes the measured short-term noise level results along with the date, start time, address, city/county, land use type, noise sources, and estimated L_{dn}. The L_{dn} noise levels were estimated by comparing the short-term measured values to the corresponding L_{eq} values at a nearby long-term measurement location subjected to a similar characteristic noise environment according to the following method:

A. Note the L_{eq} value for the short-term measurement.

B. Compare the monitored short-term (ST) L_{eq} value from Step A to the monitored L_{eq} value for the nearby long-term (LT) measurement location for the same measurement period used for the short-term (ST) L_{eq} value.

Then:

$$L_{eq}\ (ST) - L_{eq(simultaneous)}\ (LT) = delta$$

and

$$L_{dn}\ (ST) = L_{dn}\ (LT) + delta$$

Table 5-3 Summary of Short-Term Noise Level Measurements

Site	Date	Time	Address	City/County	Land Use Type	Noise Sources	Measured L_{eq}	Long-Term[1]	Estimated L_{dn}
PB-ST-23	4/16/15	11:56 AM	328 Tujunga Ave	Burbank	Apartment Complex	Rail traffic and local traffic	54.0	–	–
ST-1	8/4/16	7:05 AM	101 W Alameda Ave	Burbank	Recording Studio	Traffic on W Alameda Ave, Flower St, and I-5, and occasional Metrolink train noise	67.9	LT-2	73.1
ST-2	8/4/16	8:24 AM	521 Commercial St	Glendale	Recording Studio	Trains, auto body shop, and traffic on W Doran St, Commercial St, on-ramps, and SR 134	62.7	LT-8	63.4
ST-3	8/4/16	8:38 AM	622 W Colorado St	Glendale	Recording Studio	Traffic on W Colorado St and San Fernando Rd, trains	62.7	LT-8	70.2
ST-4	8/5/16	8:23 AM	413 W Palmer Ave	Glendale	Television Station	Equipment rental across street, traffic on W Palmer Ave and San Fernando Rd, trains	62.9	LT-11	61.7
ST-5	8/5/16	2:20 PM	1809 Gardena Ave	Glendale	Church	Traffic on Glendale Blvd, trains, traffic on Gardena Ave	68.0	LT-14	57.9
ST-6	8/5/16	9:41 AM	3200 N San Fernando Rd	Los Angeles	School	Trains, lumberyard to the west, light traffic on San Fernando Rd	62.8	LT-15	52.3
ST-7	8/5/16	11:34 AM	2829 ¼ Fletcher Dr	Los Angeles	Church	Traffic on Fletcher Dr and La Clede Ave, surrounding commercial and residential activity	68.0	LT-14	69.4
ST-8	8/5/16	2:23 PM	2709 Media Center Dr	Los Angeles	School	Traffic on SR 2 and distant roadway, surrounding industrial activity	62.8	LT-15	64.4
ST-9	8/9/16	8:05 AM	2050 N San Fernando Rd	Los Angeles	School	Distant traffic and industrial activity	57.7	LT-18	63.6
ST-10	8/9/16	9:53 AM	1230 N San Fernando Rd	Los Angeles	Church	Traffic on San Fernando Rd (especially trucks) and trains	65.4	LT-19	76.7
ST-11	8/9/16	9:00 AM	1721 N Broadway	Los Angeles	Church	Traffic on Pasadena Ave and N Broadway, existing trains	62.8	LT-23	71.8

Site	Date	Time	Address	City/County	Land Use Type	Noise Sources	Measured L_{eq}	Long-Term[1]	Estimated L_{dn}
SST-1	8/3/16	11:45 AM	1041 Rosedale Ave	Glendale	Residential	Distant traffic on I-5 and San Fernando Blvd	59.5	LT-5	61.9
SST-2	8/3/16	12:41 PM	834 Graynold Ave	Glendale	Residential	Distant traffic on San Fernando Blvd, passbys on Zook Dr	66.4	LT-6	60.9
SST-3	8/3/16	12:02 PM	Riverdale Dr and S Kenilworth Ave	Glendale	Residential	Traffic and trains	62.7	LT-10	65.4
SST-4	8/3/16	12:11 PM	3970 Seneca Ave	Los Angeles	Residential	Traffic on Los Feliz Blvd and occasional traffic on Seneca Ave	57.7	LT-12	63.2
SST-5	8/8/16	12:46 PM	2668 Loosmore Ave	Los Angeles	Residential	Traffic on Loosmore Ave	65.4	LT-19	54.3
SST-6	8/3/16	8:04 AM	660 N San Fernando Blvd	Los Angeles	Residential	Traffic on San Fernando Blvd and trains	66.7	LT-21	75.1

Source: California High-Speed Rail Authority, 2018

[1] The long-term noise level measurement used to estimate the L_{dn} level for each short-term noise level measurement location.

I = Interstate

L_{dn} = day-night average noise level

L_{eq} = equivalent continuous sound level

SR = State Route

ST = short-term

Figure A-1 of Appendix A shows the existing noise levels for each monitoring location. The noise survey sheets containing the details of noise measurement data and documentation are provided in Appendix B.

5.3 Existing Noise Conditions

The existing noise environment within the RSA is dominated by traffic on the local streets, nearby freeways, existing commercial and industrial uses, and train operations along the existing railroad corridor, which currently operates both freight and passenger rail. Noise levels were measured at the noise-sensitive land uses throughout the RSA, as indicated in Table 5-2 and Table 5-3, and the measured noise levels ranged from 52.3 to 76.7 dBA L_{dn}. These noise levels are typical for urban settings dominated by vehicular traffic and railroad operations. Below is a detailed description of the existing noise environment within the RSA.

The segment of the Burbank to Los Angeles Project Section between Lockheed Drive and Winona Avenue is completely underground. Therefore, no above-ground noise measurements were necessary.

From Winona Avenue to Alameda Avenue, the HSR Build Alternative is within the city of Burbank. Land uses in this area are primarily residential and industrial. Other specific receptors include recording studios, places of worship, and schools. HSR speeds in this subsection would approach 125 mph. The measured ambient noise levels ranged from 58.0 to 61.0 dBA L_{dn}. These noise levels are dominated by traffic on local streets and I-5 and train operations along the existing rail alignment. The measurement locations in this area are PB-LT-28, PB-LT-30, and PB-ST-23.

From Alameda Avenue to Los Feliz Boulevard, the HSR Build Alternative is within the cities of Burbank, Glendale, and Los Angeles. Land uses in this area are primarily residential, commercial, and industrial. Other specific receptors include theaters, churches, parks, and recording studios. HSR speeds in this subsection would range up to 125 mph. The measured ambient noise levels gathered at LT-1 through LT-11 range from 59.5 to 73.5 dBA $L_{dn,}$ while the short-term measurements ST-1 through ST-4, and SST-1 through SST-3 were used to estimate existing peak noise hours that ranged from 55.9 to 73.4 dBA L_{eq}. These noise levels are dominated by traffic on local streets and I-5 and train operations along the existing rail corridor.

From Los Feliz Boulevard to the SR 2, the HSR Build Alternative is within the cities of Glendale, and Los Angeles. Land uses in this area are primarily residential, commercial, and industrial. Other specific receptors include churches, retirement homes, and recording studios. HSR speeds in this subsection would approach 125 mph. The measured ambient noise levels gathered at LT-12 through LT-17 range from 57.7 to 68.0 dBA L_{dn}, while the short-term measurements ST-5 through ST-7, and SST-4 were used to estimate existing peak noise hours that ranged from 53.6 to 69.9 dBA L_{eq}. These noise levels are dominated by traffic on local streets, I-5, and SR 2, and train operations along the existing rail corridor.

From SR 2 to Arvia Street, the HSR Build Alternative is within the city of Los Angeles. Land uses in this area are primarily residential, commercial, and industrial. Other specific receptors include schools. HSR speeds in this subsection would range up to 50 mph. The measured ambient noise levels gathered at LT-18 resulted in a noise level of 57.7 dBA L_{dn}, while the short-term measurements ST-8 and ST-9 were used to estimate existing peak noise hours that ranged from 62.1 to 64.2 dBA L_{eq}. These noise levels are dominated by traffic on local streets, I-5, and SR 2, and train operations along the existing rail corridor.

From Arvia Street to SR 110, the HSR Build Alternative is within the city of Los Angeles. Land uses in this area are primarily residential, commercial, and industrial. Other specific receptors include a church, a studio, and a park. HSR speeds in this subsection would range up to 50 mph. The measured ambient noise levels gathered at LT-19 through LT-22 range from 61.8 to 70.1 dBA L_{dn}, while the short-term measurements ST-10, and SST-5 and SST-6 were used to estimate existing peak noise hours that ranged from 53.1 to 78.0 dBA L_{eq}. These noise levels are dominated by traffic on local streets, I-5, and SR 110, and train operations along the existing rail corridor.

From SR 110 to Vignes Street, the HSR Build Alternative is within the city of Los Angeles. Land uses in this area are primarily residential, a church, a park, a courthouse, commercial, and industrial. HSR speeds in this subsection would range from 20 to 55 mph. The measured ambient noise levels gathered at LT-23 through LT-25 range from 62.5 to 69.9 dBA L_{dn}, while the short-term measurement ST-11 was used to estimate the existing peak noise hour of 70.3 dBA L_{eq}. These noise levels are dominated by traffic on local streets, I-5, and SR 110, and train operations along the existing rail corridor.

From Vignes Street to U.S. Route (US) 101, the HSR Build Alternative is within the city of Los Angeles. Land uses in this area are primarily residential, commercial, and industrial. HSR speeds in this subsection would approach 20 mph. The measured ambient noise levels gathered at LT-26 show a daily noise levels of 73.1 dBA L_{dn}. These noise levels are dominated by traffic on local streets, commercial uses, and train operations along the existing rail corridor.

5.4 Existing Vibration Environment

The main sources of existing ground vibration along the proposed HSR alignment are passenger and freight trains.

5.4.1 Vibration-Sensitive Receivers

Vibration-sensitive receivers within the RSA would be similar to the noise-sensitive receivers described in Section 5.2.1. The appropriate vibration screening distance is shown in

Table 5-4.

Table 5-4 Vibration Effect Screening Distances

Land Use	Screening Distance for HSR (in feet from centerline)		
	Up to 100 mph	Up to 200 mph	Up to 300 mph
Residential	120 feet	220 feet	275 feet
Institutional	100 feet	160 feet	220 feet

Source: Federal Railroad Administration, 2012
HSR = high-speed rail   mph = miles per hour

In general, the noise-sensitive receiver locations with structures that are within the limited vibration screening distance are a small subset of the list of noise-sensitive receiver locations.

To identify areas with potential to be affected from vibration for the proposed project, the locations of VSAs were determined. Twenty-five VSAs were identified and vibration propagation measurements (Section 5.4.2) were conducted at nine sites throughout the RSA. The measurement results at these locations were used to characterize the ground vibration propagation conditions at particular VSAs, as noted in Table 5-5.

Table 5-5 Vibration-Sensitive Areas

VSA ID	Description	Measurement Locations
1	This area is on the northbound side of the proposed alignment and is bounded by Alameda Avenue and Western Avenue. The vibration-sensitive land use is Fortner Engineering, located approximately 215 feet from the proposed alignment.	VP-F
2	This area is on the northbound side of the proposed alignment and is bounded by Western Avenue and Grandview Avenue. The land uses are multifamily residential land and industrial/commercial lots. The institutional land uses are the Comfort Dental-Larrea Dentistry and Cope Studios. The closest vibration-sensitive receiver is approximately 252 feet from the proposed alignment.	VP-F
3	This area is on the southbound side of the proposed alignment and is bounded by Western Avenue and Grandview Avenue. The vibration-sensitive receiver is DisneyToon Studios, located approximately 54 feet from the proposed alignment.	VP-F
4	This area is on the northbound side of the proposed alignment and is bounded by Grandview Avenue and the Ventura Freeway. The land uses are residential and industrial/commercial. There is a row of industrial and commercial buildings between the proposed alignment and the nearest houses. The institutional receivers are the Mission: Renaissance church and SCA Premier Surgery Center. The closest vibration-sensitive receiver is approximately 158 feet from the proposed alignment.	VP-F
5	This area is on the southbound side of the proposed alignment and is bounded by the Ventura Freeway and W Wilson Avenue. The vibration-sensitive receiver is the International College of Beauty Arts and Sciences, located 72 feet from the proposed alignment.	VP-F
6	This area is on the southbound side of the proposed alignment and is bounded by W Wilson Avenue and Colorado Street. The vibration-sensitive receivers are the Galilee Mission Center and Baxalta. The closest vibration-sensitive receiver is approximately 71 feet from the proposed alignment.	VP-E/VP-F
6b	This area is on the northbound side of the proposed alignment and is bounded by the below-grade Burbank Airport Station and N Buena Vista Street. The track is in a tunnel running beneath commercial, industrial, and residential land. The closest vibration-sensitive receiver is 94 feet from the proposed alignment.	VP-M
7	This area is on the northbound side of the proposed alignment and is bounded by Colorado Street and Goodwin Avenue. San Fernando Road runs between the existing tracks and the nearest buildings. The vibration-sensitive land use is Applied Earth Sciences, located 151 feet from the proposed alignment.	VP-E
7b	This area is on the southbound side of the proposed alignment and is bounded by the below-grade Burbank Airport Station and N Buena Vista Street. The track is in a tunnel running beneath commercial, industrial, and residential land. The BHC Child Development Center is within this area. The closest vibration-sensitive receiver is 85 feet from the proposed alignment.	VP-M
8	This area is on the southbound side of the proposed alignment and is bounded by Goodwin Avenue and Verdant Street. The sensitive land use is single-family housing. There is a row of commercial buildings between the first row of houses and the tracks. The closest vibration-sensitive receiver is 190 feet from the proposed alignment.	VP-E
8b	This area is on the southbound side of the proposed alignment and is bounded by N Buena Vista Street and N Parish Place. The land use in this area is a mixture of residential and commercial. The closest vibration-sensitive receiver is 77 feet from the proposed alignment.	VP-M

VSA ID	Description	Measurement Locations
9	This area is on the southbound side of the proposed alignment, between Los Feliz Boulevard and Glendale Boulevard. The land use is a mixture of single-family and multifamily residences. There is a row of industrial buildings between the tracks and the first row of houses. The closest vibration-sensitive receiver is approximately 121 feet from the proposed alignment.	VP-D
9b	This area is on the southbound side of the proposed alignment and is bounded by N Parish Place and Burbank Boulevard. The land use in this area is a mixture of single-family and multifamily residences. The closest vibration-sensitive receiver is 69 feet from the proposed alignment.	VP-M
10	This area is on the northbound side of the proposed alignment, between Glendale Boulevard and Tyburn Street. The land use includes a mixture of single-family and multifamily residences and one church, the Russian-American SDA Church. The closest vibration-sensitive receiver is approximately 70 feet from the proposed alignment.	VP-D
10b	This area is on the southbound side of the proposed alignment and is bounded by W Olive Avenue and Alameda Avenue. The land use in the area is industrial and commercial. The vibration-sensitive receiver is the Six01 Studio, located 80 feet from the proposed alignment.	VP-M
11	This area is on the southbound side of the proposed alignment, between Glendale Boulevard and Tyburn Street. The land use includes single-family and multifamily residences. There is a row of commercial buildings between the tracks and the first row of residential buildings. The closest vibration-sensitive receiver is 241 feet from the proposed alignment.	VP-D
12	This area is on the northbound side of the proposed alignment, between Tyburn Street and SR 2. The land use is a mixture of industrial and commercial. The vibration-sensitive land use is the Los Angeles Community College, located 174 feet from the proposed alignment.	VP-C
13	This area is on the southbound side of the proposed alignment, between Tyburn Street and SR 2. The land use is a mixture of commercial and residential. There is a row of commercial buildings between the residential uses and the existing track. The Echo Theater Company, Celebration Theatre, Atwater Village Theatre, Berg Studios, and Swing House are institutional vibration-sensitive receivers. The closest vibration-sensitive receiver is 32 feet from the proposed alignment.	VP-C
14	This area is on the northbound side of the proposed alignment, between Hallett Avenue and Division Street. The vibration-sensitive receiver is the Sotomayor Learning Academies, located 145 feet from the proposed alignment.	VP-B
15	This area is on the northbound side of the proposed alignment and is bounded by Division Street and Arvia Street. The land use is residential. The closest vibration-sensitive receiver is 140 feet from the proposed alignment.	VP-B
16	This area is on the northbound side of the proposed alignment and is bounded by Arvia Street and Pepper Avenue. The land use is a mixture of single-family and multifamily housing. There is a row of commercial buildings between the alignment and the first row of houses. The closest vibration-sensitive receiver is 425 feet from the proposed alignment.	VP-B
17	This area is on the northbound side of the proposed alignment and is bounded by Pepper Avenue and SR 110. The land use is a mixture of commercial, residential, and park land. The closest vibration-sensitive receiver is 464 feet from the proposed alignment.	VP-B

VSA ID	Description	Measurement Locations
18	This area is on the northbound side of the proposed alignment and is bounded by SR 110 and N Broadway. The land use is a mixture of commercial and industrial. The closest vibration-sensitive receiver is 518 feet from the proposed alignment.	VP-A
19	This area is on the northbound side of the proposed alignment and is bounded by N Main Street and LAUS. The land use is a mixture of commercial, industrial, and multifamily residential. The closest vibration-sensitive receiver is 215 feet from the proposed alignment.	VP-A
20	This area is on the southbound side of the proposed alignment and is bounded by N Main Street and LAUS. The land use is a mixture of commercial, industrial, and multifamily residential. The closest vibration-sensitive receiver is 107 feet from the proposed alignment.	VP-A

Source: California High-Speed Rail Authority, 2018
LAUS = Los Angeles Union Station VSA = vibration-sensitive area
SR = State Route

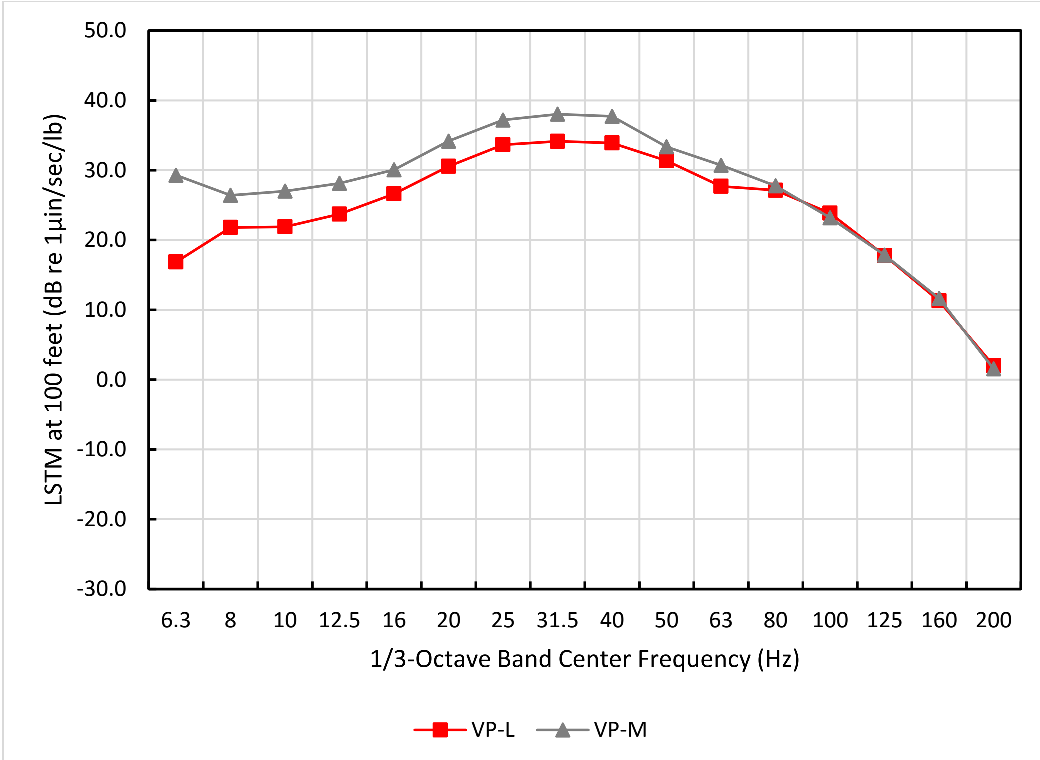
5.4.2 Measured Vibration Levels

Vibration propagation measurements were conducted at eight locations in the RSA. Figure A-2 in Appendix A shows the measurement locations. Site photographs are included in Appendix E. Descriptions of the measurement sites and results are provided below.

- **Site VP-L: Keswick Street and Delia Avenue—**The vibration propagation measurement was conducted at the southwest corner of Keswick Street and Delia Avenue in Sun Valley. The measurement site is representative of all vibration-sensitive land uses from Lanark Street to Burton Avenue along the E2 alignment.
- **Site VP-M: Thornton Avenue and N Brighton Street—**The vibration propagation measurement was conducted on the northwest corner of Thornton Avenue and N Brighton Street in the city of Burbank. This site represents vibration-sensitive land uses for the below-grade option from the Burbank Airport Station to W Olive Avenue along the proposed E2 alignment.

Representative results of the vibration propagation tests are shown on Figure 5-4 in terms of the measured line-source transfer mobilities at a distance of 100 feet. Detailed vibration propagation data are provided in Appendix E.

- **Site VP-C: 3026 Casitas Avenue**—The vibration propagation measurement was conducted on the northwest corner of Casitas Avenue and Carillon Street in the city of Los Angeles. The measurement site is representative of all vibration-sensitive land uses from Hallett Avenue to Tyburn Street along the proposed alignment.
- **Site VP-D: 1845 Princeton Street**—The vibration propagation measurement was conducted on the northeast corner of Gardenia Avenue and Princeton Street in the city of Glendale. The measurement site is representative of all vibration-sensitive land uses from Tyburn Street to Los Feliz Boulevard along the proposed alignment.
- **Site VP-E: Bemis Street and Alger Street**—The vibration propagation measurement was conducted on the northeast corner of Bemis Street and Alger Street in Los Angeles, California. The measurement site is representative of all vibration-sensitive land uses from Los Feliz Boulevard to W Wilson Avenue along the proposed alignment.
- **Site VP-F: Zook Drive and Graynold Avenue**—The vibration propagation measurement was conducted on the southeast corner of Zook Drive and Graynold Avenue in the city of Glendale. The measurement site is representative of all vibration-sensitive land uses from Colorado Street to Alameda Avenue along the proposed alignment.

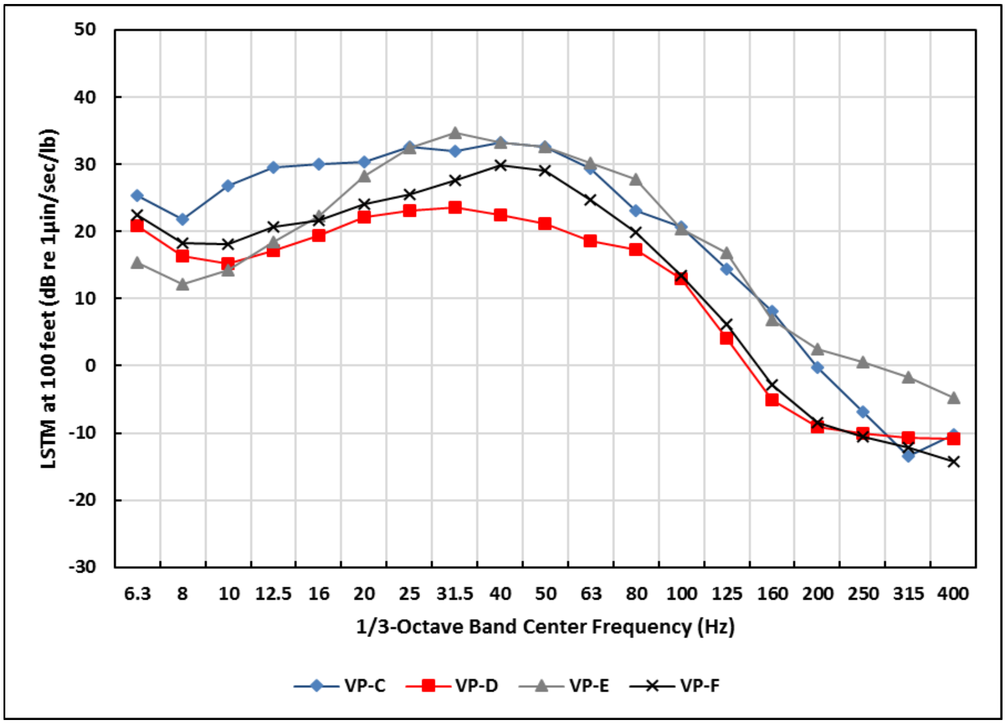


Source: California High-Speed Rail Authority, 2018

Figure 5-4 Vibration Propagation Test Data (Burbank Airport Station to Alameda Avenue)

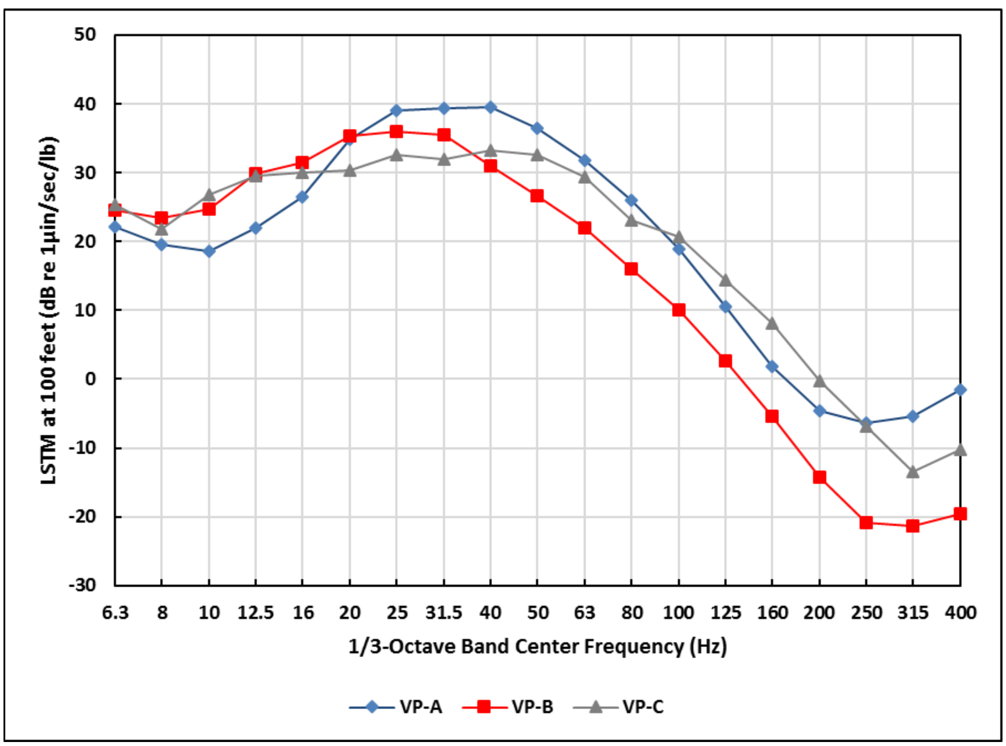
- **Site VP-A: Leroy Street and Bolero Lane**—The vibration propagation measurement was conducted on the corner of Leroy Street and Bolero Lane in the city of Los Angeles. The measurement site is representative of all vibration-sensitive land uses from College Street to SR 110 along the proposed alignment.
- **Site VP-B: Chaucer Street and Via Molina**—The vibration propagation measurement was conducted on the southwest corner of Chaucer Street and Via Molina in the city of Los Angeles. The measurement site is representative of all vibration-sensitive land uses from SR 110 to Hallett Avenue along the proposed alignment.
- **Site VP-C: 3026 Casitas Avenue**—The vibration propagation measurement was conducted on the northwest corner of Casitas Avenue and Carillon Street in the city of Los Angeles. The measurement site is representative of all vibration-sensitive land uses from Hallett Avenue to Tyburn Street along the proposed alignment.

Representative results of the vibration propagation tests are shown on Figure 5-5 and Figure 5-6 in terms of the measured line-source transfer mobilities at a distance of 100 feet. Detailed vibration propagation data are provided in Appendix E.



Source: California High-Speed Rail Authority, 2018

Figure 5-5 Vibration Propagation Test Data (Alameda Avenue to State Route 2)



Source: California High-Speed Rail (2018)

Figure 5-6 Vibration Propagation Test Data (State Route 2 to U.S. Route 101)

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6 EFFECTS ANALYSIS

6.1 Introduction

This section summarizes the noise and vibration effects assessment for the Burbank to Los Angeles Project Section.

6.2 No Project Alternative

Under the No Project Alternative, no improvements would be made within the Burbank to Los Angeles Project Section other than the projects that are already planned and committed to be constructed by or before 2040. However, it is anticipated that these planned and committed projects would result in potential noise and vibration effects.

6.3 Rail Corridor Construction Effects

The schedule for construction of the HSR alignment consists of 11 construction phases—road crossing demolition, roadway construction, elevated structures, structure demolition, land clearing, earthmoving, trenching, track at-grade, materials handling, systems facilities construction, and upgrades to the Metrolink CMF. Each phase has a unique set of construction equipment that will be utilized. Tables C-1 through C-8 in Appendix C provide a complete list of the construction equipment that may be used for each phase of construction. In addition to the construction equipment list, pile driving may be used for elevated structures.

6.3.1 Construction Noise Effects

Table 6-1 summarizes the residential noise impact screening distances for daytime and nighttime work for each phase and sub-phase of construction. These distances were calculated using the methodology described in Section 4.9, Construction Noise and Vibration Methodology. However, to be conservative, the screening distance estimates did not assume any topography or ground effects. It is likely that intervening topography or terrain may reduce potential noise impacts. Descriptions for each construction phase are provided in the subsections below.

Table 6-1 Noise Criteria Exceedance Screening Distances for High-Speed Rail Construction Activities in Residential Areas

Construction Activity	Daytime 80 dBA L_{eq} (feet)	Nighttime 70 dBA L_{eq} (feet)
Land Clearing	131–134	416–423
Earthmoving	148	467
Roadway Construction	176	555
Structure Demolition	117	370
Building Demolition	113	356
Elevated Structures	139-182	440–576
Track At-Grade	175	553
Materials Handling	160	507
Trenching Construction	199	629
Systems Facilities	163	516
Maintenance Facilities	167	527

Source: California High-Speed Rail Authority, 2019
CMF = Central Maintenance Facility
dBA = A-weighted decibels
L_{eq} = equivalent continuous sound level

6.3.1.1 Land Clearing

Land clearing would involve clearing land and constructing haul roads. Land clearing is anticipated to take 66 months to complete, while the construction of haul roads is anticipated to take 63 months to complete. The list of construction equipment for this construction phase at each site is provided in Table C-1 in Appendix C. Construction crew commutes and the transport of construction equipment and materials to the project site for land clearing would incrementally raise noise levels on local roads leading to the site. The pieces of construction equipment would be moved on-site, where they would remain for the duration of land clearing, and would not add to the daily traffic volumes in the project vicinity. Projected construction traffic volumes for the land clearing phase would be minimal compared to existing traffic volumes on affected local streets.

Assuming a small set of construction equipment that would operate simultaneously as a worst-case scenario, the worst-case composite noise level during this phase of construction would be 89 dBA L_{eq} at a distance of 50 feet from the construction boundary for land clearing, while the construction of haul roads would generate 88 dBA L_{eq} at a distance of 50 feet from the construction boundary. Residences and schools within 134 feet of the land-clearing activities would be exposed to noise levels greater than 80 dBA L_{eq} during daytime hours. For haul road construction, residences within 131 feet would be exposed to noise levels greater than 80 dBA L_{eq} during daytime hours. Residences within 423 feet of the land-clearing activities for all alternatives would be exposed to noise levels greater than 70 dBA L_{eq} during nighttime hours. For haul road construction, residences within 416 feet would be exposed to noise levels greater than 70 dBA L_{eq} during nighttime hours. Schools would not be affected during nighttime hours because they would not be in operation. Residences and schools within these distances from the construction boundary would be affected by noise generated from land-clearing activities that is greater than the recommended FRA construction noise criteria.

6.3.1.2 Earthmoving Construction Activities

Earthmoving is anticipated to take approximately 54 months to complete for the HSR Build Alternative. The list of construction equipment is provided in Table C-2 in Appendix C. Construction crew commutes and the transport of construction equipment and materials to the project site for earthmoving would incrementally raise noise levels on local roads leading to the site. The pieces of construction equipment would be moved on-site, where they would remain for the duration of earthmoving, and would not add to the daily traffic volumes in the project vicinity. Projected construction traffic volumes for earthmoving would be minimal compared to existing traffic volumes on affected local streets.

Assuming a small set of construction equipment that would operate simultaneously as a worst-case scenario, the worst-case composite noise level during this phase of construction would be 89 dBA L_{eq} at a distance of 50 feet from the construction boundary. Residences and schools within 148 feet of earthmoving activities would be exposed to noise levels greater than 80 dBA L_{eq} during daytime hours. Residences within 467 feet of earthmoving activities would be exposed to noise levels greater than 70 dBA L_{eq} during nighttime hours. Schools would not be affected during nighttime hours because they would not be in operation. Residences and schools within these distances from the construction boundary would be affected by noise generated from earthmoving activities that is greater than the recommended FRA construction noise criteria.

6.3.1.3 Grade Separation Construction Activities

The grade separation improvements for the HSR Build Alternative are anticipated to take 66 months to complete. The list of construction equipment is provided in Table C-3 in Appendix C. Construction crew commutes and the transport of construction equipment and materials to the project site for roadway construction would incrementally raise noise levels on local roads leading to the site. The pieces of construction equipment would be moved on-site, where they would remain for the duration of construction, and would not add to the daily traffic volumes in the project vicinity. Projected construction traffic volumes for roadway construction would be minimal compared to existing traffic volumes on affected local streets.

Assuming a small set of construction equipment that would operate simultaneously as a worst-case scenario, the worst-case composite noise level during this phase of construction would be 91 dBA L_{eq} at a distance of 50 feet from the construction boundary. Residences and schools within 176 feet of roadway construction activities would be exposed to noise levels greater than 80 dBA L_{eq} during daytime hours. Residences within 555 feet of construction activities related to grade separations would be exposed to noise levels greater than 70 dBA L_{eq} during nighttime hours. Schools would not be affected during nighttime hours because they would not be in operation. Residences and schools within these distances from the construction boundary would be affected by noise generated from roadway construction activities that is greater than the recommended FRA construction noise criteria.

6.3.1.4 Structure Demolition Construction Activities

The demolition of eight bridge structures is anticipated to take 2 to 4 months to complete at each location. The locations include the following:

- Loz Feliz Boulevard
- Glendale Boulevard
- CMF Access Road
- Alameda Rail Crossing
- Burbank Boulevard
- Colorado Street
- Verdugo Rail Crossing

The list of construction equipment for this construction phase at each site is provided in Table C-4 in Appendix C. Construction crew commutes and the transport of construction equipment and materials to the project site for the demolition of bridge structures would incrementally raise noise levels on local roads leading to the site. The pieces of construction equipment would be moved on-site, where they would remain for the duration of the bridge structure demolition, and would not add to the daily traffic volumes in the project vicinity. Projected construction traffic volumes for the demolition of bridge structures would be minimal compared to existing traffic volumes on affected local streets.

Assuming a small set of construction equipment that would operate simultaneously as a worst-case scenario, the worst-case composite noise level during this phase of construction would be 87 dBA L_{eq} at a distance of 50 feet from the construction boundary. Residences and schools within 117 feet of the bridge structure demolition activities would be exposed to noise levels greater than 80 dBA L_{eq} during daytime hours. Residences within 370 feet of the bridge structure demolition activities would be exposed to noise levels greater than 70 dBA L_{eq} during nighttime hours. Schools would not be affected during nighttime hours because they would not be in operation. Residences and schools within these distances from the construction boundary would be affected by noise generated from bridge structure demolition activities that is greater than the recommended FRA construction noise criteria.

6.3.1.5 Building Demolition Construction Activities

The demolition of buildings is anticipated to take up to 4 months to complete. The list of construction equipment for this construction phase at each site is provided in Table C-5 in Appendix C. Construction crew commutes and the transport of construction equipment and materials to the project site for the demolition of buildings would incrementally raise noise levels on local roads leading to the site. The pieces of construction equipment would be moved on-site, where they would remain for the duration of the building demolition, and would not add to the daily traffic volumes in the project vicinity. Projected construction traffic volumes for the demolition of buildings would be minimal compared to existing traffic volumes on affected local streets.

Assuming a small set of construction equipment that would operate simultaneously as a worst-case scenario, the worst-case composite noise level during this phase of construction would be 87 dBA L_{eq} at a distance of 50 feet from the construction boundary, depending on the building. Residences and schools within 113 feet of the building demolition activities would be exposed to noise levels greater than 80 dBA L_{eq} during daytime hours. Residences within 356 feet of the building demolition activities would be exposed to noise levels greater than 70 dBA L_{eq} during nighttime hours. Schools would not be affected during nighttime hours because they would not be in operation. Residences and schools within these distances from the construction boundary would be affected by noise generated from building demolition activities that is greater than the recommended FRA construction noise criteria.

6.3.1.6 Elevated Structure Construction Activities

Elevated structures consist of the locations in which the HSR alignment would be elevated or on fill above existing roadways. Construction of elevated structures for the HSR system is anticipated to take 66 months to complete, depending on the location of the structure. The list of construction equipment for this construction phase at each site is provided in Table C-6 in Appendix C. Construction crew commutes and the transport of construction equipment and materials to the project site for the construction of elevated structures would incrementally raise noise levels on local roads leading to the site. The pieces of construction equipment would be moved on-site, where they would remain for the duration of the construction of elevated structures, and would not add to the daily traffic volumes in the project vicinity. Projected construction traffic volumes for the construction of elevated structures would be minimal compared to existing traffic volumes on affected local streets.

Assuming a small set of construction equipment that would operate simultaneously as a worst-case scenario, the worst-case composite noise level during the construction of elevated structures would be 91 dBA L_{eq} at a distance of 50 feet from the construction boundary. Residences and schools within 182 feet of the elevated structure construction would be exposed to noise levels greater than 80 dBA L_{eq} during daytime hours. Residences within 576 feet would be exposed to noise levels greater than 70 dBA L_{eq} during nighttime hours. If pile driving is required and is conducted simultaneously with the use of other construction equipment, the worst-case composite noise level during the construction of elevated structures would be 96 dBA L_{eq} at a distance of 50 feet from the construction boundary. Residences within 311 feet of the elevated structure construction would be exposed to noise levels greater than 80 dBA L_{eq} during daytime hours. Residences within 985 feet would be exposed to noise levels greater than 70 dBA L_{eq} during nighttime hours. Schools would not be affected during nighttime hours because they would not be in operation. Residences and schools within these distances from the construction boundary would be affected by noise generated from the elevated structure construction activities that is greater than the recommended FRA construction noise criteria.

6.3.1.7 Track Laying Construction Activities

Construction of the at-grade track is anticipated to take 66 months to complete. The list of construction equipment for the construction of the at-grade track is provided in Table C-7 in Appendix C. Construction crew commutes and the transport of construction equipment and materials to the project site for the at-grade track construction would incrementally raise noise levels on local roads leading to each site. The pieces of construction equipment would be moved on-site, where they would remain for the duration of the at-grade track construction, and would not add to the daily traffic volumes in the project vicinity. Projected construction traffic volumes for the at-grade track construction would be minimal compared to existing traffic volumes on affected local streets.

Assuming a small set of construction equipment that would operate simultaneously as a worst-case scenario, the worst-case composite noise level during the construction of the at-grade track would be 91 dBA L_{eq} at a distance of 50 feet from the construction boundary. Residences and schools within 175 feet of the at-grade track construction activities would be exposed to noise levels greater than 80 dBA L_{eq} during daytime hours. Residences within a distance of 553 feet from the at-grade track construction activities would be exposed to noise levels greater than 70 dBA L_{eq} during nighttime hours. Schools would not be affected during nighttime hours because they would not be in operation. Residences and schools within these distances would be affected by noise generated from construction-related activities that is greater than the recommended FRA construction noise criteria.

6.3.1.8 Materials Handling Construction Activities

The materials handling phase is anticipated to take 78 months to complete. The list of construction equipment for materials handling is provided in Table C-8 in Appendix C. Construction crew commutes and the transport of construction equipment and materials to/from the project site for materials handling would incrementally raise noise levels on local roads leading to each site. The pieces of construction equipment would be moved on-site, where they would remain for the duration of the materials handling phase, and would not add to the daily traffic volumes in the project vicinity. Projected construction traffic volumes for materials handling would be minimal compared to existing traffic volumes on affected local streets.

Assuming a small set of construction equipment that would operate simultaneously as a worst-case scenario, the worst-case composite noise level during this phase of construction would be 90 dBA L_{eq} at a distance of 50 feet from the construction boundary. Residences and schools within a distance of 160 feet from materials handling activities would be exposed to noise levels greater than 80 dBA L_{eq} during daytime hours. Residences within a distance of 507 feet from materials handling activities would be exposed to noise levels greater than 70 dBA L_{eq} during nighttime hours. Schools would not be affected during nighttime hours because they would not be in operation. Residences and schools within these distances would be affected by noise generated from construction activities that is greater than the recommended FRA construction noise criteria.

6.3.1.9 Trenching Construction Activities

The trenching construction phase is anticipated to take 79 months to complete. The list of construction equipment for trenching construction is provided in Table C-9 in Appendix C. Construction crew commutes and the transport of construction equipment and materials to/from the project site for trenching construction would incrementally raise noise levels on local roads leading to each site. The pieces of construction equipment would be moved on-site, where they would remain for the duration of the trenching construction phase, and would not add to the daily traffic volumes in the project vicinity. Projected construction traffic volumes for trenching construction would be minimal compared to existing traffic volumes on affected local streets.

Assuming a small set of construction equipment that would operate simultaneously as a worst-case scenario, the worst-case composite noise level during this phase of construction would be 92 dBA L_{eq} at a distance of 50 feet from the construction boundary. Residences and schools within a distance of 199 feet from trenching construction activities would be exposed to noise levels greater than 80 dBA L_{eq} during daytime hours. Residences within a distance of 629 feet from trenching construction activities would be exposed to noise levels greater than 70 dBA L_{eq} during nighttime hours. Schools would not be affected during nighttime hours because they would not be in operation. Residences and schools within these distances would be affected by noise generated from construction activities that is greater than the recommended FRA construction noise criteria.

6.3.1.10 Systems Facilities Construction Activities

The systems facilities construction phase, which includes constructing the overhead contact system, switching and paralleling stations, and power facilities, is anticipated to take 78 months to complete. The list of construction equipment for systems facilities construction is provided in Table C-10 in Appendix C. Construction crew commutes and the transport of construction equipment and materials to/from the project site for systems facilities construction would incrementally raise noise levels on local roads leading to each site. The pieces of construction equipment would be moved on-site, where they would remain for the duration of the systems facilities construction phase, and would not add to the daily traffic volumes in the project vicinity. Projected construction traffic volumes for systems facilities construction would be minimal compared to existing traffic volumes on affected local streets.

Assuming a small set of construction equipment that would operate simultaneously as a worst-case scenario, the worst-case composite noise level during this phase of construction would be

90 dBA L_{eq} at a distance of 50 feet from the construction boundary. Residences and schools within a distance of 1,630 feet from systems facilities construction activities would be exposed to noise levels greater than 80 dBA L_{eq} during daytime hours. Residences within a distance of 516 feet from system facilities construction activities would be exposed to noise levels greater than 70 dBA L_{eq} during nighttime hours. Schools would not be affected during nighttime hours because they would not be in operation. Residences and schools within these distances would be affected by noise generated from construction activities that is greater than the recommended FRA construction noise criteria.

6.3.1.11 Metrolink Central Maintenance Facility Upgrades

The upgrade of the Metrolink CMF is anticipated to take 42 months to complete. The list of construction equipment for Metrolink CMF upgrade is provided in Table C-11 in Appendix C. Construction crew commutes and the transport of construction equipment and materials to/from the project site for Metrolink CMF upgrade construction would incrementally raise noise levels on local roads leading to each site. The pieces of construction equipment would be moved on-site, where they would remain for the duration of the construction phase, and would not add to the daily traffic volumes in the project vicinity. Projected construction traffic volumes for Metrolink CMF construction would be minimal compared to existing traffic volumes on affected local streets.

Assuming a small set of construction equipment that would operate simultaneously as a worst-case scenario, the worst-case composite noise level during this phase of construction would be 90 dBA L_{eq} at a distance of 50 feet from the construction boundary. Residences and schools within a distance of 167 feet from the Metrolink CMF would be exposed to noise levels greater than 80 dBA L_{eq} during daytime hours. Residences within a distance of 527 feet from the Metrolink CMF would be exposed to noise levels greater than 70 dBA L_{eq} during nighttime hours. Schools would not be affected during nighttime hours because they would not be in operation. Residences and schools within these distances would be affected by noise generated from construction activities that is greater than the recommended FRA construction noise criteria.

6.3.2 Construction Vibration Effects

During construction, some activities may cause ground-borne vibration, most notably pile driving for structural foundations, vibro-compaction for ground improvements, drilling for bored pile viaduct foundations, and excavation for trenching. Construction equipment associated with these activities can produce vibration levels at 25 feet of 104 VdB for pile driving, 94 VdB for vibro-compaction, and 87 VdB for drilling and excavation.

The only construction activity with significant potential for damage effects would be pile driving, which could affect structures at distances of up to 30 feet for the least sensitive buildings and at distances of up to 75 feet for the most sensitive buildings. However, the construction activities would have a greater potential to cause vibration annoyance or interference with the use of sensitive equipment. Table 6-2 provides the approximate distances within which receivers could experience construction-related vibration annoyance effects.

Table 6-2 Approximate Screening Distances for Construction Vibration Impact

Land Use Category[1]	Vibration Criterion Level (VdB)	Approximate Vibration Impact Distance (feet)		
		Pile Driving	Vibro-Compaction	Drilling and Excavation
Category 1	65	500	230	135
Category 2	72	290	135	80
Category 3	75	230	105	65

Source: Federal Railroad Administration, 2012
See Table 3-10 for a description of the categories.
VdB = vibration decibel

6.4 Operational Traffic Noise

The proposed HSR project would increase traffic noise in areas surrounding each stationary facility, including the train stations. The existing and future traffic volumes with and without the HSR Build Alternative were used to determine the traffic noise increase. The existing and future volumes were obtained from the *Burbank to Los Angeles Project Section: Administrative Draft Transportation Technical Report* (Authority and FRA 2019). A project-related traffic noise increase of 3 dBA was used to determine a potential significant effect. The average daily traffic (ADT) volumes were used to determine the CNEL change, and the peak-hour traffic volumes were used to determine the L_{eq} change. The following formula was used to calculate the change in noise levels with traffic volumes:

$$(\Delta) = 10\log\left(\frac{a}{b}\right)$$

where: (Δ) = change in noise level (dBA) due to implementation of the California HSR Project

a = ADT volume with the California HSR Project/future peak-hour traffic volumes with the California HSR Project

b = ADT volume without the California HSR Project/existing peak-hour traffic volumes without the California HSR Project

6.4.1 Operational Traffic Noise in the City of Burbank

Table 6-3 and
Table 6-4 show the ADT, peak-hour traffic, and project-related traffic noise level change under the existing and 2040 with and without project conditions for roadway segments in the city of Burbank. As shown in Table 6-3 and

Table 6-4, the project-related traffic noise increase would be less than 3 dBA for all segments.

6.4.2 Operational Traffic Noise in the City of Glendale

Table 6-3 and
Table 6-4 show the ADT, peak-hour traffic, and project-related traffic noise level change under the existing and 2040 with and without project conditions for roadway segments in the city of Glendale. As shown in Table 6-3 and

Table 6-4, the project-related traffic noise increase would be less than 3 dBA for all segments.

6.4.3 Operational Traffic in the City of Los Angeles

Table 6-3 and
Table 6-4 show the ADT, peak-hour traffic, and project-related traffic noise level change under the existing and 2040 with and without project conditions for roadway segments in the city of Los Angeles. As shown in Table 6-3 and

Table 6-4, the project-related traffic noise increase would be less than 3 dBA for all segments except San Fernando Minor between Vineland Avenue and Sunland Boulevard, and San Fernando Minor between Sunland Boulevard and Clyburn Avenue.

6.4.4 Traffic Noise from Roadway Improvements

The HSR Build Alternative includes roadway improvements within the RSA. Table 2-1, Table 2-2, and Table 2-3 list the proposed roadway and rail corridor crossings. The preparation of a Noise Study Report would be required for projects that are classified as a Type 1 project to identify traffic noise effects for activity category B through E land uses. Traffic noise effects occur when predicted noise levels in the design year approach or exceed the NAC or a predicted noise level substantially exceeds the existing without project noise level by 12 dBA or more.

Table 6-3 Change in Existing Traffic Noise Levels for the Proposed Project

Jurisdiction	Roadway	Limits		Existing Baseline		Existing With Project		Change in Noise Level (ADT)	Change in Noise Level (Peak-Hour)
		From	To	Average Daily Traffic	Peak-Hour Traffic	Average Daily Traffic	Peak-Hour Traffic		
North Hollywood	SR 170 SB Ramps	SR 170 SB	Sherman Way	7,946	739	7,946	739	0.0	0.0
	SR 170 SB Ramps	Sherman Way	SR 170 SB	12,387	1,152	12,516	1,164	0.0	0.0
	SR 170 SB Ramps	SR 170 SB	Victory Boulevard	5,796	539	7,312	680	1.0	1.0
	SR 170 SB Ramps	Victory Boulevard	SR 170 SB	13,419	1,248	13,419	1,248	0.0	0.0
	Laurel Canyon Boulevard	Valerio Street	Sherman Way	21,785	2,026	21,785	2,026	0.0	0.0
	Laurel Canyon Boulevard	Sherman Way	Vanowen Way	23,452	2,181	23,452	2,181	0.0	0.0
	Laurel Canyon Boulevard	Hamlin Street	Victory Boulevard	21,849	2,032	21,849	2,032	0.0	0.0
	Laurel Canyon Boulevard	Victory Boulevard	Sylvan Street	21,312	1,982	21,312	1,982	0.0	0.0
	Lankershim Boulevard	Valerio Street	Sherman Way	21,699	2,018	21,699	2,018	0.0	0.0
	Lankershim Boulevard	Sherman Way	Vose Street	18,978	1,765	18,978	1,765	0.0	0.0
	Lankershim Boulevard	Hamlin Street	Victory Boulevard	21,247	1,976	21,247	1,976	0.0	0.0
	Lankershim Boulevard	Victory Boulevard	Sylvan Street	21,097	1,962	21,097	1,962	0.0	0.0
	Sherman Way	Bellaire Avenue	SR 170 SB Ramps	39,484	3,672	39,634	3,686	0.0	0.0
	Sherman Way	SR 170 SB Ramps	Laurel Canyon Boulevard	34,032	3,165	34,419	3,201	0.0	0.0
	Sherman Way	Laurel Canyon Boulevard	Lankershim Boulevard	25,118	2,336	25,505	2,372	0.1	0.1
	Sherman Way	Lankershim Boulevard	Tujunga Avenue	23,677	2,202	24,065	2,238	0.1	0.1
	Victory Boulevard	Whittsett Avenue	SR 170 SB Ramps	49,398	4,594	49,548	4,608	0.0	0.0
	Victory Boulevard	SR 170 SB Ramps	Laurel Canyon Boulevard	44,591	4,147	46,258	4,302	0.2	0.2
	Victory Boulevard	Laurel Canyon Boulevard	Lankershim Boulevard	31,785	2,956	34,946	3,250	0.4	0.4
	Victory Boulevard	Lankershim Boulevard	Tujunga Avenue	28,731	2,672	31,892	2,966	0.5	0.5

Jurisdiction	Roadway	Limits		Existing Baseline		Existing With Project		Change in Noise Level (ADT)	Change in Noise Level (Peak-Hour)
		From	To	Average Daily Traffic	Peak-Hour Traffic	Average Daily Traffic	Peak-Hour Traffic		
Sun Valley	Sunland Boulevard	Penrose Street	Glenoaks Boulevard	22,183	2,063	22,333	2,077	0.0	0.0
	Sunland Boulevard	Glenoaks Boulevard	Vinedale Street	16,075	1,495	16,226	1,509	0.0	0.0
	Sunland Boulevard	Nettleton Street	I-5 NB Ramps	22,129	2,058	22,280	2,072	0.0	0.0
	Sunland Boulevard	I-5 NB Ramps	Roscoe Boulevard	22,366	2,080	22,591	2,101	0.0	0.0
	Sunland Boulevard	Roscoe Boulevard	San Fernando Minor	22,409	2,084	22,710	2,112	0.1	0.1
	Sunland Boulevard	San Fernando Minor	San Fernando Road	24,032	2,235	31,215	2,903	1.1	1.1
	Sunland Boulevard	San Fernando Road	Strathern Street	23,656	2,200	23,935	2,226	0.1	0.1
	Vineland Avenue	Strathern Street	Staticoy Street	22,452	2,088	22,731	2,114	0.1	0.1
North Hollywood	Vineland Avenue	Staticoy Street	Sherman Way	21,785	2,026	22,065	2,052	0.1	0.1
	Vineland Avenue	Sherman Way	Vanowen Way	25,957	2,414	26,108	2,428	0.0	0.0
	Vineland Avenue	Vanowen Way	Victory Boulevard	22,161	2,061	22,161	2,061	0.0	0.0
	Vineland Avenue	Victory Boulevard	Oxnard Street	21,226	1,974	21,505	2,000	0.1	0.1
	Vineland Avenue	Oxnard Street	Burbank Boulevard	21,054	1,958	21,333	1,984	0.1	0.1
	Vineland Avenue	Burbank Boulevard	Magnolia Boulevard	22,441	2,087	22,720	2,113	0.1	0.1
	Clybourn Avenue	Vanowen Street	Victory Boulevard	2,806	261	2,806	261	0.0	0.0
Sun Valley	I-5 NB Ramps	I-5 NB	Sunland Boulevard	4,505	419	4,581	426	0.1	0.1
	I-5 NB Ramps	Sunland Boulevard	I-5 NB	6,032	561	6,032	561	0.0	0.0
	I-5 SB Ramps	Sunland Boulevard	I-5 SB	5,398	502	5,473	509	0.1	0.1
	I-5 SB Ramps	I-5 SB	Sunland Boulevard	5,839	543	5,839	543	0.0	0.0
	San Fernando Minor	Vineland Avenue	Sunland Boulevard	946	88	3,022	281	5.0	5.0
	San Fernando Minor	Sunland Boulevard	Clybourn Avenue	4,011	373	8,817	820	3.4	3.4
	San Fernando Road	Ensign Avenue	Sunland Boulevard	8,710	810	14,194	1,320	2.1	2.1
	San Fernando Road	Sunland Boulevard	Clybourn Avenue	10,441	971	12,946	1,204	0.9	0.9
	Strathern Street	Fair Avenue	Vineland Avenue	9,355	870	9,355	870	0.0	0.0

Jurisdiction	Roadway	Limits		Existing Baseline		Existing With Project		Change in Noise Level (ADT)	Change in Noise Level (Peak-Hour)
		From	To	Average Daily Traffic	Peak-Hour Traffic	Average Daily Traffic	Peak-Hour Traffic		
Sun Valley	Strathern Street	Vineland Avenue	Clybourn Avenue	5,720	532	5,720	532	0.0	0.0
	Staticoy Street	Fair Avenue	Vineland Avenue	6,763	629	6,763	629	0.0	0.0
North Hollywood	Staticoy Street	Vineland Avenue	Cleon Avenue	4,183	389	4,183	389	0.0	0.0
	Sherman Way	Tujunga Avenue	Vineland Avenue	14,269	1,327	14,656	1,363	0.1	0.1
	Sherman Way	Vineland Avenue	Clybourn Avenue	9,462	880	9,462	880	0.0	0.0
	Vanowen Street	Tujunga Avenue	Vineland Avenue	20,054	1,865	20,333	1,891	0.1	0.1
	Vanowen Street	Vineland Avenue	Clybourn Avenue	23,634	2,198	24,043	2,236	0.1	0.1
	Vanowen Street	Clybourn Avenue	Hollywood Way	23,011	2,140	23,419	2,178	0.1	0.1
	Vanowen Street	Hollywood Way	Buena Vista Street	11,946	1,111	11,946	1,111	0.0	0.0
	Victory Boulevard	Tujunga Avenue	Vineland Avenue	24,419	2,271	27,581	2,565	0.5	0.5
	Victory Boulevard	Vineland Avenue	Clybourn Avenue	25,785	2,398	29,226	2,718	0.5	0.5
	Burbank Boulevard	Lankershim Boulevard	Vineland Avenue	17,011	1,582	17,011	1,582	0.0	0.0
	Burbank Boulevard	Vineland Avenue	Cahuenga Boulevard	17,731	1,649	17,731	1,649	0.0	0.0
Sun Valley	Glenoaks Boulevard	Penrose Street	Sunland Boulevard	12,452	1,158	12,452	1,158	0.0	0.0
	Glenoaks Boulevard	Sunland Boulevard	Vinedale Street	17,935	1,668	17,935	1,668	0.0	0.0
	Glenoaks Boulevard	Nettleton Street	Roscoe Boulevard	25,806	2,400	25,806	2,400	0.0	0.0
	Glenoaks Boulevard	Roscoe Boulevard	Roscoe Boulevard	19,161	1,782	19,161	1,782	0.0	0.0
	I-5 NB Ramps	I-5 NB	Roscoe Boulevard	4,645	432	4,645	432	0.0	0.0
	Roscoe Boulevard	Wheatland Avenue	Roscoe Boulevard	2,699	251	2,699	251	0.0	0.0
	I-5 SB Ramps	Roscoe Boulevard	I-5 SB	5,366	499	5,366	499	0.0	0.0
	Roscoe Boulevard	Glenoaks Boulevard	I-5 NB Ramps	9,763	908	9,763	908	0.0	0.0
	Roscoe Boulevard	I-5 NB Ramps	I-5 SB Ramps	6,817	634	6,817	634	0.0	0.0
	Clybourn Avenue	San Fernando Road	Staticoy Street	9,860	917	9,860	917	0.0	0.0
	San Fernando Road	Strathern Street	Arvilla Avenue	17,000	1,581	17,989	1,673	0.2	0.2

Jurisdiction	Roadway	Limits		Existing Baseline		Existing With Project		Change in Noise Level (ADT)	Change in Noise Level (Peak-Hour)
		From	To	Average Daily Traffic	Peak-Hour Traffic	Average Daily Traffic	Peak-Hour Traffic		
Sun Valley	Arvilla Avenue	Stagg Street	San Fernando Minor	1,957	182	1,957	182	0.0	0.0
	Arvilla Avenue	San Fernando Minor	San Fernando Road	6,473	602	0	0	0.0	0.0
	Arvilla Avenue	San Fernando Road	Private Drive	1,118	104	1,118	104	0.0	0.0
	San Fernando Minor	Ledge Avenue	Arvilla Avenue	2,903	270	5,634	524	2.9	2.9
	San Fernando Minor	Arvilla Avenue	Arcola Avenue	4,344	404	4,344	404	0.0	0.0
Burbank	San Fernando Minor	Arcola Avenue	Cohasset Street	5,667	527	5,667	527	0.0	0.0
	San Fernando Minor	Cohasset Street	Avon Street	6,774	630	6,774	630	0.0	0.0
	San Fernando Minor	Avon Street	I-5 SB Ramps	4,946	460	4,946	460	0.0	0.0
	San Fernando Minor	I-5 SB Ramps	Buena Vista Street	8,387	780	8,387	780	0.0	0.0
	Winona Avenue	Buena Vista Street	Lincoln Street	5,839	543	5,839	543	0.0	0.0
	San Fernando Road	Arvilla Avenue	Lockheed Drive	11,634	1,082	12,624	1,174	0.4	0.4
	San Fernando Road	Lockheed Drive	Cohasset Street	12,763	1,187	12,763	1,187	0.0	0.0
	San Fernando Road	Cohasset Street	Hollywood Way SB	14,108	1,312	14,849	1,381	0.2	0.2
	San Fernando Road	Hollywood Way SB	Hollywood Way NB	12,656	1,177	13,065	1,215	0.1	0.1
	San Fernando Road	Hollywood Way NB	Ontario Street	11,258	1,047	11,323	1,053	0.0	0.0
	San Fernando Road	Ontario Street	Naomi Street	10,925	1,016	10,989	1,022	0.0	0.0
	San Fernando Road	Naomi Street	Buena Vista Street	14,656	1,363	14,763	1,373	0.0	0.0
	San Fernando Road	Buena Vista Street	Lincoln Street	20,839	1,938	20,903	1,944	0.0	0.0
	San Fernando Road	I-5 SB Ramps	I-5 NB Ramps	35,312	3,284	35,376	3,290	0.0	0.0
	San Fernando Road	I-5 NB Ramps	Grismer Avenue	14,344	1,334	14,409	1,340	0.0	0.0
Sun Valley	Arcola Avenue	Stagg Street	San Fernando Minor	1,032	96	1,032	96	0.0	0.0
	Lockheed Drive	San Fernando Road	Cohasset Street	742	69	978	91	1.2	1.2

Jurisdiction	Roadway	Limits		Existing Baseline		Existing With Project		Change in Noise Level (ADT)	Change in Noise Level (Peak-Hour)
		From	To	Average Daily Traffic	Peak-Hour Traffic	Average Daily Traffic	Peak-Hour Traffic		
Burbank	Cohasset Street	San Fernando Minor	Hollywood Way	2,570	239	2,538	236	-0.1	-0.1
	Cohasset Street	Hollywood Way	Avon Street	5,441	506	5,441	506	0.0	0.0
	Hollywood Way SB	San Fernando Road	Hollywood Way	2,226	207	2,570	239	0.6	0.6
	Hollywood Way NB	San Fernando Road	Hollywood Way	2,946	274	3,290	306	0.5	0.5
	Avon Street	Cohasset Street	San Fernando Minor	2,946	274	2,946	274	0.0	0.0
Sun Valley	Hollywood Way	Glen Oaks Boulevard	I-5 NB Ramps	13,527	1,258	13,527	1,258	0.0	0.0
	Hollywood Way	I-5 NB Ramps	I-5 SB Ramps	22,247	2,069	24,935	2,319	0.5	0.5
Burbank	Hollywood Way	I-5 SB Ramps	Keswick Street	30,452	2,832	35,828	3,332	0.7	0.7
	Hollywood Way	Keswick Street	Cohasset Street	29,452	2,739	34,828	3,239	0.7	0.7
	Hollywood Way	Cohasset Street	Tulare Avenue	30,097	2,799	35,774	3,327	0.8	0.8
	Hollywood Way	Tulare Avenue	Winona Avenue	31,043	2,887	38,161	3,549	0.9	0.9
	Hollywood Way	Winona Avenue	Thornton Avenue	31,624	2,941	39,065	3,633	0.9	0.9
	Hollywood Way	Thornton Avenue	Avon Street	32,022	2,978	39,462	3,670	0.9	0.9
	Hollywood Way	Avon Street	Empire Avenue	2,441	227	2,505	233	0.1	0.1
	Avon Street	Hollywood Way	Empire Avenue	3,968	369	4,376	407	0.4	0.4
	Hollywood Way	Empire Avenue	Victory Boulevard	30,677	2,853	37,645	3,501	0.9	0.9
	Hollywood Way	Victory Boulevard	Burbank Boulevard	25,882	2,407	29,409	2,735	0.6	0.6
	Hollywood Way	Burbank Boulevard	Magnolia Boulevard	26,237	2,440	29,720	2,764	0.5	0.5
	Hollywood Way	Magnolia Boulevard	Verdugo Avenue	24,376	2,267	27,688	2,575	0.6	0.6
	Hollywood Way	Verdugo Avenue	Alameda Avenue	21,527	2,002	24,839	2,310	0.6	0.6
	Hollywood Way	Alameda Avenue	Riverside Drive	18,806	1,749	19,086	1,775	0.1	0.1
	Hollywood Way	Riverside Drive	Olive Avenue	11,419	1,062	11,699	1,088	0.1	0.1
	Pass Avenue	Oak Street	SR 134 EB Ramps	14,280	1,328	14,280	1,328	0.0	0.0
	Pass Avenue	SR 134 EB Ramps	Alameda Avenue	13,882	1,291	15,398	1,432	0.5	0.5

Jurisdiction	Roadway	Limits		Existing Baseline		Existing With Project		Change in Noise Level (ADT)	Change in Noise Level (Peak-Hour)
		From	To	Average Daily Traffic	Peak-Hour Traffic	Average Daily Traffic	Peak-Hour Traffic		
Burbank	Pass Avenue	Alameda Avenue	Olive Avenue	10,247	953	10,247	953	0.0	0.0
	SR 134 EB On-Ramp	Riverside Drive	SR 134 EB	6,215	578	6,215	578	0.0	0.0
	SR 134 WB On-Ramp	Alameda Avenue	SR 134 WB	5,957	554	5,957	554	0.0	0.0
	SR 134 WB Off-Ramp	SR 134 WB	Alameda Avenue	5,097	474	5,097	474	0.0	0.0
	I-5 SB Ramps	I-5 SB	San Fernando Minor	8,398	781	8,398	781	0.0	0.0
Sun Valley	Glenoaks Boulevard	Meritage Court	Hollywood Way	21,344	1,985	21,344	1,985	0.0	0.0
	Glenoaks Boulevard	Hollywood Way	Shadyspring Place	17,258	1,605	17,258	1,605	0.0	0.0
	I-5 NB On-Ramp	I-5 NB	Hollywood Way	11,054	1,028	13,290	1,236	0.8	0.8
	I-5 NB Off-Ramp	Hollywood Way	I-5 NB	2,914	271	3,366	313	0.6	0.6
	I-5 SB Off-Ramp	I-5 SB	Hollywood Way	6,742	627	8,978	835	1.2	1.2
	Keswick Street	Clayback Avenue	Hollywood Way	2,065	192	2,065	192	0.0	0.0
Burbank	Cohasset Street	Avon Street	Glenoaks Boulevard	5,548	516	5,548	516	0.0	0.0
	Winona Avenue	Hollywood Way	Ontario Street	5,409	503	6,462	601	0.8	0.8
	Winona Avenue	Ontario Street	San Fernando Road	3,452	321	3,495	325	0.1	0.1
	Airport	Private	Hollywood Way	10,785	1,003	10,785	1,003	0.0	0.0
	Thornton Avenue	Hollywood Way	Ontario Street	8,011	745	8,011	745	0.0	0.0
	Thornton Avenue	Ontario Street	Buena Vista Street	8,935	831	8,935	831	0.0	0.0
	Thornton Avenue	Buena Vista Street	Lincoln Street	7,978	742	7,978	742	0.0	0.0
	Empire Avenue	Clybourn Avenue	Hollywood Way	11,269	1,048	11,677	1,086	0.2	0.2
	Empire Avenue	Hollywood Way	Avon Street	10,280	956	10,624	988	0.1	0.1
	Empire Avenue	Avon Street	Ontario Street	11,613	1,080	11,677	1,086	0.0	0.0
	Empire Avenue	Ontario Street	Buena Vista Street	11,118	1,034	11,290	1,050	0.1	0.1
	Empire Avenue	Buena Vista Street	Lincoln Street	21,849	2,032	22,086	2,054	0.0	0.0
	Empire Avenue	Lincoln Street	Valpreda Street	15,118	1,406	15,333	1,426	0.1	0.1

Jurisdiction	Roadway	Limits		Existing Baseline		Existing With Project		Change in Noise Level (ADT)	Change in Noise Level (Peak-Hour)
		From	To	Average Daily Traffic	Peak-Hour Traffic	Average Daily Traffic	Peak-Hour Traffic		
Burbank	Empire Avenue	Valpreda Street	Victory Place	14,344	1,334	14,559	1,354	0.1	0.1
	Victory Place	Maria Street	Empire Avenue	8,473	788	8,538	794	0.0	0.0
	Victory Place	Empire Avenue	Lake Street	14,344	1,334	14,409	1,340	0.0	0.0
	Empire Avenue	Victory Place	I-5 SB Ramps	Future Roadway Segment					
	Empire Avenue	I-5 SB Ramps	I-5 NB Ramps	Future Roadway Segment					
	San Fernando Boulevard	I-5 NB Ramps	Grismer Avenue	2,634	245	2,742	255	0.2	0.2
	Victory Boulevard	Clybourn Avenue	Hollywood Way	24,075	2,239	27,516	2,559	0.6	0.6
	Victory Boulevard	Hollywood Way	Buena Vista Street	21,602	2,009	21,602	2,009	0.0	0.0
	Victory Boulevard	Hollywood Way	Burbank Boulevard	19,527	1,816	19,527	1,816	0.0	0.0
	Burbank Boulevard	Clybourn Avenue	Hollywood Way	19,839	1,845	19,839	1,845	0.0	0.0
	Burbank Boulevard	Hollywood Way	Buena Vista Street	21,527	2,002	21,570	2,006	0.0	0.0
	Burbank Boulevard	Buena Vista Street	Victory Boulevard	18,398	1,711	18,441	1,715	0.0	0.0
	Magnolia Boulevard	Clybourn Avenue	Hollywood Way	19,527	1,816	19,527	1,816	0.0	0.0
	Magnolia Boulevard	Hollywood Way	Buena Vista Street	21,194	1,971	21,366	1,987	0.0	0.0
	Verdugo Avenue	Clybourn Avenue	Hollywood Way	16,978	1,579	16,978	1,579	0.0	0.0
	Verdugo Avenue	Hollywood Way	Buena Vista Street	14,538	1,352	14,538	1,352	0.0	0.0
	SR 134 EB Ramps	SR 134 EB	Pass Avenue	8,484	789	10,000	930	0.7	0.7
	Alameda Avenue	Clybourn Avenue	Pass Avenue	15,011	1,396	15,011	1,396	0.0	0.0
	Alameda Avenue	Pass Avenue	Hollywood Way	24,806	2,307	27,839	2,589	0.5	0.5
	Alameda Avenue	Hollywood Way	SR 134 WB Ramps	27,828	2,588	27,828	2,588	0.0	0.0
	Alameda Avenue	SR 134 WB Ramps	Olive Avenue	18,849	1,753	18,849	1,753	0.0	0.0
	Riverside Drive	Pass Avenue	SR 134 EB Ramps	11,667	1,085	11,667	1,085	0.0	0.0
	Riverside Drive	SR 134 EB Ramps	Hollywood Way	13,366	1,243	13,366	1,243	0.0	0.0
	Riverside Drive	Hollywood Way	Olive Avenue	12,430	1,156	12,430	1,156	0.0	0.0

Jurisdiction	Roadway	Limits		Existing Baseline		Existing With Project		Change in Noise Level (ADT)	Change in Noise Level (Peak-Hour)
		From	To	Average Daily Traffic	Peak-Hour Traffic	Average Daily Traffic	Peak-Hour Traffic		
Burbank	Olive Avenue	Hood Avenue	Pass Avenue	39,935	3,714	40,215	3,740	0.0	0.0
	Olive Avenue	Pass Avenue	Hollywood Way	32,075	2,983	32,355	3,009	0.0	0.0
	Olive Avenue	Hollywood Way	Cordova Street	22,323	2,076	22,323	2,076	0.0	0.0
	Ontario Street	San Fernando Road	Winona Avenue	1,462	136	1,462	136	0.0	0.0
	Ontario Street	Winona Avenue	Thornton Avenue	2,731	254	2,839	264	0.2	0.2
	Ontario Street	Thornton Avenue	Empire Avenue	4,860	452	4,968	462	0.1	0.1
Sun Valley	Cohasset Street	Glenoaks Boulevard	Ontario Street	5,882	547	5,882	547	0.0	0.0
	Glenoaks Boulevard	Cabrini Drive	Cohasset Street	21,161	1,968	21,161	1,968	0.0	0.0
	Glenoaks Boulevard	Cohasset Street	Buena Vista Street	25,538	2,375	25,538	2,375	0.0	0.0
Burbank	Glenoaks Boulevard	Buena Vista Street	Tulare Avenue	18,935	1,761	18,935	1,761	0.0	0.0
	I-5 SB Ramps	I-5 SB	San Fernando Minor	8,398	781	8,398	781	0.0	0.0
	Buena Vista Street	Kenneth Road	Glenoaks Boulevard	3,978	370	3,978	370	0.0	0.0
	Buena Vista Street	Glenoaks Boulevard	I-5 NB Ramps	14,108	1,312	14,108	1,312	0.0	0.0
	Buena Vista Street	I-5 NB Ramps	Winona Avenue	18,763	1,745	18,763	1,745	0.0	0.0
	Buena Vista Street	Winona Avenue	San Fernando Road	24,086	2,240	24,086	2,240	0.0	0.0
	Buena Vista Street	San Fernando Road	Thornton Avenue	21,505	2,000	21,548	2,004	0.0	0.0
	Buena Vista Street	Thornton Avenue	Empire Avenue	20,118	1,871	20,161	1,875	0.0	0.0
	Buena Vista Street	Empire Avenue	Vanowen Way	28,935	2,691	28,935	2,691	0.0	0.0
	Buena Vista Street	Vanowen Way	Victory Boulevard	25,204	2,344	25,204	2,344	0.0	0.0
	Buena Vista Street	Victory Boulevard	Burbank Boulevard	25,473	2,369	25,473	2,369	0.0	0.0
	Buena Vista Street	Burbank Boulevard	Magnolia Boulevard	25,892	2,408	25,892	2,408	0.0	0.0
	Buena Vista Street	Magnolia Boulevard	Olive Avenue	24,280	2,258	24,280	2,258	0.0	0.0
	Buena Vista Street	Olive Avenue	Alameda Avenue	20,032	1,863	20,032	1,863	0.0	0.0

Jurisdiction	Roadway	Limits		Existing Baseline		Existing With Project		Change in Noise Level (ADT)	Change in Noise Level (Peak-Hour)
		From	To	Average Daily Traffic	Peak-Hour Traffic	Average Daily Traffic	Peak-Hour Traffic		
Burbank	Buena Vista Street	Alameda Avenue	Riverside Drive	18,065	1,680	18,065	1,680	0.0	0.0
	Lincoln Street	San Fernando Road	Empire Avenue	15,247	1,418	15,247	1,418	0.0	0.0
	I-5 NB Ramps	I-5 NB	Buena Vista Street	11,097	1,032	11,097	1,032	0.0	0.0
	Thornton Avenue	Naomi Street	Buena Vista Street	8,935	831	8,935	831	0.0	0.0
	Thornton Avenue	Buena Vista Street	Lincoln Street	7,978	742	7,978	742	0.0	0.0
	Olive Avenue	Alameda Avenue	Buena Vista Street	23,699	2,204	23,699	2,204	0.0	0.0
	Olive Avenue	Buena Vista Street	Keystone Street	21,968	2,043	21,968	2,043	0.0	0.0
	Alameda Avenue	Olive Avenue	Buena Vista Street	20,828	1,937	20,828	1,937	0.0	0.0
	Alameda Avenue	Buena Vista Street	Keystone Street	23,720	2,206	23,720	2,206	0.0	0.0
	Victory Place	Lincoln Street	Empire Avenue	8,473	788	8,538	794	0.0	0.0
	Victory Place	Empire Avenue	Burbank Boulevard	23,215	2,159	23,258	2,163	0.0	0.0
	Victory Boulevard	Burbank Boulevard	Magnolia Boulevard	26,355	2,451	26,376	2,453	0.0	0.0
	Victory Boulevard	Magnolia Boulevard	Olive Avenue	25,204	2,344	25,204	2,344	0.0	0.0
	Victory Boulevard	Olive Avenue	Alameda Avenue	21,419	1,992	21,419	1,992	0.0	0.0
	Victory Boulevard	Alameda Avenue	Linden Avenue	16,871	1,569	16,871	1,569	0.0	0.0
	Burbank Boulevard	Buena Vista Street	Victory Boulevard	42,742	3,975	42,806	3,981	0.0	0.0
	Burbank Boulevard	Victory Boulevard	Front Street	39,323	3,657	39,387	3,663	0.0	0.0
	Burbank Boulevard	Front Street	I-5 NB Ramps	42,753	3,976	42,817	3,982	0.0	0.0
	Burbank Boulevard	I-5 NB Ramps	San Fernando Boulevard	34,333	3,193	34,398	3,199	0.0	0.0
	Burbank Boulevard	San Fernando Boulevard	3rd Street	34,645	3,222	34,710	3,228	0.0	0.0
	Magnolia Boulevard	Buena Vista Street	Victory Boulevard	22,161	2,061	22,204	2,065	0.0	0.0
	Magnolia Boulevard	5th Street	Glenoaks Boulevard	7,473	695	7,473	695	0.0	0.0
	Magnolia Boulevard	Glenoaks Boulevard	3rd Street	13,548	1,260	13,548	1,260	0.0	0.0
	Magnolia Boulevard	3rd Street	1st Street	17,505	1,628	17,570	1,634	0.0	0.0

Jurisdiction	Roadway	Limits		Existing Baseline		Existing With Project		Change in Noise Level (ADT)	Change in Noise Level (Peak-Hour)
		From	To	Average Daily Traffic	Peak-Hour Traffic	Average Daily Traffic	Peak-Hour Traffic		
Burbank	Magnolia Boulevard	1st Street	Victory Boulevard	21,957	2,042	22,022	2,048	0.0	0.0
	Glenoaks Boulevard	San Jose Avenue	Magnolia Boulevard	29,280	2,723	29,280	2,723	0.0	0.0
	Glenoaks Boulevard	Magnolia Boulevard	Olive Avenue	29,333	2,728	29,333	2,728	0.0	0.0
	Glenoaks Boulevard	Olive Avenue	Verdugo Avenue	28,355	2,637	28,355	2,637	0.0	0.0
	3rd Street	Amherst Drive	Burbank Boulevard	10,118	941	10,118	941	0.0	0.0
	3rd Street	Burbank Boulevard	Magnolia Boulevard	19,452	1,809	19,516	1,815	0.0	0.0
	3rd Street	Magnolia Boulevard	Olive Avenue	11,462	1,066	11,462	1,066	0.0	0.0
	3rd Street	Olive Avenue	Verdugo Avenue	6,860	638	6,860	638	0.0	0.0
	San Fernando Boulevard	Delaware Road	Burbank Boulevard	16,065	1,494	16,065	1,494	0.0	0.0
	San Fernando Boulevard	Burbank Boulevard	Cypress Avenue	40,720	3,787	40,720	3,787	0.0	0.0
	I-5 NB Off-Ramp	I-5 NB	Burbank Boulevard	6,011	559	6,011	559	0.0	0.0
	I-5 SB Off-Ramp	I-5 SB	Burbank Boulevard	8,839	822	8,839	822	0.0	0.0
	Front Street	Burbank Boulevard	I-5 SB Ramps	7,667	713	7,667	713	0.0	0.0
	Alameda Avenue	6th Street	Glenoaks Boulevard	8,624	802	8,624	802	0.0	0.0
	Alameda Avenue	Glenoaks Boulevard	San Fernando Road	18,129	1,686	18,129	1,686	0.0	0.0
	Alameda Avenue	Lake Street	Victory Boulevard	27,161	2,526	27,161	2,526	0.0	0.0
	Alameda Avenue	Victory Boulevard	Chavez Street	23,043	2,143	23,043	2,143	0.0	0.0
	Glenoaks Boulevard	Providencia Avenue	Alameda Avenue	31,763	2,954	31,763	2,954	0.0	0.0
	Glenoaks Boulevard	Alameda Avenue	Linden Avenue	32,000	2,976	32,000	2,976	0.0	0.0
	Victory Boulevard	Providencia Avenue	Alameda Avenue	18,215	1,694	18,215	1,694	0.0	0.0
	Victory Boulevard	Alameda Avenue	Allen Avenue	16,871	1,569	16,871	1,569	0.0	0.0
Glendale	Lake Street	Allen Avenue	Western Avenue	4,312	401	4,312	401	0.0	0.0
	Lake Street	Western Avenue	Sonora Avenue	3,194	297	3,194	297	0.0	0.0
	Flower Street	Alameda Street	Allen Avenue	9,054	842	9,054	842	0.0	0.0

Jurisdiction	Roadway	Limits		Existing Baseline		Existing With Project		Change in Noise Level (ADT)	Change in Noise Level (Peak-Hour)
		From	To	Average Daily Traffic	Peak-Hour Traffic	Average Daily Traffic	Peak-Hour Traffic		
Glendale	Flower Street	Allen Avenue	Western Avenue	10,473	974	10,473	974	0.0	0.0
	Flower Street	Western Avenue	Sonora Avenue	17,269	1,606	17,269	1,606	0.0	0.0
	Flower Street	Sonora Avenue	Grandview Avenue	15,860	1,475	15,860	1,475	0.0	0.0
	Flower Street	Grandview Avenue	Fairmont Avenue	14,452	1,344	14,452	1,344	0.0	0.0
	Grand Central Avenue	Sonora Avenue	Grandview Avenue	5,634	524	5,634	524	0.0	0.0
	Grand Central Avenue	Grandview Avenue	Flower Street	2,903	270	2,903	270	0.0	0.0
	Air Way	Sonora Avenue	Grandview Avenue	3,258	303	3,258	303	0.0	0.0
	Air Way	Grandview Avenue	Flower Street	2,290	213	2,290	213	0.0	0.0
	San Fernando Road	Alameda Street	Linden Avenue	19,323	1,797	19,323	1,797	0.0	0.0
	San Fernando Road	Linden Avenue	Allen Avenue	19,505	1,814	19,505	1,814	0.0	0.0
	San Fernando Road	Allen Avenue	Western Avenue	22,172	2,062	22,172	2,062	0.0	0.0
	San Fernando Road	Western Avenue	Ruberta Avenue	22,409	2,084	22,409	2,084	0.0	0.0
	San Fernando Road	Ruberta Avenue	Sonora Avenue	21,204	1,972	21,204	1,972	0.0	0.0
	San Fernando Road	Sonora Avenue	Grandview Avenue	23,000	2,139	23,000	2,139	0.0	0.0
	San Fernando Road	Grandview Avenue	Norton Avenue	25,065	2,331	25,065	2,331	0.0	0.0
	San Fernando Road	Norton Avenue	Flower Street-Pelanconi Avenue	24,968	2,322	24,968	2,322	0.0	0.0
	San Fernando Road	Flower Street-Pelanconi Avenue	Alma Street	28,634	2,663	28,634	2,663	0.0	0.0
	San Fernando Road	Alma Street	Kellogg Avenue	28,699	2,669	28,699	2,669	0.0	0.0
	San Fernando Road	Kellogg Avenue	Fairmont Avenue	31,011	2,884	31,011	2,884	0.0	0.0
	San Fernando Road	Fairmont Avenue	Doran Street	29,817	2,773	29,817	2,773	0.0	0.0
	San Fernando Road	Doran Street	Milford Street	21,860	2,033	21,860	2,033	0.0	0.0
	Glenoaks Boulevard	Raymond Avenue	Western Avenue	31,022	2,885	31,022	2,885	0.0	0.0

Jurisdiction	Roadway	Limits		Existing Baseline		Existing With Project		Change in Noise Level (ADT)	Change in Noise Level (Peak-Hour)
		From	To	Average Daily Traffic	Peak-Hour Traffic	Average Daily Traffic	Peak-Hour Traffic		
Glendale	Glenoaks Boulevard	Western Avenue	Sonora Avenue	33,720	3,136	33,720	3,136	0.0	0.0
	Glenoaks Boulevard	Sonora Avenue	Grandview Avenue	35,097	3,264	35,097	3,264	0.0	0.0
	Glenoaks Boulevard	Grandview Avenue	Graynold Avenue	36,376	3,383	36,376	3,383	0.0	0.0
	Glenoaks Boulevard	Graynold Avenue	Norton Avenue	36,194	3,366	36,194	3,366	0.0	0.0
	Glenoaks Boulevard	Norton Avenue	Pelanconi Avenue	36,710	3,414	36,710	3,414	0.0	0.0
	Glenoaks Boulevard	Pelanconi Avenue	Alma Street	36,656	3,409	36,656	3,409	0.0	0.0
	Glenoaks Boulevard	Alma Street	Highland Avenue	36,677	3,411	36,677	3,411	0.0	0.0
	Glenoaks Boulevard	Highland Avenue	Estelle Avenue	35,882	3,337	35,882	3,337	0.0	0.0
	Linden Avenue	San Fernando Road	Glenoaks Boulevard	634	59	634	59	0.0	0.0
	Allen Avenue	Lake Street	Flower Street	1,935	180	1,935	180	0.0	0.0
	Allen Avenue	Flower Street	San Fernando Road	1,742	162	1,742	162	0.0	0.0
	Allen Avenue	San Fernando Road	Glenoaks Boulevard	3,172	295	3,172	295	0.0	0.0
	Western Avenue	Victory Boulevard	Lake Street	13,280	1,235	13,280	1,235	0.0	0.0
	Western Avenue	Lake Street	Flower Street	21,312	1,982	21,312	1,982	0.0	0.0
	Western Avenue	Flower Street	San Fernando Road	21,247	1,976	21,247	1,976	0.0	0.0
	Western Avenue	San Fernando Road	Glenoaks Boulevard	14,129	1,314	14,129	1,314	0.0	0.0
	Western Avenue	Glenoaks Boulevard	Glenwood Road	10,075	937	10,075	937	0.0	0.0
	Ruberta Avenue	Private	San Fernando Road	925	86	925	86	0.0	0.0
	Ruberta Avenue	San Fernando Road	Glenoaks Boulevard	1,839	171	1,839	171	0.0	0.0
	Sonora Avenue	Lake Street	Flower Street	17,097	1,590	17,097	1,590	0.0	0.0
	Sonora Avenue	Flower Street	Grand Central Avenue	18,290	1,701	18,290	1,701	0.0	0.0
	Sonora Avenue	Grand Central Avenue	Air Way	15,387	1,431	15,387	1,431	0.0	0.0
	Sonora Avenue	Air Way	San Fernando Road	14,989	1,394	14,989	1,394	0.0	0.0
	Sonora Avenue	San Fernando Road	Glenoaks Boulevard	10,548	981	10,548	981	0.0	0.0

Jurisdiction	Roadway	Limits		Existing Baseline		Existing With Project		Change in Noise Level (ADT)	Change in Noise Level (Peak-Hour)
		From	To	Average Daily Traffic	Peak-Hour Traffic	Average Daily Traffic	Peak-Hour Traffic		
Glendale	Sonora Avenue	Glenoaks Boulevard	5th Street	8,226	765	8,226	765	0.0	0.0
	Grandview Avenue	Flower Street	Grand Central Avenue	3,753	349	3,753	349	0.0	0.0
	Grandview Avenue	Grand Central Avenue	Air Way	2,774	258	2,774	258	0.0	0.0
	Grandview Avenue	Air Way	San Fernando Road	2,559	238	2,559	238	0.0	0.0
	Grandview Avenue	San Fernando Road	Glenoaks Boulevard	6,172	574	6,172	574	0.0	0.0
	Grandview Avenue	Glenoaks Boulevard	Glenwood Road	6,054	563	6,054	563	0.0	0.0
	Graynold Avenue	Zook Drive	Glenoaks Boulevard	591	55	591	55	0.0	0.0
	Graynold Avenue	Glenoaks Boulevard	Glenwood Road	946	88	946	88	0.0	0.0
	Norton Avenue	San Fernando Road	Glenoaks Boulevard	806	75	806	75	0.0	0.0
	Norton Avenue	Glenoaks Boulevard	Glenwood Road	258	24	258	24	0.0	0.0
	Flower Street	Flower Street-Fairmont Avenue	Air Way	15,559	1,447	15,559	1,447	0.0	0.0
	Flower Street	Air Way	San Fernando Road	3,796	353	3,796	353	0.0	0.0
	Pelanconi Avenue	San Fernando Road	Glenoaks Boulevard	312	29	312	29	0.0	0.0
	Alma Street	San Fernando Road	Glenoaks Boulevard	484	45	484	45	0.0	0.0
	Alma Street	Glenoaks Boulevard	Glenwood Road	226	21	226	21	0.0	0.0
	Kellogg Avenue	San Fernando Road	Pelanconi Avenue	602	56	602	56	0.0	0.0
	Highland Avenue	San Fernando Road	Glenoaks Boulevard	5,484	510	5,484	510	0.0	0.0
	Highland Avenue	Glenoaks Boulevard	Glenwood Road	5,753	535	5,753	535	0.0	0.0
	Fairmont Avenue	San Fernando Road	SR 134 WB Ramps	24,548	2,283	24,548	2,283	0.0	0.0
	Fairmont Avenue	SR 134 WB Ramps	Concord Street	14,194	1,320	14,194	1,320	0.0	0.0
	Doran Street	San Fernando Road	SR 134 EB Ramps-Commercial Street	10,978	1,021	10,978	1,021	0.0	0.0
	Doran Street	SR 134 EB Ramps-Commercial Street	State Street	10,323	960	10,323	960	0.0	0.0

Jurisdiction	Roadway	Limits		Existing Baseline		Existing With Project		Change in Noise Level (ADT)	Change in Noise Level (Peak-Hour)
		From	To	Average Daily Traffic	Peak-Hour Traffic	Average Daily Traffic	Peak-Hour Traffic		
Los Angeles	Glenfeliz Boulevard	Glemanor Place	Glendale Boulevard	6,978	649	6,978	649	0.0	0.0
	Glenhurst Avenue	Glendale Boulevard	Tyburn Street	3,946	367	3,946	367	0.0	0.0
	Brunswick Avenue	Baywood Street	Chevy Chase Drive	3,570	332	4,258	396	0.8	0.8
	Brunswick Avenue	Chevy Chase Drive	Los Feliz Boulevard	5,419	504	5,419	504	0.0	0.0
	Brunswick Avenue	Los Feliz Boulevard	Glendale Boulevard	4,473	416	4,473	416	0.0	0.0
	Larga Avenue	Glendale Boulevard	Tyburn Street	2,968	276	2,968	276	0.0	0.0
	Perlita Avenue	Chevy Chase Drive	Rigali Avenue	763	71	763	71	0.0	0.0
	La Clede Avenue	Chevy Chase Drive	Verdant Street	957	89	957	89	0.0	0.0
	La Clede Avenue	Glendale Boulevard	Fletcher Drive	2,624	244	2,624	244	0.0	0.0
	La Clede Avenue	Fletcher Drive	Carillon Street	3,151	293	3,151	293	0.0	0.0
	Casitas Avenue	Topock Street	Tyburn Street	710	66	710	66	0.0	0.0
	Casitas Avenue	Tyburn Street	Silver Lake Boulevard	1,065	99	1,065	99	0.0	0.0
	Casitas Avenue	Silver Lake Boulevard	Minneapolis Street	1,065	99	1,065	99	0.0	0.0
	W San Fernando Road	Bermis Street	Chevy Chase Drive	2,785	259	4,731	440	2.3	2.3
Glendale	San Fernando Road	Acacia Avenue	Chevy Chase Drive	25,656	2,386	29,710	2,763	0.6	0.6
	San Fernando Road	Chevy Chase Drive	Los Feliz Boulevard	21,753	2,023	20,978	1,951	-0.2	-0.2
	San Fernando Road	Los Feliz Boulevard	Central Avenue	15,140	1,408	15,140	1,408	0.0	0.0
	San Fernando Road	Central Avenue	El Bonito Avenue	19,796	1,841	19,796	1,841	0.0	0.0
	San Fernando Road	El Bonito Avenue	Cerritos Avenue	19,720	1,834	19,720	1,834	0.0	0.0
	San Fernando Road	Cerritos Avenue	Mira Loma Avenue	18,000	1,674	18,000	1,674	0.0	0.0
	San Fernando Road	Mira Loma Avenue	Glendale Boulevard	18,667	1,736	18,667	1,736	0.0	0.0

Jurisdiction	Roadway	Limits		Existing Baseline		Existing With Project		Change in Noise Level (ADT)	Change in Noise Level (Peak-Hour)
		From	To	Average Daily Traffic	Peak-Hour Traffic	Average Daily Traffic	Peak-Hour Traffic		
Los Angeles	San Fernando Road	Glendale Boulevard	Tyburn Street	25,817	2,401	25,817	2,401	0.0	0.0
	San Fernando Road	Tyburn Street	Fletcher Drive	27,247	2,534	27,247	2,534	0.0	0.0
	San Fernando Road	Fletcher Drive	SR-2 SB Ramps	30,860	2,870	30,860	2,870	0.0	0.0
	San Fernando Road	SR-2 SB Ramps	SR-2 NB Off-Ramp	28,333	2,635	28,333	2,635	0.0	0.0
	San Fernando Road	SR-2 NB Off-Ramp	SR-2 NB On-Ramp	28,667	2,666	28,667	2,666	0.0	0.0
	San Fernando Road	SR-2 NB On-Ramp	Edward Avenue	31,656	2,944	31,656	2,944	0.0	0.0
	Silver Lake Boulevard	Casitas Avenue	La Clede Avenue	290	27	290	27	0.0	0.0
	Chevy Chase Drive	Edenhurst Avenue	Brunswick Avenue	1,075	100	1,376	128	1.1	1.1
	Chevy Chase Drive	Brunswick Avenue	Perlita Avenue	3,312	308	2,731	254	-0.8	-0.8
	Chevy Chase Drive	Perlita Avenue	La Clede Avenue	3,656	340	3,032	282	-0.8	-0.8
	Chevy Chase Drive	La Clede Avenue	W San Fernando Road	4,312	401	5,710	531	1.2	1.2
	Chevy Chase Drive	W San Fernando Road	San Fernando Road	5,763	536	1,688	157	-5.3	-5.3
Glendale	Chevy Chase Drive	San Fernando Road	Central Avenue	12,032	1,119	13,634	1,268	0.5	0.5
	Chevy Chase Drive	Central Avenue	Brand Boulevard	13,591	1,264	13,591	1,264	0.0	0.0
Los Angeles	Los Feliz Road	Edenhurst Avenue	Brunswick Avenue	29,817	2,773	29,817	2,773	0.0	0.0
	Los Feliz Road	Brunswick Avenue	San Fernando Road	28,720	2,671	28,720	2,671	0.0	0.0
Glendale	Los Feliz Road	San Fernando Road	Central Avenue	19,011	1,768	19,011	1,768	0.0	0.0
Los Angeles	Central Avenue	Gardena Avenue	San Fernando Road	2,355	219	2,355	219	0.0	0.0
Glendale	Central Avenue	San Fernando Road	Los Feliz Boulevard	6,559	610	6,559	610	0.0	0.0
Los Angeles	El Bonito Avenue	Gardena Avenue	San Fernando Road	527	49	527	49	0.0	0.0
	Cerritos Avenue	Gardena Avenue	San Fernando Road	2,086	194	2,086	194	0.0	0.0
Glendale	Cerritos Avenue	San Fernando Road	Brand Boulevard	3,538	329	3,538	329	0.0	0.0

Jurisdiction	Roadway	Limits		Existing Baseline		Existing With Project		Change in Noise Level (ADT)	Change in Noise Level (Peak-Hour)
		From	To	Average Daily Traffic	Peak-Hour Traffic	Average Daily Traffic	Peak-Hour Traffic		
Los Angeles	Mira Loma Avenue	Gardena Avenue	San Fernando Road	978	91	978	91	0.0	0.0
	Glendale Boulevard	Hollydale Drive	Glenfeliz Boulevard-Glenhurst Avenue	40,108	3,730	40,108	3,730	0.0	0.0
	Glendale Boulevard	Glenfeliz Boulevard-Glenhurst Avenue	Larga Avenue	33,978	3,160	33,978	3,160	0.0	0.0
	Glendale Boulevard	Larga Avenue	La Clede Avenue	33,054	3,074	33,054	3,074	0.0	0.0
	Glendale Boulevard	La Clede Avenue	San Fernando Road	30,645	2,850	30,645	2,850	0.0	0.0
Glendale	Glendale Boulevard	San Fernando Road	Cerritos Avenue	22,323	2,076	22,323	2,076	0.0	0.0
Los Angeles	Tyburn Street	La Clede Avenue	Casitas Avenue	753	70	753	70	0.0	0.0
	Tyburn Street	Vassar Street	San Fernando Road	1,656	154	1,656	154	0.0	0.0
	Fletcher Drive	Perlita Avenue	La Clede Avenue	15,548	1,446	15,548	1,446	0.0	0.0
	Fletcher Drive	La Clede Avenue	San Fernando Road	14,430	1,342	14,430	1,342	0.0	0.0
	Fletcher Drive	San Fernando Road	Delay Drive	12,624	1,174	12,624	1,174	0.0	0.0
	San Fernando Road	Division Street	Macon Street	24,065	2,238	24,065	2,238	0.0	0.0
	San Fernando Road	Macon Street	Future Street	25,022	2,327	25,022	2,327	0.0	0.0
	San Fernando Road	Future Street	Private	28,032	2,607	28,032	2,607	0.0	0.0
	San Fernando Road	Private	Granada Street	28,011	2,605	28,011	2,605	0.0	0.0
	Macon Street	San Fernando Road	Cypress Avenue	602	56	602	56	0.0	0.0
	Future Street	San Fernando Road	Cypress Avenue	3,323	309	3,323	309	0.0	0.0
	Private	–	San Fernando Road	409	38	409	38	0.0	0.0
	Figueroa Street	Figueroa Terrace	Alpine Street	10,602	986	10,688	994	0.0	0.0
	Figueroa Street	Alpine Street	Cesar Chavez Avenue	13,699	1,274	13,763	1,280	0.0	0.0
	Figueroa Street	Cesar Chavez Avenue	Temple Street	21,742	2,022	21,785	2,026	0.0	0.0
	Figueroa Street	Temple Street	1st Street	23,624	2,197	23,688	2,203	0.0	0.0

Jurisdiction	Roadway	Limits		Existing Baseline		Existing With Project		Change in Noise Level (ADT)	Change in Noise Level (Peak-Hour)
		From	To	Average Daily Traffic	Peak-Hour Traffic	Average Daily Traffic	Peak-Hour Traffic		
Los Angeles	Grand Avenue	Alpine Street	Cesar Chavez Avenue	8,710	810	8,806	819	0.0	0.0
	Grand Avenue	Cesar Chavez Avenue	Temple Street	20,075	1,867	20,323	1,890	0.1	0.1
	Hill Place	Alpine Street	Cesar Chavez Avenue	24,247	2,255	24,441	2,273	0.0	0.0
	Hill Street	Bamboo Lane	College Street	32,075	2,983	32,839	3,054	0.1	0.1
	Hill Street	College Street	Ord Street	28,731	2,672	28,882	2,686	0.0	0.0
	Hill Street	Ord Street	Cesar Chavez Avenue	25,161	2,340	25,720	2,392	0.1	0.1
	Broadway	Bamboo Lane	College Street	32,075	2,983	32,839	3,054	0.1	0.1
	Broadway	College Street	Alpine Street	28,731	2,672	28,882	2,686	0.0	0.0
	Broadway	Alpine Street	Cesar Chavez Avenue	20,968	1,950	21,237	1,975	0.1	0.1
	Broadway	Cesar Chavez Avenue	US-101 NB On-Ramp	18,484	1,719	18,656	1,735	0.0	0.0
	Broadway	US-101 NB On-Ramp	Arcadia Street	20,774	1,932	20,978	1,951	0.0	0.0
	Broadway	Arcadia Street	Aliso Street	17,215	1,601	17,430	1,621	0.1	0.1
	Broadway	Aliso Street	1st Street	17,215	1,601	17,570	1,634	0.1	0.1
	Broadway	1st Street	2nd Street	10,441	971	10,505	977	0.0	0.0
	Spring Street	Ord Street	Cesar Chavez Avenue	2,495	232	2,495	232	0.0	0.0
	Spring Street	Cesar Chavez Avenue	US-101 NB Off-Ramp	4,677	435	4,677	435	0.0	0.0
	Spring Street	US-101 NB Off-Ramp	Arcadia Street	5,688	529	5,763	536	0.1	0.1
	Spring Street	Arcadia Street	Aliso Street	6,366	592	6,441	599	0.1	0.1
	Spring Street	Aliso Street	Temple Street	5,989	557	6,065	564	0.1	0.1
	Spring Street	Avenue 18	Sotello Street	13,645	1,269	13,742	1,278	0.0	0.0
	Spring Street	Sotello Street	College Street	13,763	1,280	13,860	1,289	0.0	0.0
	Alameda Street	College Street	Alpine Street	20,925	1,946	21,011	1,954	0.0	0.0
	Alameda Street	Alpine Street	Ord Street-Main Street	19,032	1,770	19,204	1,786	0.0	0.0
	Alameda Street	Ord Street-Main Street	Cesar Chavez Avenue	27,118	2,522	27,290	2,538	0.0	0.0
	Alameda Street	Cesar Chavez Avenue	Paseo de la Plaza	19,667	1,829	21,290	1,980	0.3	0.3

Jurisdiction	Roadway	Limits		Existing Baseline		Existing With Project		Change in Noise Level (ADT)	Change in Noise Level (Peak-Hour)
		From	To	Average Daily Traffic	Peak-Hour Traffic	Average Daily Traffic	Peak-Hour Traffic		
Los Angeles	Alameda Street	Paseo de la Plaza	Arcadia Street	26,086	2,426	27,140	2,524	0.2	0.2
	Alameda Street	Arcadia Street	Aliso Street-Commercial Street	27,011	2,512	27,925	2,597	0.1	0.1
	Alameda Street	Aliso Street-Commercial Street	Temple Street	23,280	2,165	24,011	2,233	0.1	0.1
	Alameda Street	Temple Street	1st Street	24,559	2,284	25,032	2,328	0.1	0.1
	Alameda Street	1st Street	2nd Street	21,204	1,972	21,591	2,008	0.1	0.1
	Alameda Street	2nd Street	3rd Street	17,957	1,670	18,355	1,707	0.1	0.1
	Alameda Street	3rd Street	4th Street	20,355	1,893	20,645	1,920	0.1	0.1
	Alameda Street	4th Street	5th Street	21,333	1,984	21,624	2,011	0.1	0.1
	Alameda Street	Olympic Boulevard	Newton Street	24,763	2,303	25,065	2,331	0.1	0.1
	Alameda Street	Newton Street	I-10 EB Ramps	27,387	2,547	27,495	2,557	0.0	0.0
	Alameda Street	I-10 EB Ramps	Washington Boulevard	30,473	2,834	30,473	2,834	0.0	0.0
	Main Street	Wilhardt Street	Sotello Street	18,753	1,744	18,828	1,751	0.0	0.0
	Main Street	Sotello Street	Elmyra Street	18,763	1,745	20,129	1,872	0.3	0.3
	Main Street	Elmyra Street	College Street	19,301	1,795	19,376	1,802	0.0	0.0
	Main Street	College Street	Alpine Street	19,086	1,775	19,161	1,782	0.0	0.0
	Main Street	Alpine Street	Ord Street-Main Street	9,344	869	9,344	869	0.0	0.0
	Main Street	Alameda Street	Cesar Chavez Avenue	10,258	954	10,258	954	0.0	0.0
	Main Street	Cesar Chavez Avenue	1st Street	21,398	1,990	21,398	1,990	0.0	0.0
	Main Street	1st Street	2nd Street	22,032	2,049	22,032	2,049	0.0	0.0
	Judge John Aiso Street	Temple Street	1st Street	7,624	709	7,624	709	0.0	0.0
	Garey Street	US-101 SB Ramps	Ducommun Street	4,720	439	4,839	450	0.1	0.1
	Garey Street	Ducommun Street	Temple Street	4,763	443	4,882	454	0.1	0.1
	Vignes Street	Bauchet Street	Cesar Chavez Avenue	16,624	1,546	16,699	1,553	0.0	0.0

Jurisdiction	Roadway	Limits		Existing Baseline		Existing With Project		Change in Noise Level (ADT)	Change in Noise Level (Peak-Hour)
		From	To	Average Daily Traffic	Peak-Hour Traffic	Average Daily Traffic	Peak-Hour Traffic		
Los Angeles	Vignes Street	Cesar Chavez Avenue	Gateway Plaza-Ramirez Street	19,075	1,774	22,946	2,134	0.8	0.8
	Vignes Street	Jackson Street	Temple Street	2,957	275	2,957	275	0.0	0.0
	Vignes Street	Temple Street	1st Street	3,989	371	4,043	376	0.1	0.1
	Vignes Street	1st Street	2nd Street	2,785	259	2,785	259	0.0	0.0
	Center Street	Vignes Street	Commercial Street	12,462	1,159	13,247	1,232	0.3	0.3
	Center Street	Commercial Street	Temple Street	9,495	883	9,731	905	0.1	0.1
	Center Street	Temple Street	Banning Street	10,065	936	10,065	936	0.0	0.0
	Wilhardt Street	Spring Street	Main Street	763	71	763	71	0.0	0.0
	Sotello Street	Spring Street	Main Street	1,409	131	2,699	251	2.8	2.8
	Elmyra Street	Spring Street	Main Street	763	71	763	71	0.0	0.0
	Elmyra Street	Main Street	Magdalena Street	634	59	634	59	0.0	0.0
	College Street	Yale Street	Hill Street	6,785	631	7,462	694	0.4	0.4
	College Street	Hill Street	Broadway	9,785	910	9,785	910	0.0	0.0
	College Street	Broadway	Spring Street	12,172	1,132	12,172	1,132	0.0	0.0
	College Street	Spring Street	Main Street	3,011	280	3,011	280	0.0	0.0
	College Street	Main Street	Alhambra Avenue	3,968	369	3,968	369	0.0	0.0
	Figueroa Terrace	Beaudry Avenue	Figueroa Street	6,430	598	6,452	600	0.0	0.0
	Figueroa Terrace	Figueroa Street	New Depot Street	7,839	729	7,957	740	0.1	0.1
	Alpine Street	Figueroa Street	Hill Place	6,860	638	6,957	647	0.1	0.1
	Alpine Street	Hill Place	Broadway	8,258	768	8,333	775	0.0	0.0
	Alpine Street	Broadway	Alameda Street	11,452	1,065	11,559	1,075	0.0	0.0
	Alpine Street	Alameda Street	Main Street	13,151	1,223	13,172	1,225	0.0	0.0
	Alpine Street	Main Street	Bauchet Street	14,817	1,378	14,892	1,385	0.0	0.0
	Ord Street	Hill Street	Alameda Street	5,430	505	5,430	505	0.0	0.0

Jurisdiction	Roadway	Limits		Existing Baseline		Existing With Project		Change in Noise Level (ADT)	Change in Noise Level (Peak-Hour)
		From	To	Average Daily Traffic	Peak-Hour Traffic	Average Daily Traffic	Peak-Hour Traffic		
Los Angeles	Bauchet Street	Avila Street	Vignes Street	935	87	935	87	0.0	0.0
	Bauchet Street	Vignes Street	–	4,301	400	4,301	400	0.0	0.0
	Cesar Chavez Avenue	Boston Street	Figueroa Street	26,538	2,468	26,538	2,468	0.0	0.0
	Cesar Chavez Avenue	Figueroa Street	Grand Avenue	26,301	2,446	26,323	2,448	0.0	0.0
	Cesar Chavez Avenue	Grand Avenue	Broadway	28,624	2,662	28,796	2,678	0.0	0.0
	Cesar Chavez Avenue	Broadway	New High Street-Spring Street	26,258	2,442	26,538	2,468	0.0	0.0
	Cesar Chavez Avenue	New High Street-Spring Street	Main Street	28,247	2,627	28,527	2,653	0.0	0.0
	Cesar Chavez Avenue	Main Street	Alameda Street	25,860	2,405	26,129	2,430	0.0	0.0
	Cesar Chavez Avenue	Alameda Street	Vignes Street	25,731	2,393	27,667	2,573	0.3	0.3
	Cesar Chavez Avenue	Vignes Street	Mission Road	26,849	2,497	28,731	2,672	0.3	0.3
	Arcadia Street	Broadway	Spring Street	7,860	731	7,871	732	0.0	0.0
	Arcadia Street	Spring Street	Alameda Street	9,398	874	9,409	875	0.0	0.0
	Aliso Street	Broadway	Spring Street	7,140	664	7,237	673	0.1	0.1
	Aliso Street	Spring Street	Alameda Street	8,419	783	8,516	792	0.0	0.0
	Commercial Street	Alameda Street	Garey Street	6,914	643	7,140	664	0.1	0.1
	Commercial Street	Garey Street	Center Street	5,613	522	6,376	593	0.6	0.6
	Ducommun Street	Hewitt Street	Garey Street	333	31	333	31	0.0	0.0
	Ducommun Street	Garey Street	Vignes Street	226	21	226	21	0.0	0.0
	Kearney Street	Pleasant Avenue	Pennsylvania Avenue	280	26	280	26	0.0	0.0
	Temple Street	Fremont Avenue	Figueroa Street	7,161	666	7,161	666	0.0	0.0
	Temple Street	Figueroa Street	Judge John Aiso Street	17,312	1,610	17,968	1,671	0.2	0.2
	Temple Street	Judge John Aiso Street	Alameda Street	15,817	1,471	16,473	1,532	0.2	0.2
	Temple Street	Alameda Street	Garey Street	7,602	707	7,903	735	0.2	0.2

Jurisdiction	Roadway	Limits		Existing Baseline		Existing With Project		Change in Noise Level (ADT)	Change in Noise Level (Peak-Hour)
		From	To	Average Daily Traffic	Peak-Hour Traffic	Average Daily Traffic	Peak-Hour Traffic		
Los Angeles	Temple Street	Garey Street	Vignes Street	3,774	351	3,957	368	0.2	0.2
	Temple Street	Vignes Street	Center Street	1,258	117	1,495	139	0.7	0.7
	1st Street	Hill Street	Broadway	22,828	2,123	22,903	2,130	0.0	0.0
	1st Street	Broadway	Main Street	22,419	2,085	22,538	2,096	0.0	0.0
	1st Street	Main Street	Alameda Street	19,667	1,829	19,763	1,838	0.0	0.0
	1st Street	Alameda Street	Vignes Street	13,086	1,217	13,172	1,225	0.0	0.0
	1st Street	Vignes Street	Pecan Street	13,946	1,297	14,086	1,310	0.0	0.0
	1st Street	Pecan Street	US-101 NB Ramps	11,968	1,113	12,075	1,123	0.0	0.0
	1st Street	US-101 NB Ramps	Boyle Avenue	12,290	1,143	12,301	1,144	0.0	0.0
	2nd Street	Central Avenue	Alameda Street	7,323	681	7,323	681	0.0	0.0
	2nd Street	Alameda Street	Rose Street	4,591	427	4,591	427	0.0	0.0
	3rd Street	Central Avenue	Alameda Street	11,785	1,096	11,796	1,097	0.0	0.0
	3rd Street	Alameda Street	4th Street	9,355	870	9,452	879	0.0	0.0
	4th Street	Central Avenue	Alameda Street	21,914	2,038	21,957	2,042	0.0	0.0
	4th Street	Alameda Street	Pecan Street	30,204	2,809	30,333	2,821	0.0	0.0
	4th Street	Pecan Street	US-101 SB Off-Ramp	20,957	1,949	21,054	1,958	0.0	0.0
	4th Street	US-101 SB Off-Ramp	US-101 NB Off-Ramp	21,247	1,976	21,344	1,985	0.0	0.0
	4th Street	US-101 NB Off-Ramp	Boyle Avenue	20,247	1,883	20,247	1,883	0.0	0.0
	San Fernando Road	Poplar Road	Avenue 26	28,946	2,692	29,075	2,704	0.0	0.0
	San Fernando Road	Avenue 26	Figueroa Street	15,484	1,440	15,548	1,446	0.0	0.0
	Avenue 26	San Fernando Road	Figueroa Street	17,452	1,623	17,516	1,629	0.0	0.0
	Avenue 26	Figueroa Street	I-5 SB On Ramp	25,946	2,413	26,022	2,420	0.0	0.0
	Avenue 26	I-5 SB On-Ramp	I-110 NB On Ramp	23,108	2,149	23,172	2,155	0.0	0.0
	Avenue 26	I-110 NB On-Ramp	I-5 NB Off Ramp	32,075	2,983	32,839	3,054	0.1	0.1
	Avenue 26	I-5 NB Off-Ramp	Artesian Street	28,731	2,672	28,882	2,686	0.0	0.0

Jurisdiction	Roadway	Limits		Existing Baseline		Existing With Project		Change in Noise Level (ADT)	Change in Noise Level (Peak-Hour)
		From	To	Average Daily Traffic	Peak-Hour Traffic	Average Daily Traffic	Peak-Hour Traffic		
Los Angeles	Figueroa Street	Avenue 19	I-110 SB On-Ramp	8,989	836	9,000	837	0.0	0.0
	Figueroa Street	I-110 SB On-Ramp	I-110 NB Off-Ramp	18,215	1,694	18,247	1,697	0.0	0.0
	Figueroa Street	I-110 NB Off-Ramp	Avenue 26	23,333	2,170	23,387	2,175	0.0	0.0
	Figueroa Street	Avenue 26	Avenue 28	20,430	1,900	20,430	1,900	0.0	0.0
	Avenue 18	Barranca Street	Pasadena Avenue	1,086	101	1,086	101	0.0	0.0
	Avenue 18	Pasadena Avenue	Broadway	1,140	106	1,140	106	0.0	0.0
	Avenue 18	Broadway	Albion Street	14,204	1,321	15,613	1,452	0.4	0.4
	Avenue 20	Pasadena Avenue	Broadway	5,376	500	5,387	501	0.0	0.0
	Avenue 20	Broadway	Main Street	5,258	489	5,258	489	0.0	0.0
	Avenue 21	Humboldt Street	Pasadena Avenue	6,914	643	6,978	649	0.0	0.0
	N Avenue 21	Pasadena Avenue	Broadway	3,957	368	4,011	373	0.1	0.1
	S Avenue 21	Pasadena Avenue	Broadway	6,753	628	6,828	635	0.0	0.0
	Daly Street	Avenue 26	Broadway	19,505	1,814	19,570	1,820	0.0	0.0
	Daly Street	Broadway	Main Street	17,935	1,668	18,032	1,677	0.0	0.0
	Daly Street	Main Street	Mission Road	17,710	1,647	17,763	1,652	0.0	0.0
	Daly Street	Mission	I-5 NB On-Ramp	26,441	2,459	26,441	2,459	0.0	0.0
	Daly Street	I-5 NB On-Ramp	State Street	22,559	2,098	22,602	2,102	0.0	0.0
	Marengo Street	State Street	Kingston Avenue	18,075	1,681	18,075	1,681	0.0	0.0
	Pasadena Avenue	Broadway	Avenue 18	15,161	1,410	15,301	1,423	0.0	0.0
	Pasadena Avenue	Avenue 18	N Avenue 21	13,989	1,301	14,129	1,314	0.0	0.0
	Pasadena Avenue	N Avenue 21	S Avenue 21	11,075	1,030	11,151	1,037	0.0	0.0
	Pasadena Avenue	S Avenue 21	Avenue 23	10,559	982	10,634	989	0.0	0.0
	Broadway	Baker Street	Pasadena Avenue	23,989	2,231	24,129	2,244	0.0	0.0
	Broadway	Pasadena Avenue	Avenue 18	8,914	829	8,914	829	0.0	0.0
	Pasadena Avenue	Avenue 18	Avenue 20	21,774	2,025	21,860	2,033	0.0	0.0

Jurisdiction	Roadway	Limits		Existing Baseline		Existing With Project		Change in Noise Level (ADT)	Change in Noise Level (Peak-Hour)
		From	To	Average Daily Traffic	Peak-Hour Traffic	Average Daily Traffic	Peak-Hour Traffic		
Los Angeles	Pasadena Avenue	Avenue 20	N Avenue 21	22,591	2,101	22,667	2,108	0.0	0.0
	Pasadena Avenue	N Avenue 21	S Avenue 21	22,581	2,100	22,624	2,104	0.0	0.0
	Pasadena Avenue	S Avenue 21	Daly Street	22,430	2,086	22,462	2,089	0.0	0.0
	Pasadena Avenue	Daly Street	Workman Street	21,366	1,987	21,366	1,987	0.0	0.0
	Main Street	Gibbons Street	Avenue 20	17,817	1,657	17,892	1,664	0.0	0.0
	Main Street	Avenue 20	Daly Street	21,194	1,971	21,269	1,978	0.0	0.0
	Main Street	Daly Street	Workman Street	20,473	1,904	20,473	1,904	0.0	0.0
	Mission Road	Kearney Street	US-101 SB Ramps	7,731	719	8,247	767	0.3	0.3
	Mission Road	US-101 SB Ramps	US-101 NB Ramps	15,978	1,486	16,860	1,568	0.2	0.2
	Mission Road	US-101 NB Ramps	Cesar Chavez Avenue	14,559	1,354	14,591	1,357	0.0	0.0
	Mission Road	Cesar Chavez Avenue	Richmond Street	24,527	2,281	24,656	2,293	0.0	0.0
	Mission Road	Richmond Street	I-5 SB Ramps	24,452	2,274	24,581	2,286	0.0	0.0
	Mission Road	I-5 SB Ramps	Daly Street	28,419	2,643	28,495	2,650	0.0	0.0
	Mission Road	Daly Street	Zonal Avenue	26,441	2,459	26,441	2,459	0.0	0.0
	State Street	Marengo Street	I-10 WB Off-Ramp	11,860	1,103	11,882	1,105	0.0	0.0
	State Street	I-10 WB Off-Ramp	I-10 EB Ramps	12,194	1,134	12,215	1,136	0.0	0.0
	State Street	I-10 EB Ramps	City View Avenue	17,022	1,583	17,054	1,586	0.0	0.0

Source: California High-Speed Rail Authority, 2018

[1] The roadway segment does not exist under this scenario.

ADT = average daily traffic
CNEL = Community Noise Equivalent Level
EB = eastbound
I = Interstate
N/A = not applicable
NB = northbound
SB = southbound
SR = State Route
US = U.S. Route
WB = westbound

Table 6-4 Change in 2040 Traffic Noise Levels for the Proposed Project

Jurisdiction	Roadway	Limits		2040 Without Project		2040 With Project		Change in Noise Level (ADT)	Change in Noise Level (Peak-Hour)
		From	To	Average Daily Traffic	Peak-Hour Traffic	Average Daily Traffic	Peak-Hour Traffic		
North Hollywood	SR 170 SB Ramps	SR 170 SB	Sherman Way	8,065	750	8,065	750	0.0	0.0
	SR 170 SB Ramps	Sherman Way	SR 170 SB	12,581	1,170	12,968	1,206	0.1	0.1
	SR 170 SB Ramps	SR 170 SB	Victory Boulevard	5,914	550	7,301	679	0.9	0.9
	SR 170 SB Ramps	Victory Boulevard	SR 170 SB	13,548	1,260	13,548	1,260	0.0	0.0
	Laurel Canyon Boulevard	Valerio Street	Sherman Way	22,688	2,110	22,688	2,110	0.0	0.0
	Laurel Canyon Boulevard	Sherman Way	Vanowen Way	24,839	2,310	24,839	2,310	0.0	0.0
	Laurel Canyon Boulevard	Hamlin Street	Victory Boulevard	22,473	2,090	22,473	2,090	0.0	0.0
	Laurel Canyon Boulevard	Victory Boulevard	Sylvan Street	21,935	2,040	21,935	2,040	0.0	0.0
	Lankershim Boulevard	Valerio Street	Sherman Way	23,548	2,190	23,548	2,190	0.0	0.0
	Lankershim Boulevard	Sherman Way	Vose Street	20,000	1,860	20,000	1,860	0.0	0.0
	Lankershim Boulevard	Hamlin Street	Victory Boulevard	21,720	2,020	21,720	2,020	0.0	0.0
	Lankershim Boulevard	Victory Boulevard	Sylvan Street	21,613	2,010	21,613	2,010	0.0	0.0
	Sherman Way	Bellaire Avenue	SR 170 SB Ramps	40,645	3,780	40,796	3,794	0.0	0.0
	Sherman Way	SR 170 SB Ramps	Laurel Canyon Boulevard	37,312	3,470	38,215	3,554	0.1	0.1
	Sherman Way	Laurel Canyon Boulevard	Lankershim Boulevard	28,710	2,670	29,613	2,754	0.1	0.1
	Sherman Way	Lankershim Boulevard	Tujunga Avenue	26,129	2,430	27,032	2,514	0.1	0.1
	Victory Boulevard	Whittsett Avenue	SR 170 SB Ramps	51,828	4,820	51,978	4,834	0.0	0.0
	Victory Boulevard	SR 170 SB Ramps	Laurel Canyon Boulevard	46,989	4,370	48,527	4,513	0.1	0.1
	Victory Boulevard	Laurel Canyon Boulevard	Lankershim Boulevard	32,043	2,980	34,968	3,252	0.4	0.4
	Victory Boulevard	Lankershim Boulevard	Tujunga Avenue	29,570	2,750	32,495	3,022	0.4	0.4

Jurisdiction	Roadway	Limits		2040 Without Project		2040 With Project		Change in Noise Level (ADT)	Change in Noise Level (Peak-Hour)
		From	To	Average Daily Traffic	Peak-Hour Traffic	Average Daily Traffic	Peak-Hour Traffic		
Sun Valley	Sunland Boulevard	Penrose Street	Glenoaks Boulevard	23,226	2,160	23,376	2,174	0.0	0.0
	Sunland Boulevard	Glenoaks Boulevard	Vinedale Street	17,527	1,630	17,677	1,644	0.0	0.0
	Sunland Boulevard	Nettleton Street	I-5 NB Ramps	24,839	2,310	24,989	2,324	0.0	0.0
	Sunland Boulevard	I-5 NB Ramps	Roscoe Boulevard	26,559	2,470	26,849	2,497	0.0	0.0
	Sunland Boulevard	Roscoe Boulevard	San Fernando Minor	25,484	2,370	25,914	2,410	0.1	0.1
	Sunland Boulevard	San Fernando Minor	San Fernando Road	27,097	2,520	34,409	3,200	1.0	1.0
	Sunland Boulevard	San Fernando Road	Strathern Street	24,946	2,320	25,806	2,400	0.1	0.1
	Vineland Avenue	Strathern Street	Staticoy Street	23,871	2,220	24,731	2,300	0.2	0.2
North Hollywood	Vineland Avenue	Staticoy Street	Sherman Way	23,763	2,210	24,624	2,290	0.2	0.2
	Vineland Avenue	Sherman Way	Vanowen Way	28,387	2,640	28,602	2,660	0.0	0.0
	Vineland Avenue	Vanowen Way	Victory Boulevard	24,516	2,280	24,581	2,286	0.0	0.0
	Vineland Avenue	Victory Boulevard	Oxnard Street	23,978	2,230	24,258	2,256	0.1	0.1
	Vineland Avenue	Oxnard Street	Burbank Boulevard	23,763	2,210	24,043	2,236	0.1	0.1
	Vineland Avenue	Burbank Boulevard	Magnolia Boulevard	23,978	2,230	24,258	2,256	0.1	0.1
	Clybourn Avenue	Vanowen Street	Victory Boulevard	3,118	290	3,118	290	0.0	0.0
Sun Valley	I-5 NB Ramps	I-5 NB	Sunland Boulevard	4,624	430	4,763	443	0.1	0.1
	I-5 NB Ramps	Sunland Boulevard	I-5 NB	7,849	730	7,849	730	0.0	0.0
	I-5 SB Ramps	Sunland Boulevard	I-5 SB	5,591	520	5,731	533	0.1	0.1
	I-5 SB Ramps	I-5 SB	Sunland Boulevard	6,129	570	6,129	570	0.0	0.0
	San Fernando Minor	Vineland Avenue	Sunland Boulevard	1,183	110	3,258	303	4.4	4.4
	San Fernando Minor	Sunland Boulevard	Clybourn Avenue	4,301	400	9,108	847	3.3	3.3
	San Fernando Road	Ensign Avenue	Sunland Boulevard	9,194	855	14,677	1,365	2.0	2.0
	San Fernando Road	Sunland Boulevard	Clybourn Avenue	9,355	870	12,570	1,169	1.3	1.3
	Strathern Street	Fair Avenue	Vineland Avenue	9,892	920	9,892	920	0.0	0.0

Jurisdiction	Roadway	Limits		2040 Without Project		2040 With Project		Change in Noise Level (ADT)	Change in Noise Level (Peak-Hour)
		From	To	Average Daily Traffic	Peak-Hour Traffic	Average Daily Traffic	Peak-Hour Traffic		
Sun Valley	Strathern Street	Vineland Avenue	Clybourn Avenue	6,667	620	6,882	640	0.1	0.1
	Staticoy Street	Fair Avenue	Vineland Avenue	7,204	670	7,204	670	0.0	0.0
North Hollywood	Staticoy Street	Vineland Avenue	Cleon Avenue	4,516	420	4,516	420	0.0	0.0
	Sherman Way	Tujunga Avenue	Vineland Avenue	18,925	1,760	19,828	1,844	0.2	0.2
	Sherman Way	Vineland Avenue	Clybourn Avenue	13,011	1,210	13,011	1,210	0.0	0.0
	Vanowen Street	Tujunga Avenue	Vineland Avenue	20,430	1,900	20,710	1,926	0.1	0.1
	Vanowen Street	Vineland Avenue	Clybourn Avenue	24,409	2,270	24,774	2,304	0.1	0.1
	Vanowen Street	Clybourn Avenue	Hollywood Way	23,763	2,210	24,129	2,244	0.1	0.1
	Vanowen Street	Hollywood Way	Buena Vista Street	12,194	1,134	12,194	1,134	0.0	0.0
	Victory Boulevard	Tujunga Avenue	Vineland Avenue	25,269	2,350	28,194	2,622	0.5	0.5
	Victory Boulevard	Vineland Avenue	Clybourn Avenue	26,237	2,440	29,376	2,732	0.5	0.5
	Burbank Boulevard	Lankershim Boulevard	Vineland Avenue	23,011	2,140	23,011	2,140	0.0	0.0
	Burbank Boulevard	Vineland Avenue	Cahuenga Boulevard	21,505	2,000	21,505	2,000	0.0	0.0
Sun Valley	Glenoaks Boulevard	Penrose Street	Sunland Boulevard	13,548	1,260	13,548	1,260	0.0	0.0
	Glenoaks Boulevard	Sunland Boulevard	Vinedale Street	18,602	1,730	18,602	1,730	0.0	0.0
	Glenoaks Boulevard	Nettleton Street	Roscoe Boulevard	26,882	2,500	26,882	2,500	0.0	0.0
	Glenoaks Boulevard	Roscoe Boulevard	Roscoe Boulevard	19,677	1,830	19,677	1,830	0.0	0.0
	I-5 NB Ramps	I-5 NB	Roscoe Boulevard	5,484	510	5,484	510	0.0	0.0
	Roscoe Boulevard	Wheatland Avenue	Roscoe Boulevard	2,796	260	2,796	260	0.0	0.0
	I-5 SB Ramps	Roscoe Boulevard	I-5 SB	5,591	520	5,591	520	0.0	0.0
	Roscoe Boulevard	Glenoaks Boulevard	I-5 NB Ramps	10,645	990	10,645	990	0.0	0.0
	Roscoe Boulevard	I-5 NB Ramps	I-5 SB Ramps	7,097	660	7,097	660	0.0	0.0
	Clybourn Avenue	San Fernando Road	Staticoy Street	10,430	970	12,366	1,150	0.7	0.7
	San Fernando Road	Strathern Street	Arvilla Avenue	16,882	1,570	18,581	1,728	0.4	0.4

Jurisdiction	Roadway	Limits		2040 Without Project		2040 With Project		Change in Noise Level (ADT)	Change in Noise Level (Peak-Hour)
		From	To	Average Daily Traffic	Peak-Hour Traffic	Average Daily Traffic	Peak-Hour Traffic		
Sun Valley	Arvilla Avenue	Stagg Street	San Fernando Minor	2,280	212	2,280	212	0.0	0.0
	Arvilla Avenue	San Fernando Minor	San Fernando Road	6,882	640	0	0	0.0	0.0
	Arvilla Avenue	San Fernando Road	Private Drive	1,505	140	1,505	140	0.0	0.0
	San Fernando Minor	Ledge Avenue	Arvilla Avenue	3,151	293	5,882	547	2.7	2.7
	San Fernando Minor	Arvilla Avenue	Arcola Avenue	4,624	430	4,624	430	0.0	0.0
Burbank	San Fernando Minor	Arcola Avenue	Cohasset Street	5,946	553	5,946	553	0.0	0.0
	San Fernando Minor	Cohasset Street	Avon Street	7,419	690	7,419	690	0.0	0.0
	San Fernando Minor	Avon Street	I-5 SB Ramps	6,882	640	6,882	640	0.0	0.0
	San Fernando Minor	I-5 SB Ramps	Buena Vista Street	8,022	746	8,022	746	0.0	0.0
	Winona Avenue	Buena Vista Street	Lincoln Street	6,452	600	6,452	600	0.0	0.0
	San Fernando Road	Arvilla Avenue	Lockheed Drive	12,796	1,190	14,495	1,348	0.5	0.5
	San Fernando Road	Lockheed Drive	Cohasset Street	13,237	1,231	13,462	1,252	0.1	0.1
	San Fernando Road	Cohasset Street	Hollywood Way SB	16,022	1,490	17,011	1,582	0.3	0.3
	San Fernando Road	Hollywood Way SB	Hollywood Way NB	14,409	1,340	14,935	1,389	0.2	0.2
	San Fernando Road	Hollywood Way NB	Ontario Street	14,247	1,325	14,355	1,335	0.0	0.0
	San Fernando Road	Ontario Street	Naomi Street	13,817	1,285	13,925	1,295	0.0	0.0
	San Fernando Road	Naomi Street	Buena Vista Street	17,742	1,650	17,634	1,640	0.0	0.0
	San Fernando Road	Buena Vista Street	Lincoln Street	8,129	756	8,151	758	0.0	0.0
	San Fernando Road	I-5 SB Ramps	I-5 NB Ramps	12,806	1,191	12,828	1,193	0.0	0.0
	San Fernando Road	I-5 NB Ramps	Grismer Avenue	11,796	1,097	11,817	1,099	0.0	0.0
Sun Valley	Arcola Avenue	Stagg Street	San Fernando Minor	1,183	110	1,183	110	0.0	0.0
	Lockheed Drive	San Fernando Road	Cohasset Street	968	90	1,398	130	1.6	1.6

Jurisdiction	Roadway	Limits		2040 Without Project		2040 With Project		Change in Noise Level (ADT)	Change in Noise Level (Peak-Hour)
		From	To	Average Daily Traffic	Peak-Hour Traffic	Average Daily Traffic	Peak-Hour Traffic		
Burbank	Cohasset Street	San Fernando Minor	Hollywood Way	3,226	300	3,226	300	0.0	0.0
	Cohasset Street	Hollywood Way	Avon Street	5,591	520	5,591	520	0.0	0.0
	Hollywood Way SB	San Fernando Road	Hollywood Way	2,473	230	2,935	273	0.7	0.7
	Hollywood Way NB	San Fernando Road	Hollywood Way	3,699	344	4,118	383	0.5	0.5
	Avon Street	Cohasset Street	San Fernando Minor	3,118	290	3,118	290	0.0	0.0
Sun Valley	Hollywood Way	Glen Oaks Boulevard	I-5 NB Ramps	14,871	1,383	14,871	1,383	0.0	0.0
	Hollywood Way	I-5 NB Ramps	I-5 SB Ramps	25,462	2,368	28,118	2,615	0.4	0.4
Burbank	Hollywood Way	I-5 SB Ramps	Keswick Street	34,516	3,210	39,828	3,704	0.6	0.6
	Hollywood Way	Keswick Street	Cohasset Street	33,548	3,120	38,860	3,614	0.6	0.6
	Hollywood Way	Cohasset Street	Tulare Avenue	30,215	2,810	35,720	3,322	0.7	0.7
	Hollywood Way	Tulare Avenue	Winona Avenue	31,290	2,910	38,215	3,554	0.9	0.9
	Hollywood Way	Winona Avenue	Thornton Avenue	34,086	3,170	40,989	3,812	0.8	0.8
	Hollywood Way	Thornton Avenue	Avon Street	34,731	3,230	41,634	3,872	0.8	0.8
	Hollywood Way	Avon Street	Empire Avenue	2,903	270	2,968	276	0.1	0.1
	Avon Street	Hollywood Way	Empire Avenue	4,301	400	4,710	438	0.4	0.4
	Hollywood Way	Empire Avenue	Victory Boulevard	31,183	2,900	37,613	3,498	0.8	0.8
	Hollywood Way	Victory Boulevard	Burbank Boulevard	27,849	2,590	31,140	2,896	0.5	0.5
	Hollywood Way	Burbank Boulevard	Magnolia Boulevard	29,355	2,730	32,581	3,030	0.5	0.5
	Hollywood Way	Magnolia Boulevard	Verdugo Avenue	29,247	2,720	32,301	3,004	0.4	0.4
	Hollywood Way	Verdugo Avenue	Alameda Avenue	23,656	2,200	26,710	2,484	0.5	0.5
	Hollywood Way	Alameda Avenue	Riverside Drive	19,559	1,819	19,839	1,845	0.1	0.1
	Hollywood Way	Riverside Drive	Olive Avenue	11,720	1,090	12,000	1,116	0.1	0.1
	Pass Avenue	Oak Street	SR 134 EB Ramps	18,065	1,680	18,065	1,680	0.0	0.0
	Pass Avenue	SR 134 EB Ramps	Alameda Avenue	14,946	1,390	16,333	1,519	0.4	0.4

Jurisdiction	Roadway	Limits		2040 Without Project		2040 With Project		Change in Noise Level (ADT)	Change in Noise Level (Peak-Hour)
		From	To	Average Daily Traffic	Peak-Hour Traffic	Average Daily Traffic	Peak-Hour Traffic		
Burbank	Pass Avenue	Alameda Avenue	Olive Avenue	11,183	1,040	11,183	1,040	0.0	0.0
	SR 134 EB On-Ramp	Riverside Drive	SR 134 EB	6,344	590	6,344	590	0.0	0.0
	SR 134 WB On-Ramp	Alameda Avenue	SR 134 WB	6,129	570	6,129	570	0.0	0.0
	SR 134 WB Off-Ramp	SR 134 WB	Alameda Avenue	5,161	480	5,161	480	0.0	0.0
	I-5 SB Ramps	I-5 SB	San Fernando Minor	9,312	866	9,312	866	0.0	0.0
Sun Valley	Glenoaks Boulevard	Meritage Court	Hollywood Way	22,151	2,060	22,151	2,060	0.0	0.0
	Glenoaks Boulevard	Hollywood Way	Shadyspring Place	17,527	1,630	17,527	1,630	0.0	0.0
	I-5 NB On-Ramp	I-5 NB	Hollywood Way	12,720	1,183	14,892	1,385	0.7	0.7
	I-5 NB Off-Ramp	Hollywood Way	I-5 NB	3,237	301	3,720	346	0.6	0.6
	I-5 SB Off-Ramp	I-5 SB	Hollywood Way	7,333	682	9,505	884	1.1	1.1
	Keswick Street	Clayback Avenue	Hollywood Way	2,366	220	2,366	220	0.0	0.0
Burbank	Cohasset Street	Avon Street	Glenoaks Boulevard	5,699	530	5,699	530	0.0	0.0
	Winona Avenue	Hollywood Way	Ontario Street	7,742	720	7,763	722	0.0	0.0
	Winona Avenue	Ontario Street	San Fernando Road	6,129	570	6,151	572	0.0	0.0
	Airport	Private	Hollywood Way	11,398	1,060	11,398	1,060	0.0	0.0
	Thornton Avenue	Hollywood Way	Ontario Street	12,151	1,130	12,151	1,130	0.0	0.0
	Thornton Avenue	Ontario Street	Buena Vista Street	9,140	850	9,140	850	0.0	0.0
	Thornton Avenue	Buena Vista Street	Lincoln Street	8,258	768	8,258	768	0.0	0.0
	Empire Avenue	Clybourn Avenue	Hollywood Way	14,516	1,350	14,882	1,384	0.1	0.1
	Empire Avenue	Hollywood Way	Avon Street	12,688	1,180	12,989	1,208	0.1	0.1
	Empire Avenue	Avon Street	Ontario Street	15,054	1,400	15,161	1,410	0.0	0.0
	Empire Avenue	Ontario Street	Buena Vista Street	14,731	1,370	14,839	1,380	0.0	0.0
	Empire Avenue	Buena Vista Street	Lincoln Street	30,290	2,817	30,462	2,833	0.0	0.0
	Empire Avenue	Lincoln Street	Valpreda Street	33,247	3,092	33,419	3,108	0.0	0.0

Jurisdiction	Roadway	Limits		2040 Without Project		2040 With Project		Change in Noise Level (ADT)	Change in Noise Level (Peak-Hour)
		From	To	Average Daily Traffic	Peak-Hour Traffic	Average Daily Traffic	Peak-Hour Traffic		
Burbank	Empire Avenue	Valpreda Street	Victory Place	30,817	2,866	30,989	2,882	0.0	0.0
	Victory Place	Maria Street	Empire Avenue	12,000	1,116	12,022	1,118	0.0	0.0
	Victory Place	Empire Avenue	Lake Street	11,796	1,097	11,817	1,099	0.0	0.0
	Empire Avenue	Victory Place	I-5 SB Ramps	11,796	1,097	20,505	1,907	2.4	2.4
	Empire Avenue	I-5 SB Ramps	I-5 NB Ramps	30,817	2,866	30,989	2,882	0.0	0.0
	San Fernando Boulevard	I-5 NB Ramps	Grismer Avenue	20,419	1,899	20,505	1,907	0.0	0.0
	Victory Boulevard	Clybourn Avenue	Hollywood Way	24,731	2,300	27,871	2,592	0.5	0.5
	Victory Boulevard	Hollywood Way	Buena Vista Street	22,366	2,080	22,366	2,080	0.0	0.0
	Victory Boulevard	Hollywood Way	Burbank Boulevard	19,892	1,850	19,892	1,850	0.0	0.0
	Burbank Boulevard	Clybourn Avenue	Hollywood Way	20,323	1,890	20,323	1,890	0.0	0.0
	Burbank Boulevard	Hollywood Way	Buena Vista Street	22,151	2,060	22,215	2,066	0.0	0.0
	Burbank Boulevard	Buena Vista Street	Victory Boulevard	18,817	1,750	18,882	1,756	0.0	0.0
	Magnolia Boulevard	Clybourn Avenue	Hollywood Way	20,430	1,900	20,430	1,900	0.0	0.0
	Magnolia Boulevard	Hollywood Way	Buena Vista Street	22,258	2,070	22,430	2,086	0.0	0.0
	Verdugo Avenue	Clybourn Avenue	Hollywood Way	19,677	1,830	19,677	1,830	0.0	0.0
	Verdugo Avenue	Hollywood Way	Buena Vista Street	15,376	1,430	15,376	1,430	0.0	0.0
	SR 134 EB Ramps	SR 134 EB	Pass Avenue	11,505	1,070	12,892	1,199	0.5	0.5
	Alameda Avenue	Clybourn Avenue	Pass Avenue	17,849	1,660	17,849	1,660	0.0	0.0
	Alameda Avenue	Pass Avenue	Hollywood Way	30,000	2,790	32,774	3,048	0.4	0.4
	Alameda Avenue	Hollywood Way	SR 134 WB Ramps	37,742	3,510	37,742	3,510	0.0	0.0
	Alameda Avenue	SR 134 WB Ramps	Olive Avenue	28,817	2,680	28,817	2,680	0.0	0.0
	Riverside Drive	Pass Avenue	SR 134 EB Ramps	13,978	1,300	13,978	1,300	0.0	0.0
	Riverside Drive	SR 134 EB Ramps	Hollywood Way	15,484	1,440	15,484	1,440	0.0	0.0
	Riverside Drive	Hollywood Way	Olive Avenue	13,086	1,217	13,086	1,217	0.0	0.0

Jurisdiction	Roadway	Limits		2040 Without Project		2040 With Project		Change in Noise Level (ADT)	Change in Noise Level (Peak-Hour)
		From	To	Average Daily Traffic	Peak-Hour Traffic	Average Daily Traffic	Peak-Hour Traffic		
Burbank	Olive Avenue	Hood Avenue	Pass Avenue	40,860	3,800	41,140	3,826	0.0	0.0
	Olive Avenue	Pass Avenue	Hollywood Way	32,258	3,000	32,538	3,026	0.0	0.0
	Olive Avenue	Hollywood Way	Cordova Street	24,516	2,280	24,516	2,280	0.0	0.0
	Ontario Street	San Fernando Road	Winona Avenue	1,828	170	1,828	170	0.0	0.0
	Ontario Street	Winona Avenue	Thornton Avenue	3,011	280	3,011	280	0.0	0.0
	Ontario Street	Thornton Avenue	Empire Avenue	9,892	920	9,892	920	0.0	0.0
Sun Valley	Cohasset Street	Glenoaks Boulevard	Ontario Street	6,452	600	6,452	600	0.0	0.0
	Glenoaks Boulevard	Cabrini Drive	Cohasset Street	21,505	2,000	21,505	2,000	0.0	0.0
	Glenoaks Boulevard	Cohasset Street	Buena Vista Street	26,129	2,430	26,129	2,430	0.0	0.0
Burbank	Glenoaks Boulevard	Buena Vista Street	Tulare Avenue	18,032	1,677	18,032	1,677	0.0	0.0
	I-5 SB Ramps	I-5 SB	San Fernando Minor	9,312	866	9,312	866	0.0	0.0
	Buena Vista Street	Kenneth Road	Glenoaks Boulevard	4,366	406	4,366	406	0.0	0.0
	Buena Vista Street	Glenoaks Boulevard	I-5 NB Ramps	15,591	1,450	15,591	1,450	0.0	0.0
	Buena Vista Street	I-5 NB Ramps	Winona Avenue	20,258	1,884	20,258	1,884	0.0	0.0
	Buena Vista Street	Winona Avenue	San Fernando Road	25,054	2,330	25,054	2,330	0.0	0.0
	Buena Vista Street	San Fernando Road	Thornton Avenue	34,516	3,210	34,602	3,218	0.0	0.0
	Buena Vista Street	Thornton Avenue	Empire Avenue	33,677	3,132	33,763	3,140	0.0	0.0
	Buena Vista Street	Empire Avenue	Vanowen Way	31,613	2,940	31,634	2,942	0.0	0.0
	Buena Vista Street	Vanowen Way	Victory Boulevard	27,720	2,578	27,742	2,580	0.0	0.0
	Buena Vista Street	Victory Boulevard	Burbank Boulevard	26,667	2,480	26,688	2,482	0.0	0.0
	Buena Vista Street	Burbank Boulevard	Magnolia Boulevard	27,204	2,530	27,226	2,532	0.0	0.0
	Buena Vista Street	Magnolia Boulevard	Olive Avenue	25,376	2,360	25,376	2,360	0.0	0.0
	Buena Vista Street	Olive Avenue	Alameda Avenue	22,473	2,090	22,473	2,090	0.0	0.0
	Buena Vista Street	Alameda Avenue	Riverside Drive	19,355	1,800	19,355	1,800	0.0	0.0

Jurisdiction	Roadway	Limits		2040 Without Project		2040 With Project		Change in Noise Level (ADT)	Change in Noise Level (Peak-Hour)
		From	To	Average Daily Traffic	Peak-Hour Traffic	Average Daily Traffic	Peak-Hour Traffic		
Burbank	Lincoln Street	San Fernando Road	Empire Avenue	5,796	539	5,796	539	0.0	0.0
	I-5 NB Ramps	I-5 NB	Buena Vista Street	10,043	934	10,043	934	0.0	0.0
	Thornton Avenue	Naomi Street	Buena Vista Street	9,140	850	9,140	850	0.0	0.0
	Thornton Avenue	Buena Vista Street	Lincoln Street	8,258	768	8,258	768	0.0	0.0
	Olive Avenue	Alameda Avenue	Buena Vista Street	26,452	2,460	26,452	2,460	0.0	0.0
	Olive Avenue	Buena Vista Street	Keystone Street	24,946	2,320	24,946	2,320	0.0	0.0
	Alameda Avenue	Olive Avenue	Buena Vista Street	21,505	2,000	21,505	2,000	0.0	0.0
	Alameda Avenue	Buena Vista Street	Keystone Street	25,699	2,390	25,699	2,390	0.0	0.0
	Victory Place	Lincoln Street	Empire Avenue	12,000	1,116	12,022	1,118	0.0	0.0
	Victory Place	Empire Avenue	Burbank Boulevard	22,247	2,069	22,290	2,073	0.0	0.0
	Victory Boulevard	Burbank Boulevard	Magnolia Boulevard	27,817	2,587	27,839	2,589	0.0	0.0
	Victory Boulevard	Magnolia Boulevard	Olive Avenue	26,344	2,450	26,344	2,450	0.0	0.0
	Victory Boulevard	Olive Avenue	Alameda Avenue	22,581	2,100	22,581	2,100	0.0	0.0
	Victory Boulevard	Alameda Avenue	Linden Avenue	17,204	1,600	17,204	1,600	0.0	0.0
	Burbank Boulevard	Buena Vista Street	Victory Boulevard	42,516	3,954	42,602	3,962	0.0	0.0
	Burbank Boulevard	Victory Boulevard	Front Street	38,720	3,601	38,785	3,607	0.0	0.0
	Burbank Boulevard	Front Street	I-5 NB Ramps	42,505	3,953	42,570	3,959	0.0	0.0
	Burbank Boulevard	I-5 NB Ramps	San Fernando Boulevard	33,559	3,121	33,624	3,127	0.0	0.0
	Burbank Boulevard	San Fernando Boulevard	3rd Street	33,914	3,154	33,978	3,160	0.0	0.0
	Magnolia Boulevard	Buena Vista Street	Victory Boulevard	23,118	2,150	23,183	2,156	0.0	0.0
	Magnolia Boulevard	5th Street	Glenoaks Boulevard	10,645	990	10,645	990	0.0	0.0
	Magnolia Boulevard	Glenoaks Boulevard	3rd Street	19,796	1,841	19,796	1,841	0.0	0.0
	Magnolia Boulevard	3rd Street	1st Street	28,505	2,651	28,570	2,657	0.0	0.0
	Magnolia Boulevard	1st Street	Victory Boulevard	26,344	2,450	26,409	2,456	0.0	0.0

Jurisdiction	Roadway	Limits		2040 Without Project		2040 With Project		Change in Noise Level (ADT)	Change in Noise Level (Peak-Hour)
		From	To	Average Daily Traffic	Peak-Hour Traffic	Average Daily Traffic	Peak-Hour Traffic		
Burbank	Glenoaks Boulevard	San Jose Avenue	Magnolia Boulevard	31,086	2,891	31,086	2,891	0.0	0.0
	Glenoaks Boulevard	Magnolia Boulevard	Olive Avenue	31,828	2,960	31,828	2,960	0.0	0.0
	Glenoaks Boulevard	Olive Avenue	Verdugo Avenue	28,817	2,680	28,817	2,680	0.0	0.0
	3rd Street	Amherst Drive	Burbank Boulevard	9,151	851	9,151	851	0.0	0.0
	3rd Street	Burbank Boulevard	Magnolia Boulevard	22,204	2,065	22,269	2,071	0.0	0.0
	3rd Street	Magnolia Boulevard	Olive Avenue	14,548	1,353	14,548	1,353	0.0	0.0
	3rd Street	Olive Avenue	Verdugo Avenue	8,172	760	8,172	760	0.0	0.0
	San Fernando Boulevard	Delaware Road	Burbank Boulevard	15,581	1,449	15,581	1,449	0.0	0.0
	San Fernando Boulevard	Burbank Boulevard	Cypress Avenue	43,892	4,082	43,892	4,082	0.0	0.0
	I-5 NB Off-Ramp	I-5 NB	Burbank Boulevard	4,903	456	4,903	456	0.0	0.0
	I-5 SB Off-Ramp	I-5 SB	Burbank Boulevard	9,376	872	9,376	872	0.0	0.0
	Front Street	Burbank Boulevard	I-5 SB Ramps	7,957	740	7,957	740	0.0	0.0
	Alameda Avenue	6th Street	Glenoaks Boulevard	8,925	830	8,925	830	0.0	0.0
	Alameda Avenue	Glenoaks Boulevard	San Fernando Road	26,667	2,480	26,667	2,480	0.0	0.0
	Alameda Avenue	Lake Street	Victory Boulevard	28,710	2,670	28,710	2,670	0.0	0.0
	Alameda Avenue	Victory Boulevard	Chavez Street	24,409	2,270	24,409	2,270	0.0	0.0
	Glenoaks Boulevard	Providencia Avenue	Alameda Avenue	34,409	3,200	34,409	3,200	0.0	0.0
	Glenoaks Boulevard	Alameda Avenue	Linden Avenue	37,957	3,530	37,957	3,530	0.0	0.0
	Victory Boulevard	Providencia Avenue	Alameda Avenue	18,710	1,740	18,710	1,740	0.0	0.0
	Victory Boulevard	Alameda Avenue	Allen Avenue	17,204	1,600	17,204	1,600	0.0	0.0
Glendale	Lake Street	Allen Avenue	Western Avenue	4,946	460	4,946	460	0.0	0.0
	Lake Street	Western Avenue	Sonora Avenue	6,344	590	6,344	590	0.0	0.0
	Flower Street	Alameda Street	Allen Avenue	9,570	890	9,570	890	0.0	0.0
	Flower Street	Allen Avenue	Western Avenue	11,398	1,060	11,398	1,060	0.0	0.0

Jurisdiction	Roadway	Limits		2040 Without Project		2040 With Project		Change in Noise Level (ADT)	Change in Noise Level (Peak-Hour)
		From	To	Average Daily Traffic	Peak-Hour Traffic	Average Daily Traffic	Peak-Hour Traffic		
Glendale	Flower Street	Western Avenue	Sonora Avenue	27,957	2,600	27,957	2,600	0.0	0.0
	Flower Street	Sonora Avenue	Grandview Avenue	16,022	1,490	16,022	1,490	0.0	0.0
	Flower Street	Grandview Avenue	Fairmont Avenue	16,559	1,540	16,559	1,540	0.0	0.0
	Grand Central Avenue	Sonora Avenue	Grandview Avenue	6,022	560	6,022	560	0.0	0.0
	Grand Central Avenue	Grandview Avenue	Flower Street	3,871	360	3,871	360	0.0	0.0
	Air Way	Sonora Avenue	Grandview Avenue	3,548	330	3,548	330	0.0	0.0
	Air Way	Grandview Avenue	Flower Street	3,441	320	3,441	320	0.0	0.0
	San Fernando Road	Alameda Street	Linden Avenue	19,677	1,830	19,677	1,830	0.0	0.0
	San Fernando Road	Linden Avenue	Allen Avenue	20,538	1,910	20,538	1,910	0.0	0.0
	San Fernando Road	Allen Avenue	Western Avenue	23,011	2,140	23,011	2,140	0.0	0.0
	San Fernando Road	Western Avenue	Ruberta Avenue	23,656	2,200	23,656	2,200	0.0	0.0
	San Fernando Road	Ruberta Avenue	Sonora Avenue	23,333	2,170	23,333	2,170	0.0	0.0
	San Fernando Road	Sonora Avenue	Grandview Avenue	24,409	2,270	24,409	2,270	0.0	0.0
	San Fernando Road	Grandview Avenue	Norton Avenue	26,989	2,510	26,989	2,510	0.0	0.0
	San Fernando Road	Norton Avenue	Flower Street-Pelanconi Avenue	25,161	2,340	25,161	2,340	0.0	0.0
	San Fernando Road	Flower Street-Pelanconi Avenue	Alma Street	28,817	2,680	28,817	2,680	0.0	0.0
	San Fernando Road	Alma Street	Kellogg Avenue	28,817	2,680	28,817	2,680	0.0	0.0
	San Fernando Road	Kellogg Avenue	Fairmont Avenue	31,290	2,910	31,290	2,910	0.0	0.0
	San Fernando Road	Fairmont Avenue	Doran Street	32,796	3,050	32,796	3,050	0.0	0.0
	San Fernando Road	Doran Street	Milford Street	25,591	2,380	25,591	2,380	0.0	0.0
	Glenoaks Boulevard	Raymond Avenue	Western Avenue	34,194	3,180	34,194	3,180	0.0	0.0
	Glenoaks Boulevard	Western Avenue	Sonora Avenue	34,946	3,250	34,946	3,250	0.0	0.0

Jurisdiction	Roadway	Limits		2040 Without Project		2040 With Project		Change in Noise Level (ADT)	Change in Noise Level (Peak-Hour)
		From	To	Average Daily Traffic	Peak-Hour Traffic	Average Daily Traffic	Peak-Hour Traffic		
Glendale	Glenoaks Boulevard	Sonora Avenue	Grandview Avenue	36,774	3,420	36,774	3,420	0.0	0.0
	Glenoaks Boulevard	Grandview Avenue	Graynold Avenue	37,204	3,460	37,204	3,460	0.0	0.0
	Glenoaks Boulevard	Graynold Avenue	Norton Avenue	36,882	3,430	36,882	3,430	0.0	0.0
	Glenoaks Boulevard	Norton Avenue	Pelanconi Avenue	36,882	3,430	36,882	3,430	0.0	0.0
	Glenoaks Boulevard	Pelanconi Avenue	Alma Street	36,882	3,430	36,882	3,430	0.0	0.0
	Glenoaks Boulevard	Alma Street	Highland Avenue	38,710	3,600	38,710	3,600	0.0	0.0
	Glenoaks Boulevard	Highland Avenue	Estelle Avenue	39,677	3,690	39,677	3,690	0.0	0.0
	Linden Avenue	San Fernando Road	Glenoaks Boulevard	1,075	100	1,075	100	0.0	0.0
	Allen Avenue	Lake Street	Flower Street	2,796	260	2,796	260	0.0	0.0
	Allen Avenue	Flower Street	San Fernando Road	2,581	240	2,581	240	0.0	0.0
	Allen Avenue	San Fernando Road	Glenoaks Boulevard	4,946	460	4,946	460	0.0	0.0
	Western Avenue	Victory Boulevard	Lake Street	13,978	1,300	13,978	1,300	0.0	0.0
	Western Avenue	Lake Street	Flower Street	30,323	2,820	30,323	2,820	0.0	0.0
	Western Avenue	Flower Street	San Fernando Road	29,247	2,720	29,247	2,720	0.0	0.0
	Western Avenue	San Fernando Road	Glenoaks Boulevard	20,430	1,900	20,430	1,900	0.0	0.0
	Western Avenue	Glenoaks Boulevard	Glenwood Road	11,720	1,090	11,720	1,090	0.0	0.0
	Ruberta Avenue	Private	San Fernando Road	1,290	120	1,290	120	0.0	0.0
	Ruberta Avenue	San Fernando Road	Glenoaks Boulevard	2,258	210	2,258	210	0.0	0.0
	Sonora Avenue	Lake Street	Flower Street	19,355	1,800	19,355	1,800	0.0	0.0
	Sonora Avenue	Flower Street	Grand Central Avenue	21,613	2,010	21,613	2,010	0.0	0.0
	Sonora Avenue	Grand Central Avenue	Air Way	18,495	1,720	18,495	1,720	0.0	0.0
	Sonora Avenue	Air Way	San Fernando Road	18,172	1,690	18,172	1,690	0.0	0.0
	Sonora Avenue	San Fernando Road	Glenoaks Boulevard	10,860	1,010	10,860	1,010	0.0	0.0
	Sonora Avenue	Glenoaks Boulevard	5th Street	9,032	840	9,032	840	0.0	0.0

Jurisdiction	Roadway	Limits		2040 Without Project		2040 With Project		Change in Noise Level (ADT)	Change in Noise Level (Peak-Hour)
		From	To	Average Daily Traffic	Peak-Hour Traffic	Average Daily Traffic	Peak-Hour Traffic		
Glendale	Grandview Avenue	Flower Street	Grand Central Avenue	5,914	550	5,914	550	0.0	0.0
	Grandview Avenue	Grand Central Avenue	Air Way	3,871	360	3,871	360	0.0	0.0
	Grandview Avenue	Air Way	San Fernando Road	3,333	310	3,333	310	0.0	0.0
	Grandview Avenue	San Fernando Road	Glenoaks Boulevard	9,462	880	9,462	880	0.0	0.0
	Grandview Avenue	Glenoaks Boulevard	Glenwood Road	6,237	580	6,237	580	0.0	0.0
	Graynold Avenue	Zook Drive	Glenoaks Boulevard	1,183	110	1,183	110	0.0	0.0
	Graynold Avenue	Glenoaks Boulevard	Glenwood Road	1,290	120	1,290	120	0.0	0.0
	Norton Avenue	San Fernando Road	Glenoaks Boulevard	968	90	968	90	0.0	0.0
	Norton Avenue	Glenoaks Boulevard	Glenwood Road	323	30	323	30	0.0	0.0
	Flower Street	Flower Street-Fairmont Avenue	Air Way	17,849	1,660	17,849	1,660	0.0	0.0
	Flower Street	Air Way	San Fernando Road	5,161	480	5,161	480	0.0	0.0
	Pelanconi Avenue	San Fernando Road	Glenoaks Boulevard	430	40	430	40	0.0	0.0
	Alma Street	San Fernando Road	Glenoaks Boulevard	645	60	645	60	0.0	0.0
	Alma Street	Glenoaks Boulevard	Glenwood Road	323	30	323	30	0.0	0.0
	Kellogg Avenue	San Fernando Road	Pelanconi Avenue	645	60	645	60	0.0	0.0
	Highland Avenue	San Fernando Road	Glenoaks Boulevard	10,860	1,010	10,860	1,010	0.0	0.0
	Highland Avenue	Glenoaks Boulevard	Glenwood Road	6,022	560	6,022	560	0.0	0.0
	Fairmont Avenue	San Fernando Road	SR 134 WB Ramps	24,946	2,320	24,946	2,320	0.0	0.0
	Fairmont Avenue	SR 134 WB Ramps	Concord Street	14,839	1,380	14,839	1,380	0.0	0.0
	Doran Street	San Fernando Road	SR 134 EB Ramps-Commercial Street	11,935	1,110	11,935	1,110	0.0	0.0
	Doran Street	SR 134 EB Ramps-Commercial Street	State Street	11,290	1,050	11,290	1,050	0.0	0.0

Jurisdiction	Roadway	Limits		2040 Without Project		2040 With Project		Change in Noise Level (ADT)	Change in Noise Level (Peak-Hour)
		From	To	Average Daily Traffic	Peak-Hour Traffic	Average Daily Traffic	Peak-Hour Traffic		
Los Angeles	Glenfeliz Boulevard	Glemanor Place	Glendale Boulevard	7,419	690	7,419	690	0.0	0.0
	Glenhurst Avenue	Glendale Boulevard	Tyburn Street	4,946	460	4,946	460	0.0	0.0
	Brunswick Avenue	Baywood Street	Chevy Chase Drive	3,871	360	4,559	424	0.7	0.7
	Brunswick Avenue	Chevy Chase Drive	Los Feliz Boulevard	6,237	580	6,237	580	0.0	0.0
	Brunswick Avenue	Los Feliz Boulevard	Glendale Boulevard	4,946	460	4,946	460	0.0	0.0
	Larga Avenue	Glendale Boulevard	Tyburn Street	3,871	360	3,871	360	0.0	0.0
	Perlita Avenue	Chevy Chase Drive	Rigali Avenue	968	90	968	90	0.0	0.0
	La Clede Avenue	Chevy Chase Drive	Verdant Street	1,183	110	1,183	110	0.0	0.0
	La Clede Avenue	Glendale Boulevard	Fletcher Drive	2,796	260	2,796	260	0.0	0.0
	La Clede Avenue	Fletcher Drive	Carillon Street	3,548	330	3,548	330	0.0	0.0
	Casitas Avenue	Topock Street	Tyburn Street	968	90	968	90	0.0	0.0
	Casitas Avenue	Tyburn Street	Silver Lake Boulevard	1,398	130	1,398	130	0.0	0.0
	Casitas Avenue	Silver Lake Boulevard	Minneapolis Street	1,398	130	1,398	130	0.0	0.0
	W San Fernando Road	Bermis Street	Chevy Chase Drive	2,903	270	4,849	451	2.2	2.2
Glendale	San Fernando Road	Acacia Avenue	Chevy Chase Drive	26,237	2,440	30,290	2,817	0.6	0.6
	San Fernando Road	Chevy Chase Drive	Los Feliz Boulevard	22,903	2,130	22,129	2,058	-0.1	-0.1
	San Fernando Road	Los Feliz Boulevard	Central Avenue	16,237	1,510	16,237	1,510	0.0	0.0
	San Fernando Road	Central Avenue	El Bonito Avenue	20,430	1,900	20,430	1,900	0.0	0.0
	San Fernando Road	El Bonito Avenue	Cerritos Avenue	20,000	1,860	20,000	1,860	0.0	0.0
	San Fernando Road	Cerritos Avenue	Mira Loma Avenue	18,495	1,720	18,495	1,720	0.0	0.0
	San Fernando Road	Mira Loma Avenue	Glendale Boulevard	19,032	1,770	19,032	1,770	0.0	0.0

Jurisdiction	Roadway	Limits		2040 Without Project		2040 With Project		Change in Noise Level (ADT)	Change in Noise Level (Peak-Hour)
		From	To	Average Daily Traffic	Peak-Hour Traffic	Average Daily Traffic	Peak-Hour Traffic		
Los Angeles	San Fernando Road	Glendale Boulevard	Tyburn Street	26,452	2,460	26,452	2,460	0.0	0.0
	San Fernando Road	Tyburn Street	Fletcher Drive	27,957	2,600	27,957	2,600	0.0	0.0
	San Fernando Road	Fletcher Drive	SR-2 SB Ramps	32,043	2,980	32,043	2,980	0.0	0.0
	San Fernando Road	SR-2 SB Ramps	SR-2 NB Off-Ramp	29,570	2,750	29,570	2,750	0.0	0.0
	San Fernando Road	SR-2 NB Off-Ramp	SR-2 NB On-Ramp	29,785	2,770	29,785	2,770	0.0	0.0
	San Fernando Road	SR-2 NB On-Ramp	Edward Avenue	32,796	3,050	32,796	3,050	0.0	0.0
	Silver Lake Boulevard	Casitas Avenue	La Clede Avenue	645	60	645	60	0.0	0.0
	Chevy Chase Drive	Edenhurst Avenue	Brunswick Avenue	1,290	120	1,591	148	0.9	0.9
	Chevy Chase Drive	Brunswick Avenue	Perlita Avenue	3,548	330	2,968	276	-0.8	-0.8
	Chevy Chase Drive	Perlita Avenue	La Clede Avenue	3,871	360	3,247	302	-0.8	-0.8
	Chevy Chase Drive	La Clede Avenue	W San Fernando Road	4,624	430	6,022	560	1.1	1.1
	Chevy Chase Drive	W San Fernando Road	San Fernando Road	6,344	590	2,269	211	-4.5	-4.5
Glendale	Chevy Chase Drive	San Fernando Road	Central Avenue	12,688	1,180	14,290	1,329	0.5	0.5
	Chevy Chase Drive	Central Avenue	Brand Boulevard	14,194	1,320	14,194	1,320	0.0	0.0
Los Angeles	Los Feliz Road	Edenhurst Avenue	Brunswick Avenue	31,505	2,930	31,505	2,930	0.0	0.0
	Los Feliz Road	Brunswick Avenue	San Fernando Road	29,785	2,770	29,785	2,770	0.0	0.0
Glendale	Los Feliz Road	San Fernando Road	Central Avenue	19,785	1,840	19,785	1,840	0.0	0.0
Los Angeles	Central Avenue	Gardena Avenue	San Fernando Road	2,796	260	2,796	260	0.0	0.0
Glendale	Central Avenue	San Fernando Road	Los Feliz Boulevard	6,989	650	6,989	650	0.0	0.0
Los Angeles	El Bonito Avenue	Gardena Avenue	San Fernando Road	753	70	753	70	0.0	0.0
	Cerritos Avenue	Gardena Avenue	San Fernando Road	2,581	240	2,581	240	0.0	0.0
Glendale	Cerritos Avenue	San Fernando Road	Brand Boulevard	3,871	360	3,871	360	0.0	0.0

Jurisdiction	Roadway	Limits		2040 Without Project		2040 With Project		Change in Noise Level (ADT)	Change in Noise Level (Peak-Hour)
		From	To	Average Daily Traffic	Peak-Hour Traffic	Average Daily Traffic	Peak-Hour Traffic		
Los Angeles	Mira Loma	Gardena Avenue	San Fernando Road	1,183	110	1,183	110	0.0	0.0
	Glendale Boulevard	Hollydale Drive	Glenfeliz Boulevard-Glenhurst Avenue	41,613	3,870	41,613	3,870	0.0	0.0
	Glendale Boulevard	Glenfeliz Boulevard-Glenhurst Avenue	Larga Avenue	36,129	3,360	36,129	3,360	0.0	0.0
	Glendale Boulevard	Larga Avenue	La Clede Avenue	35,054	3,260	35,054	3,260	0.0	0.0
	Glendale Boulevard	La Clede Avenue	San Fernando Road	32,473	3,020	32,473	3,020	0.0	0.0
Glendale	Glendale Boulevard	San Fernando Road	Cerritos Avenue	23,978	2,230	23,978	2,230	0.0	0.0
Los Angeles	Tyburn Street	La Clede Avenue	Casitas Avenue	968	90	968	90	0.0	0.0
	Tyburn Street	Vassar Street	San Fernando Road	1,935	180	1,935	180	0.0	0.0
	Fletcher Drive	Perlita Avenue	La Clede Avenue	16,882	1,570	16,882	1,570	0.0	0.0
	Fletcher Drive	La Clede Avenue	San Fernando Road	15,914	1,480	15,914	1,480	0.0	0.0
	Fletcher Drive	San Fernando Road	Delay Drive	14,086	1,310	14,086	1,310	0.0	0.0
	San Fernando Road	Division Street	Macon Street	24,624	2,290	24,624	2,290	0.0	0.0
	San Fernando Road	Macon Street	Future Street	25,591	2,380	25,591	2,380	0.0	0.0
	San Fernando Road	Future Street	Private	28,495	2,650	28,495	2,650	0.0	0.0
	San Fernando Road	Private	Granada Street	28,495	2,650	28,495	2,650	0.0	0.0
	Macon Street	San Fernando Road	Cypress Avenue	753	70	753	70	0.0	0.0
	Future Street	San Fernando Road	Cypress Avenue	3,656	340	3,656	340	0.0	0.0
	Private	–	San Fernando Road	645	60	645	60	0.0	0.0
	Figueroa Street	Figueroa Terrace	Alpine Street	13,548	1,260	13,634	1,268	0.0	0.0
	Figueroa Street	Alpine Street	Cesar Chavez Avenue	14,839	1,380	14,903	1,386	0.0	0.0
	Figueroa Street	Cesar Chavez Avenue	Temple Street	23,118	2,150	23,161	2,154	0.0	0.0
	Figueroa Street	Temple Street	1st Street	26,559	2,470	26,624	2,476	0.0	0.0

Jurisdiction	Roadway	Limits		2040 Without Project		2040 With Project		Change in Noise Level (ADT)	Change in Noise Level (Peak-Hour)
		From	To	Average Daily Traffic	Peak-Hour Traffic	Average Daily Traffic	Peak-Hour Traffic		
Los Angeles	Grand Avenue	Alpine Street	Cesar Chavez Avenue	10,215	950	10,312	959	0.0	0.0
	Grand Avenue	Cesar Chavez Avenue	Temple Street	25,161	2,340	25,409	2,363	0.0	0.0
	Hill Place	Alpine Street	Cesar Chavez Avenue	24,624	2,290	24,817	2,308	0.0	0.0
	Hill Street	Bamboo Lane	College Street	33,226	3,090	33,989	3,161	0.1	0.1
	Hill Street	College Street	Ord Street	29,892	2,780	30,043	2,794	0.0	0.0
	Hill Street	Ord Street	Cesar Chavez Avenue	25,914	2,410	26,473	2,462	0.1	0.1
	Broadway	Bamboo Lane	College Street	33,226	3,090	33,989	3,161	0.1	0.1
	Broadway	College Street	Alpine Street	29,892	2,780	30,043	2,794	0.0	0.0
	Broadway	Alpine Street	Cesar Chavez Avenue	23,871	2,220	24,140	2,245	0.0	0.0
	Broadway	Cesar Chavez Avenue	US-101 NB On-Ramp	20,430	1,900	20,602	1,916	0.0	0.0
	Broadway	US-101 NB On-Ramp	Arcadia Street	21,828	2,030	22,032	2,049	0.0	0.0
	Broadway	Arcadia Street	Aliso Street	19,032	1,770	19,247	1,790	0.0	0.0
	Broadway	Aliso Street	1st Street	18,495	1,720	18,849	1,753	0.1	0.1
	Broadway	1st Street	2nd Street	10,860	1,010	10,925	1,016	0.0	0.0
	Spring Street	Ord Street	Cesar Chavez Avenue	3,011	280	3,011	280	0.0	0.0
	Spring Street	Cesar Chavez Avenue	US-101 NB Off-Ramp	6,129	570	6,129	570	0.0	0.0
	Spring Street	US-101 NB Off-Ramp	Arcadia Street	6,452	600	6,527	607	0.1	0.1
	Spring Street	Arcadia Street	Aliso Street	7,957	740	8,032	747	0.0	0.0
	Spring Street	Aliso Street	Temple Street	6,882	640	6,957	647	0.0	0.0
	Spring Street	Avenue 18	Sotello Street	14,194	1,320	14,290	1,329	0.0	0.0
	Spring Street	Sotello Street	College Street	16,774	1,560	16,871	1,569	0.0	0.0
	Alameda Street	College Street	Alpine Street	23,226	2,160	23,312	2,168	0.0	0.0
	Alameda Street	Alpine Street	Ord Street-Main Street	27,634	2,570	27,806	2,586	0.0	0.0
	Alameda Street	Ord Street-Main Street	Cesar Chavez Avenue	30,753	2,860	30,925	2,876	0.0	0.0

Jurisdiction	Roadway	Limits		2040 Without Project		2040 With Project		Change in Noise Level (ADT)	Change in Noise Level (Peak-Hour)
		From	To	Average Daily Traffic	Peak-Hour Traffic	Average Daily Traffic	Peak-Hour Traffic		
Los Angeles	Alameda Street	Cesar Chavez Avenue	Paseo de la Plaza	23,978	2,230	25,602	2,381	0.3	0.3
	Alameda Street	Paseo de la Plaza	Arcadia Street	28,172	2,620	29,226	2,718	0.2	0.2
	Alameda Street	Arcadia Street	Aliso Street-Commercial Street	29,140	2,710	30,054	2,795	0.1	0.1
	Alameda Street	Aliso Street-Commercial Street	Temple Street	25,591	2,380	26,323	2,448	0.1	0.1
	Alameda Street	Temple Street	1st Street	26,344	2,450	26,817	2,494	0.1	0.1
	Alameda Street	1st Street	2nd Street	22,796	2,120	23,183	2,156	0.1	0.1
	Alameda Street	2nd Street	3rd Street	20,215	1,880	20,613	1,917	0.1	0.1
	Alameda Street	3rd Street	4th Street	21,183	1,970	21,473	1,997	0.1	0.1
	Alameda Street	4th Street	5th Street	21,613	2,010	21,903	2,037	0.1	0.1
	Alameda Street	Olympic Boulevard	Newton Street	25,161	2,340	25,462	2,368	0.1	0.1
	Alameda Street	Newton Street	I-10 EB Ramps	27,742	2,580	27,849	2,590	0.0	0.0
	Alameda Street	I-10 EB Ramps	Washington Boulevard	31,075	2,890	31,075	2,890	0.0	0.0
	Main Street	Wilhardt Street	Sotello Street	22,796	2,120	22,871	2,127	0.0	0.0
	Main Street	Sotello Street	Elmyra Street	22,473	2,090	23,839	2,217	0.3	0.3
	Main Street	Elmyra Street	College Street	30,430	2,830	30,505	2,837	0.0	0.0
	Main Street	College Street	Alpine Street	30,538	2,840	30,613	2,847	0.0	0.0
	Main Street	Alpine Street	Ord Street-Main Street	14,301	1,330	14,301	1,330	0.0	0.0
	Main Street	Alameda Street	Cesar Chavez Avenue	10,538	980	10,538	980	0.0	0.0
	Main Street	Cesar Chavez Avenue	1st Street	21,505	2,000	21,505	2,000	0.0	0.0
	Main Street	1st Street	2nd Street	22,688	2,110	22,688	2,110	0.0	0.0
	Judge John Aiso Street	Temple Street	1st Street	8,280	770	8,280	770	0.0	0.0
	Garey Street	US-101 SB Ramps	Ducommun Street	4,946	460	5,065	471	0.1	0.1

Jurisdiction	Roadway	Limits		2040 Without Project		2040 With Project		Change in Noise Level (ADT)	Change in Noise Level (Peak-Hour)
		From	To	Average Daily Traffic	Peak-Hour Traffic	Average Daily Traffic	Peak-Hour Traffic		
Los Angeles	Garey Street	Ducommun Street	Temple Street	5,161	480	5,280	491	0.1	0.1
	Vignes Street	Bauchet Street	Cesar Chavez Avenue	22,258	2,070	22,333	2,077	0.0	0.0
	Vignes Street	Cesar Chavez Avenue	Gateway Plaza-Ramirez Street	26,452	2,460	30,323	2,820	0.6	0.6
	Vignes Street	Jackson Street	Temple Street	3,441	320	3,441	320	0.0	0.0
	Vignes Street	Temple Street	1st Street	4,731	440	4,785	445	0.0	0.0
	Vignes Street	1st Street	2nd Street	3,226	300	3,226	300	0.0	0.0
	Center Street	Vignes Street	Commercial Street	13,118	1,220	13,903	1,293	0.3	0.3
	Center Street	Commercial Street	Temple Street	10,000	930	10,237	952	0.1	0.1
	Center Street	Temple Street	Banning Street	10,538	980	10,538	980	0.0	0.0
	Wilhardt Street	Spring Street	Main Street	1,613	150	1,613	150	0.0	0.0
	Sotello Street	Spring Street	Main Street	1,828	170	3,118	290	2.3	2.3
	Elmyra Street	Spring Street	Main Street	1,613	150	1,613	150	0.0	0.0
	Elmyra Street	Main Street	Magdalena Street	1,398	130	1,398	130	0.0	0.0
	College Street	Yale Street	Hill Street	7,312	680	7,989	743	0.4	0.4
	College Street	Hill Street	Broadway	11,935	1,110	11,935	1,110	0.0	0.0
	College Street	Broadway	Spring Street	14,839	1,380	14,839	1,380	0.0	0.0
	College Street	Spring Street	Main Street	4,301	400	4,301	400	0.0	0.0
	College Street	Main Street	Alhambra Avenue	4,839	450	4,839	450	0.0	0.0
	Figueroa Terrace	Beaudry Avenue	Figueroa Street	7,957	740	7,978	742	0.0	0.0
	Figueroa Terrace	Figueroa Street	New Depot Street	8,172	760	8,290	771	0.1	0.1
	Alpine Street	Figueroa Street	Hill Place	8,065	750	8,161	759	0.1	0.1
	Alpine Street	Hill Place	Broadway	10,215	950	10,290	957	0.0	0.0
	Alpine Street	Broadway	Alameda Street	14,409	1,340	14,516	1,350	0.0	0.0

Jurisdiction	Roadway	Limits		2040 Without Project		2040 With Project		Change in Noise Level (ADT)	Change in Noise Level (Peak-Hour)
		From	To	Average Daily Traffic	Peak-Hour Traffic	Average Daily Traffic	Peak-Hour Traffic		
Los Angeles	Alpine Street	Alameda Street	Main Street	17,527	1,630	17,548	1,632	0.0	0.0
	Alpine Street	Main Street	Bauchet Street	20,323	1,890	20,398	1,897	0.0	0.0
	Ord Street	Hill Street	Alameda Street	8,280	770	8,280	770	0.0	0.0
	Bauchet Street	Avila Street	Vignes Street	1,290	120	1,290	120	0.0	0.0
	Bauchet Street	Vignes Street	–	4,946	460	4,946	460	0.0	0.0
	Cesar Chavez Avenue	Boston Street	Figueroa Street	29,785	2,770	29,785	2,770	0.0	0.0
	Cesar Chavez Avenue	Figueroa Street	Grand Avenue	31,828	2,960	31,849	2,962	0.0	0.0
	Cesar Chavez Avenue	Grand Avenue	Broadway	39,462	3,670	39,634	3,686	0.0	0.0
	Cesar Chavez Avenue	Broadway	New High Street-Spring Street	33,011	3,070	33,290	3,096	0.0	0.0
	Cesar Chavez Avenue	New High Street-Spring Street	Main Street	31,290	2,910	31,570	2,936	0.0	0.0
	Cesar Chavez Avenue	Main Street	Alameda Street	28,710	2,670	28,978	2,695	0.0	0.0
	Cesar Chavez Avenue	Alameda Street	Vignes Street	30,000	2,790	31,935	2,970	0.3	0.3
	Cesar Chavez Avenue	Vignes Street	Mission Road	35,699	3,320	37,581	3,495	0.2	0.2
	Arcadia Street	Broadway	Spring Street	10,538	980	10,548	981	0.0	0.0
	Arcadia Street	Spring Street	Alameda Street	12,043	1,120	12,054	1,121	0.0	0.0
	Aliso Street	Broadway	Spring Street	7,527	700	7,624	709	0.1	0.1
	Aliso Street	Spring Street	Alameda Street	9,677	900	9,774	909	0.0	0.0
	Commercial Street	Alameda Street	Garey Street	10,860	1,010	11,086	1,031	0.1	0.1
	Commercial Street	Garey Street	Center Street	7,634	710	8,398	781	0.4	0.4
	Ducommun Street	Hewitt Street	Garey Street	753	70	753	70	0.0	0.0
	Ducommun Street	Garey Street	Vignes Street	753	70	753	70	0.0	0.0
	Kearney Street	Pleasant Avenue	Pennsylvania Avenue	645	60	645	60	0.0	0.0

Jurisdiction	Roadway	Limits		2040 Without Project		2040 With Project		Change in Noise Level (ADT)	Change in Noise Level (Peak-Hour)
		From	To	Average Daily Traffic	Peak-Hour Traffic	Average Daily Traffic	Peak-Hour Traffic		
Los Angeles	Temple Street	Fremont Avenue	Figueroa Street	8,280	770	8,280	770	0.0	0.0
	Temple Street	Figueroa Street	Judge John Aiso Street	18,817	1,750	19,473	1,811	0.1	0.1
	Temple Street	Judge John Aiso Street	Alameda Street	17,849	1,660	18,505	1,721	0.2	0.2
	Temple Street	Alameda Street	Garey Street	9,032	840	9,333	868	0.1	0.1
	Temple Street	Garey Street	Vignes Street	4,946	460	5,129	477	0.2	0.2
	Temple Street	Vignes Street	Center Street	1,828	170	2,065	192	0.5	0.5
	1st Street	Hill Street	Broadway	23,011	2,140	23,086	2,147	0.0	0.0
	1st Street	Broadway	Main Street	22,796	2,120	22,914	2,131	0.0	0.0
	1st Street	Main Street	Alameda Street	21,075	1,960	21,172	1,969	0.0	0.0
	1st Street	Alameda Street	Vignes Street	16,452	1,530	16,538	1,538	0.0	0.0
	1st Street	Vignes Street	Pecan Street	17,527	1,630	17,667	1,643	0.0	0.0
	1st Street	Pecan Street	US-101 NB Ramps	15,376	1,430	15,484	1,440	0.0	0.0
	1st Street	US-101 NB Ramps	Boyle Avenue	13,871	1,290	13,882	1,291	0.0	0.0
	2nd Street	Central Avenue	Alameda Street	10,430	970	10,430	970	0.0	0.0
	2nd Street	Alameda Street	Rose Street	6,774	630	6,774	630	0.0	0.0
	3rd Street	Central Avenue	Alameda Street	16,882	1,570	16,892	1,571	0.0	0.0
	3rd Street	Alameda Street	4th Street	12,688	1,180	12,785	1,189	0.0	0.0
	4th Street	Central Avenue	Alameda Street	23,441	2,180	23,484	2,184	0.0	0.0
	4th Street	Alameda Street	Pecan Street	36,989	3,440	37,118	3,452	0.0	0.0
	4th Street	Pecan Street	US-101 SB Off-Ramp	27,742	2,580	27,839	2,589	0.0	0.0
	4th Street	US-101 SB Off-Ramp	US-101 NB Off-Ramp	27,849	2,590	27,946	2,599	0.0	0.0
	4th Street	US-101 NB Off-Ramp	Boyle Avenue	25,806	2,400	25,806	2,400	0.0	0.0
	San Fernando Road	Poplar Road	Avenue 26	29,462	2,740	29,591	2,752	0.0	0.0
	San Fernando Road	Avenue 26	Figueroa Street	15,914	1,480	15,978	1,486	0.0	0.0

Jurisdiction	Roadway	Limits		2040 Without Project		2040 With Project		Change in Noise Level (ADT)	Change in Noise Level (Peak-Hour)
		From	To	Average Daily Traffic	Peak-Hour Traffic	Average Daily Traffic	Peak-Hour Traffic		
Los Angeles	Avenue 26	San Fernando Road	Figueroa Street	19,355	1,800	19,419	1,806	0.0	0.0
	Avenue 26	Figueroa Street	I-5 SB On-Ramp	27,634	2,570	27,710	2,577	0.0	0.0
	Avenue 26	I-5 SB On-Ramp	I-110 NB On-Ramp	24,409	2,270	24,473	2,276	0.0	0.0
	Avenue 26	I-110 NB On-Ramp	I-5 NB Off-Ramp	33,226	3,090	33,989	3,161	0.1	0.1
	Avenue 26	I-5 NB Off-Ramp	Artesian Street	29,892	2,780	30,043	2,794	0.0	0.0
	Figueroa Street	Avenue 19	I-110 SB On-Ramp	12,473	1,160	12,484	1,161	0.0	0.0
	Figueroa Street	I-110 SB On-Ramp	I-110 NB Off-Ramp	20,860	1,940	20,892	1,943	0.0	0.0
	Figueroa Street	I-110 NB Off-Ramp	Avenue 26	27,957	2,600	28,011	2,605	0.0	0.0
	Figueroa Street	Avenue 26	Avenue 28	21,828	2,030	21,828	2,030	0.0	0.0
	Avenue 18	Barranca Street	Pasadena Avenue	1,290	120	1,290	120	0.0	0.0
	Avenue 18	Pasadena Avenue	Broadway	1,613	150	1,613	150	0.0	0.0
	Avenue 18	Broadway	Albion Street	14,839	1,380	16,247	1,511	0.4	0.4
	Avenue 20	Pasadena Avenue	Broadway	6,989	650	7,000	651	0.0	0.0
	Avenue 20	Broadway	Main Street	7,527	700	7,527	700	0.0	0.0
	Avenue 21	Humboldt Street	Pasadena Avenue	8,925	830	8,989	836	0.0	0.0
	N Avenue 21	Pasadena Avenue	Broadway	4,086	380	4,140	385	0.1	0.1
	S Avenue 21	Pasadena Avenue	Broadway	7,419	690	7,495	697	0.0	0.0
	Daly Street	Avenue 26	Broadway	20,108	1,870	20,172	1,876	0.0	0.0
	Daly Street	Broadway	Main Street	18,602	1,730	18,699	1,739	0.0	0.0
	Daly Street	Main Street	Mission Road	18,495	1,720	18,548	1,725	0.0	0.0
	Daly Street	Mission	I-5 NB On-Ramp	27,204	2,530	27,204	2,530	0.0	0.0
	Daly Street	I-5 NB On-Ramp	State Street	27,204	2,530	27,247	2,534	0.0	0.0
	Marengo Street	State Street	Kingston Avenue	19,032	1,770	19,032	1,770	0.0	0.0
	Pasadena Avenue	Broadway	Avenue 18	16,882	1,570	17,022	1,583	0.0	0.0

Jurisdiction	Roadway	Limits		2040 Without Project		2040 With Project		Change in Noise Level (ADT)	Change in Noise Level (Peak-Hour)
		From	To	Average Daily Traffic	Peak-Hour Traffic	Average Daily Traffic	Peak-Hour Traffic		
Los Angeles	Pasadena Avenue	Avenue 18	N Avenue 21	16,344	1,520	16,484	1,533	0.0	0.0
	Pasadena Avenue	N Avenue 21	S Avenue 21	15,699	1,460	15,774	1,467	0.0	0.0
	Pasadena Avenue	S Avenue 21	Avenue 23	11,828	1,100	11,903	1,107	0.0	0.0
	Broadway	Baker Street	Pasadena Avenue	27,419	2,550	27,559	2,563	0.0	0.0
	Broadway	Pasadena Avenue	Avenue 18	10,753	1,000	10,753	1,000	0.0	0.0
	Pasadena Avenue	Avenue 18	Avenue 20	24,301	2,260	24,387	2,268	0.0	0.0
	Pasadena Avenue	Avenue 20	N Avenue 21	26,559	2,470	26,634	2,477	0.0	0.0
	Pasadena Avenue	N Avenue 21	S Avenue 21	27,204	2,530	27,247	2,534	0.0	0.0
	Pasadena Avenue	S Avenue 21	Daly Street	25,484	2,370	25,516	2,373	0.0	0.0
	Pasadena Avenue	Daly Street	Workman Street	22,581	2,100	22,581	2,100	0.0	0.0
	Main Street	Gibbons Street	Avenue 20	25,376	2,360	25,452	2,367	0.0	0.0
	Main Street	Avenue 20	Daly Street	26,452	2,460	26,527	2,467	0.0	0.0
	Main Street	Daly Street	Workman Street	23,226	2,160	23,226	2,160	0.0	0.0
	Mission Road	Kearney Street	US-101 SB Ramps	8,495	790	9,011	838	0.3	0.3
	Mission Road	US-101 SB Ramps	US-101 NB Ramps	17,097	1,590	17,978	1,672	0.2	0.2
	Mission Road	US-101 NB Ramps	Cesar Chavez Avenue	18,925	1,760	18,957	1,763	0.0	0.0
	Mission Road	Cesar Chavez Avenue	Richmond Street	26,989	2,510	27,118	2,522	0.0	0.0
	Mission Road	Richmond Street	I-5 SB Ramps	26,989	2,510	27,118	2,522	0.0	0.0
	Mission Road	I-5 SB Ramps	Daly Street	29,785	2,770	29,860	2,777	0.0	0.0
	Mission Road	Daly Street	Zonal Avenue	27,204	2,530	27,204	2,530	0.0	0.0
	State Street	Marengo Street	I-10 WB Off-Ramp	12,258	1,140	12,280	1,142	0.0	0.0

Jurisdiction	Roadway	Limits		2040 Without Project		2040 With Project		Change in Noise Level (ADT)	Change in Noise Level (Peak-Hour)
		From	To	Average Daily Traffic	Peak-Hour Traffic	Average Daily Traffic	Peak-Hour Traffic		
Los Angeles	State Street	I-10 WB Off-Ramp	I-10 EB Ramps	12,688	1,180	12,710	1,182	0.0	0.0
	State Street	I-10 EB Ramps	City View Avenue	17,957	1,670	17,989	1,673	0.0	0.0

Source: California High-Speed Rail Authority, 2018
[1] The roadway segment does not exist under this scenario.
ADT = average daily traffic
CNEL = Community Noise Equivalent Level
EB = eastbound
I = Interstate
N/A = not applicable
NB = northbound
SB = southbound
SR = State Route
US = U.S. Route
WB = westbound

As presented above in Section 3.1.2, FHWA/Caltrans noise regulations only apply at locations with a significant change in the horizontal or vertical alignment of an existing highway or roadway or where traffic volumes are anticipated to increase by a substantial amount (a doubling of volume) under the HSR Build Alternative. There were no locations in the project corridor near noise-sensitive receivers where either of these conditions were met; therefore, no detailed analyses associated with roadway improvement are necessary.

6.5 Annoyance and Startle Effects for Human Noise-Sensitive Receivers Due to Rapid Onset Rates

An onset rate of 15 dB per second at a distance of 90 feet would result in annoyance, and an onset rate of 30 dB per second at a distance of 45 feet would result in startle effects. The term startle effect has been previously defined as "*a transient disruption of interruption of human task, performance, or activity in man or animals cause by any abrupt or unexpected physical stimulus or event"* (Applied System Technologies, Inc. 1994). Noise-sensitive receivers within 90 feet of the HSR alignment would experience annoyance from onset rates caused by the HSR Build Alternative. In addition, noise-sensitive receivers within 45 feet of the proposed alignment would experience a startle effect from onset rates caused by the HSR Build Alternative. Because there are a number of unresolved issues regarding the application of the U.S. Air Force research (Stusnick and Bradley 1992) to determine the startle effects of the HSR Build Alternative, the annoyance and startle effects should only be considered as additional information for this assessment rather than a specific assessment of of noise exposure.

Tunnel Portal Noise

Based on the current tunnel design, it is anticipated that roughly half of the sound generated in the tunnel would pass out through the exit portal, and the other half would propagate into the interior. The effect would be a rapid rise in sound level as the train leaves the tunnel and portal, forewarned by a propagating wave ahead of the train. Depending on the shape of the portal, shape of the train nose, and blockage ratio, the rate of pressure rise may be substantial. The pressure wave front rate of rise is reduced by friction between the moving air column and tunnel wall, so that the pressure wave does not easily develop into a shock wave. This portal noise effect has been studied theoretically and experimentally and is well understood. Attenuation of the portal noise for this project section, where necessary, would be achieved with the incorporation of noise mitigation hoods which may be up to 150 feet long and will be inclined at least 45 degrees from the vertical. Typically, these features are only necessary when train speeds are 150 mph or more, whereas the peak speed in the Burbank to Los Angeles Project Section is no more than 140 mph. Additionally, in-tunnel cross-passages and vents can reduce pressure magnitudes and rates of rise, though passage of these vents may generate additional propagating and steepening wave fronts. These tunnel portal design features will be used to attenuate any additional noise associated with the train entering or exiting a tunnel.

6.6 Noise Effects on Wildlife Noise-Sensitive Receivers

All domestic and wild birds and mammals near the RSA may be affected by train passbys if they are subjected to SEL values of 100 dBA or higher. While it is possible for some animals to become habituated to higher noise levels and exhibit reduced response to noise after prior exposure, there is no developed general criterion level or threshold for habituation. Assuming a maximum speed of 125 mph, when these species are within 30 feet of the HSR centerline, they may be affected. However, the HSR Build Alternative would be fenced, and these animal species would be more than 30 feet from the HSR track. Additionally, due to the intermittent nature of the train operations, it is expected that the noise environment would only be affected for short periods of time and would not affect animal species communications.

6.7 High-Speed Rail Project Alternative

6.7.1 High-Speed Train Operations Assumptions

The Authority's environmental program manager provided the operational parameters used to model future with project noise levels. These data include the type of HSR car to be modeled, the number of cars per train, the length of the train, the number of operations expected throughout the day, and the basic track geometries for the project alignment. These parameters are summarized in Table 6-5. The number of daily trains, including those during the peak period and nighttime hours were calculated from the tables provided in the Authority's *Operations and Service Plan* (Authority 2017). Note that any change in the number of operations, particularly during nighttime hours, would result in a change in predicted noise levels. The reference noise data used to model the HSR Build Alternative's operations were taken from the high-speed electric-multiple-unit systems for the propulsion and wheel rail sources and the very-high-speed electric systems for the aerodynamic source. A specific speed profile for the entire proposed project alignment was utilized to analyze the receptors within the RSA more accurately. Any changes to the speeds of the modeled operations would result in a change in the corresponding noise effects.

Table 6-5 High-Speed Rail Build Alternative Operational and Geometric Assumptions

Parameter	Value
Number of Cars per Train	8
Number of Powered Cars per Train	8
Car Length	82.5 feet
Train Length	660 feet
Number of Daytime Operations	174
Number of Nighttime Operations	22
Number of Peak-Hour Trains	15
Range of Speed	20–125 mph
Track Geometry	Two-track, 16.5 feet on center
Geometric Cross-Sections	At-grade
Near Track to Noise Barrier—At-Grade	21.5 feet

Source: California High-Speed Rail Authority, 2018
mph = miles per hour

The projected HSR Build Alternative noise and vibration levels were calculated at each noise measurement location within the RSA using the operational assumptions listed above. The calculated noise levels were then compared to the measured noise levels at each location, and the moderate impacts and severe impact distances were determined. The RSA was subdivided into seven sections between Burbank and Los Angeles. The results of the analysis are presented for each subsection. Noise modeling projections do not include the effects of atmospheric absorption. However, using atmospheric absorption of sound based on the International Organization for Standardization's ISO 9613-2 would result in a 1 dBA drop in noise level per 1,000 feet from the proposed alignment.

6.7.2 High-Speed Train Operations Noise Effects

A noise analysis was conducted for the proposed project using the FRA methodology. Noise effects using the FRA methodology are determined by the increase in noise exposure levels attributed to the proposed project based on the existing noise environment. Figure 3-1 of FRA's *High-Speed Ground Transportation Noise and Vibration Impact Assessment* (FRA 2012) shows FRA's noise criteria for the proposed project. As shown on Figure 3-1, the noise criteria and noise descriptor depend on the land use. In addition, noise effects are classified as "no impact," "moderate impact," or "severe impact."

A preliminary noise analysis was conducted for the long-term and short-term measurement locations to show potential noise effects in the RSA. The measured existing noise level and proposed project noise levels were used to determine the total noise level and the proposed project-related noise level increase at each measurement location. Table 6-6 shows the results of the analysis for the long-term and short-term measurement locations under the HSR Build Alternative, along with the various parameters used to determine the noise effects. These parameters include the track elevation, receiver base elevation, land use, land use category, existing noise level, project noise level (unmitigated), total noise level (unmitigated), noise level increase, and FRA impact. The noise levels shown in Table 6-6 are described in terms of either L_{dn} or L_{eq}, depending on the land use category. For land use categories 1 and 3, the noise descriptor is L_{eq}, whereas the noise descriptor for land use category 2 is L_{dn}. The existing noise level, project noise level (unmitigated), and total noise level (unmitigated) were rounded to the nearest whole number. Table 6-6 also provides the calculated distances to the severe and moderate impacts for each measurement location for generalization purposes.

Table 6-6 Operational Noise Levels and Contours for the High-Speed Rail Build Alternative

Site Name	Track Elevation (feet)	Receiver Base Elevation (feet)[1]	Nearest Track to Receiver Distance (feet)	Land Use	Land Use Category	Existing Noise Level[2]	Project Noise Level[2] Unmitigated	Total Noise Level[2] Unmitigated	Noise Level Increase (dBA)	FRA Impact—No Mitigation	Moderate Impact Contour Distance (feet)	Severe Impact Contour Distance (feet)
PB-LT-28	611	624	80	Residential	2	58	64	65	6	Severe	240	105
PB-LT-30	548	570	521	Residential	2	60	50	60	0	None	185	80
LT-01	532	540	810	Residential	2	63	54	64	1	None	228	63
LT-02	526	506	579	Residential	2	68	63	69	1	Moderate	664	196
LT-03	508	480	689	Residential	2	63	56	64	1	None	274	79
LT-04	514	496	571	Residential	2	60	57	62	2	None	413	114
LT-05	506	482	523	Residential	2	60	56	61	1	None	337	91
LT-06	496	471	237	Residential	2	66	67	70	4	Severe	750	221
LT-07	472	461	147	Residential	2	74	69	75	1	Moderate	329	70
LT-08	466	475	528	Residential	2	63	57	64	1	None	318	88
LT-09	487	477	967	Residential	2	60	51	61	1	None	212	57
LT-10	453	441	368	Residential	2	63	60	65	2	Moderate	443	122
LT-11	451	440	454	Residential	2	63	58	64	1	None	321	88
LT-12	439	426	229	Residential	2	58	62	63	5	Severe	891	234
LT-13	438	432	597	Residential	2	60	55	61	1	None	368	99
LT-14	432	423	386	Residential	2	68	65	70	2	Moderate	627	189
LT-15	419	419	199	Residential	2	63	68	69	6	Severe	1512	416
LT-16	425	424	191	Residential	2	61	63	65	4	Moderate	619	170
LT-17	407	395	683	Residential	2	59	55	60	1	None	367	99

Site Name	Track Elevation (feet)	Receiver Base Elevation (feet)[1]	Nearest Track to Receiver Distance (feet)	Land Use	Land Use Category	Existing Noise Level[2]	Project Noise Level[2] Unmitigated	Total Noise Level[2] Unmitigated	Noise Level Increase (dBA)	FRA Impact—No Mitigation	Moderate Impact Contour Distance (feet)	Severe Impact Contour Distance (feet)
LT-18	366	347	639	Residential	2	58	63	64	6	Severe	2921	768
LT-19	343	347	546	Residential	2	65	59	66	1	None	322	93
LT-20	341	329	408	Residential	2	62	65	67	5	Severe	1739	490
LT-21	338	344	547	Residential	2	67	64	69	2	Moderate	867	256
LT-22	333	346	990	Residential	2	70	56	70	0	None	140	43
LT-23	320	318	455	Residential	2	63	64	67	4	Moderate	1579	435
LT-24	310	303	657	Residential	2	63	63	66	3	Moderate	1577	434
LT-25	305	285	80	Residential	2	70	71	74	4	Severe	450	136
LT-26	305	282	345	Residential	2	73	65	74	1	Moderate	378	81
PB-ST-23	536	554	80	Studio	1	58	66	67	8	Moderate	165	170
ST-01	537	520	404	Recording Studio	1	73	59	73	0	None	101	22
ST-02	467	477	481	Recording Studio	1	64	57	65	1	None	247	71
ST-03	471	458	447	Recording Studio	1	73	59	73	0	None	100	26
ST-04	447	451	622	Theater	3	64	55	65	1	None	55	16
ST-05	430	431	293	Church	3	58	66	67	9	Severe	736	198
ST-06	400	401	290	School	3	54	66	66	12	Severe	1266	311
ST-07	391	381	650	Church	3	70	54	70	0	None	25	7
ST-08	377	375	98	School	3	64	70	71	7	Severe	303	87
ST-09	364	362	157	School	3	62	68	69	7	Severe	433	119
ST-10	347	354	585	Church	3	76	58	76	0	None	35	4

Site Name	Track Elevation (feet)	Receiver Base Elevation (feet)[1]	Nearest Track to Receiver Distance (feet)	Land Use	Land Use Category	Existing Noise Level[2]	Project Noise Level[2] Unmitigated	Total Noise Level[2] Unmitigated	Noise Level Increase (dBA)	FRA Impact—No Mitigation	Moderate Impact Contour Distance (feet)	Severe Impact Contour Distance (feet)
ST-11	311	326	560	Church	3	70	63	71	1	None	128	40
SST-01	510	496	814	Residential	2	62	52	62	0	None	162	46
SST-02	494	472	589	Residential	2	61	55	62	1	None	289	79
SST-03	461	465	444	Residential	2	65	59	66	1	None	293	85
SST-04	444	434	333	Residential	2	63	66	68	5	Severe	1326	383
SST-05	341	352	984	Residential	2	54	51	56	2	None	401	103
SST-06	336	343	481	Residential	2	75	64	75	0	None	382	58

Source: California High-Speed Rail Authority, 2018
[1] Receivers have a height of 5 feet.
[2] The noise descriptor for Category 1 and Category 3 land uses is L_{eq}, and the noise descriptor for Category 2 land uses is L_{dn}.
dBA = A-weighted decibel(s)
L_{dn} = day-night average noise level
FRA = Federal Railroad Administration
L_{eq} = equivalent continuous sound level

A noise analysis was then conducted for all noise-sensitive receivers in the RSA. The existing noise levels at noise-sensitive receivers were established using the representative long-term and short-term measurement results. The existing noise levels for some of the noise-sensitive receivers were averaged from the long-term and short-term noise level measurements to obtain a general background noise level for areas that would have similar noise environments. The project noise levels were calculated at each noise-sensitive receiver location to determine the total noise level and the project-related noise level increase. Table 6-7 summarizes the results of the noise analysis by reporting the number of total affected noise-sensitive receivers under the HSR Build Alternative based on their land use category and noise impact classification (either moderate or severe impact). Figure D-1 in Appendix D shows land use category 2 noise-sensitive receivers under the HSR Build Alternative. Figure D-2 in Appendix D shows land use category 1 and category 3 noise-sensitive receivers that would experience either moderate or severe impacts as a result of operations under the HSR Build Alternative. Noise mitigation measures for noise-sensitive receivers that would experience either moderate or severe impacts will be evaluated in the EIR/EIS for the Burbank to Los Angeles Project Section. An inventory of all severely impacted receptors is provided in Table D-1 of Appendix D.

Table 6-7 Noise Effects Summary for the High-Speed Rail Build Alternative

Level of Impact	Category 1			Category 2		Category 3			
	Television Station	Theater	Recording Studio	Residential	Nursing Home	Church	Courthouse	Park	School
Severe	0	2	0	210	0	0	0	0	0
Moderate	0	0	1	712	1	1	0	0	3

Source: California High-Speed Rail Authority, 2018
HSR = high-speed rail

The assessment of noise effects from HSR operations in this subsection indicates effects at both residential and institutional noise receptors. The results indicate that severe noise impacts are projected at 210 single-family residences due to the proximity of the receivers to the proposed track and the speed of the train.

The results also indicate severe noise impacts at the following institutional noise receptors:

- **ATX Arts and Innovation Complex**—The results indicate a severe noise impact at this theater at 3191 Casitas Avenue in the city of Los Angeles.
- **Atwater Village Theatre**—The results indicate a severe noise impact at this theater located at 3265 Casitas Avenue in the city of Los Angeles.

6.7.2.1 Schools

More detailed effect information on schools within 700 feet of the HSR alignment is provided in Table 6-8. As shown in Table 6-8, of the five schools within 700 feet of the study area, four schools would experience a moderate noise impact and one school would have no effect. The construction of noise barriers may not be feasible or economically reasonable.

Table 6-8 Effect on Schools

School Name	Existing Noise Exposure (dBA L_{eq})	Total Noise Level (Unmitigated) (dBA L_{eq})	FRA Manual Impact Rating (No Mitigation)
Monterey High School	58.0	58.0	None
Hollywood Piano Company	58.0	62.0	Moderate
Glendale Fire Training Center	66.8	67.7	None
Los Feliz Charter School for the Arts	64.2	69.0	Moderate
Renaissance Arts Academy	64.2	65.2	None
Sotomayor Learning Academies	62.1	66.2	Moderate

Source: California High-Speed Rail Authority, 2018
dBA = A-weighted decibel(s)
L_{eq} = equivalent continuous sound level
FRA = Federal Railroad Administration

6.7.3 High-Speed Train Operations Vibration Effects

The results of the ground-borne vibration and noise analysis of HSR operations for this subsection of the HSR Build Alternative are summarized below.

The assessment of ground-borne vibration effects from HSR operations is summarized in Table 6-9 for residential land uses and in Table 6-10 for institutional land uses. The assessment of ground-borne noise effects from HSR operations is summarized in Table 6-11 for residential land uses and in Table 6-12 for institutional land uses. The results include a tabulation of location information for each sensitive receptor or receptor group, the projections of future vibration levels, the criteria, and whether effects are projected.

Table 6-9 Residential Vibration Assessment

Location	Side of Track	Closest Receiver(s) Distance to Near Track (feet)	Maximum Train Speed (mph)	HSR Vibration Levels (VdB)*		No. of Effects
				Project Levels	FRA Impact Criteria	
Burbank Station to N Buena Vista Street	NB	247	90	60	72	0
Burbank Station to N Buena Vista Street	SB	112	90	66	72	0
N Buena Vista Street to N Parish Place	NB	No vibration-sensitive receivers				
N Buena Vista Street to N Parish Place	SB	63	90	73	72	1
N Parish Place to Burbank Boulevard	NB	589	90	59	72	0
N Parish Place to Burbank Boulevard	SB	70	90	72	72	0
W Olive Avenue to Alameda Avenue	NB	537	125	62	72	0
W Olive Avenue to Alameda Avenue	SB	882	125	61	72	0
Alameda Avenue to Western Avenue	NB	No vibration-sensitive receivers				

Location	Side of Track	Closest Receiver(s) Distance to Near Track (feet)	Maximum Train Speed (mph)	HSR Vibration Levels (VdB)*		No. of Effects
				Project Levels	FRA Impact Criteria	
Alameda Avenue to Western Avenue	SB	No vibration-sensitive receivers				
Western Avenue to Grandview Avenue	NB	268	125	52	72	0
Western Avenue to Grandview Avenue	SB	No vibration-sensitive receivers				
Grandview Avenue to Ventura Freeway	NB	166	125	54	72	0
Grandview Avenue to Ventura Freeway	SB	No vibration-sensitive receivers				
Ventura Freeway to W Wilson Avenue	NB	No vibration-sensitive receivers				
Ventura Freeway to W Wilson Avenue	SB	No vibration-sensitive receivers.				
W Wilson Avenue to Colorado Street	NB	No vibration-sensitive receivers.				
W Wilson Avenue to Colorado Street	SB	No vibration-sensitive receivers.				
Colorado Street to Goodwin Avenue	NB	No vibration-sensitive receivers				
Colorado Street to Goodwin Avenue	SB	No vibration-sensitive receivers				
Goodwin Avenue to Verdant Street	NB	No vibration-sensitive receivers				
Goodwin Avenue to Verdant Street	SB	193	125	60	72	0
Verdant Street to Los Feliz Boulevard	NB	No vibration-sensitive receivers				
Verdant Street to Los Feliz Boulevard	SB	No vibration-sensitive receivers				
Los Feliz Boulevard to Glendale Boulevard	NB	No vibration-sensitive receivers				
Los Feliz Boulevard to Glendale Boulevard	SB	123	125	54	72	0
Glendale Boulevard to Tyburn Street	NB	85	125	57	72	0
Glendale Boulevard to Tyburn Street	SB	242	125	51	72	0
Tyburn Street to SR 2	NB	No vibration-sensitive receivers				
Tyburn Street to SR 2	SB	241	125	63	72	0
SR 2 to Hallett Avenue	NB	No vibration-sensitive receivers				
SR 2 to Hallett Avenue	SB	No vibration-sensitive receivers				
Hallett Avenue to Division Street	NB	No vibration-sensitive receivers				
Hallett Avenue to Division Street	SB	No vibration-sensitive receivers				
Division Street to Arvia Street	NB	155	50	57	72	0
Division Street to Arvia Street	SB	No vibration-sensitive receivers				

Location	Side of Track	Closest Receiver(s) Distance to Near Track (feet)	Maximum Train Speed (mph)	HSR Vibration Levels (VdB)*		No. of Effects
				Project Levels	FRA Impact Criteria	
Arvia Street to Pepper Avenue	NB	437	50	45	72	0
Arvia Street to Pepper Avenue	SB	No vibration-sensitive receivers				
Pepper Avenue to SR 110	NB	476	50	45	72	0
Pepper Avenue to SR 110	SB	No vibration-sensitive receivers				
SR 110 to N Broadway	NB	No vibration-sensitive receivers				
SR 110 to N Broadway	SB	No vibration-sensitive receivers				
N Broadway to N Main Street	NB	No vibration-sensitive receivers				
N Broadway to N Main Street	SB	No vibration-sensitive receivers				
N Main Street to Vignes Street	NB	240	25	51	72	
N Main Street to Vignes Street	SB	93	25	59	72	
Vignes Street to US-101	NB	No vibration-sensitive receivers				0
Vignes Street to US-101	SB	176	25	54	72	0

Source: California High-Speed Rail Authority, 2018
* Maximum 1/3-octave band vibration velocity level over the frequency range between 8 Hz and 80 Hz.
FRA = Federal Railroad Administration
HSR = high-speed rail
Hz = hertz
mph = miles per hour
NB =northbound
SB =southbound
SR = State Route
VdB = vibration velocity decibels

Table 6-10 Institutional Vibration Assessment

Location	Name	Side of Track	Distance to Near Track (feet)	Train Speed (mph)	HSR Vibration Levels (VdB)[1]		No. of Effects
					Project Levels	FRA Impact Criteria	
N Buena Vista Street to N Parish Place	Monterey High School	SB	569	90	59	75	0
W Olive Avenue to Alameda Avenue	Six01 Studio	SB	82	125	73	65	1
W Olive Avenue to Alameda Avenue	Stage Red Recording Studio	SB	454	125	62	65	0
W Olive Avenue to Alameda Avenue	Rocco Guarino Studio	SB	730	125	52	65	0
Alameda Avenue to Western Avenue	Fortner Engineering	NB	230	125	53	78	0
Western Avenue to Grandview Avenue	Cope Studios	NB	310	125	52	78	0
Western Avenue to Grandview Avenue	Comfort Dental-Larrea Dentistry	NB	369	125	51	78	0
Western Avenue to Grandview Avenue	DisneyToon Studios	SB	54	125	72	65	1
Grandview Avenue to Ventura Freeway	Mission: Renaissance	NB	170	125	54	78	0

Location	Name	Side of Track	Distance to Near Track (feet)	Train Speed (mph)	HSR Vibration Levels (VdB)[1]		No. of Effects
					Project Levels	FRA Impact Criteria	
Grandview Avenue to Ventura Freeway	SCA Premier Surgery Center	NB	172	125	54	78	0
Ventura Freeway to W Wilson Avenue	International College of Beauty Arts and Sciences	SB	75	125	68	78	0
W Wilson Avenue to Colorado Street	Galilee Mission Center	SB	103	125	62	78	0
W Wilson Avenue to Colorado Street	Baxalta	SB	74	125	69	78	0
Colorado Street to Goodwin Avenue	Applied Earth Sciences	NB	165	125	61	65	0
Glendale Boulevard to Tyburn Street	Russian American SDA Church	NB	98	125	56	78	0
Tyburn Street to SR 2	The Echo Theater Company	SB	33	125	68	72	0
Tyburn Street to SR 2	Celebration Theatre	SB	121	125	54	72	0
Tyburn Street to SR 2	Atwater Village Theatre	SB	143	125	53	72	0
Tyburn Street to SR 2	Berg Studios	SB	105	125	65	78	0
Tyburn Street to SR 2	Swing House	SB	36	125	77	65	1
Tyburn Street to SR 2	Independent Shakespeare Co.	SB	35	125	77	65	1
Tyburn Street to SR 2	Los Angeles Community College	NB	189	55	56	78	0
SR 2 to Hallett Avenue	Los Feliz Charter School for the Arts	NB	71	55	62	78	0
SR 2 to Hallett Avenue	Los Angeles Media Tech Center	NB	170	50	55	78	0
Hallett Avenue to Division Street	Sotomayer Learning Academy	NB	157	50	57	78	0
SR 110 to N Broadway	Young Nak English College Ministry	NB	530	55	55	78	0
SR 110 to N Broadway	Young Nak Presbyterian Church of LA	NB	557	25	48	78	0

Source: California High-Speed Rail Authority, 2018
[1] Maximum 1/3-octave band vibration velocity level over the frequency range between 8 Hz and 80 Hz.
FRA = Federal Railroad Administration
HSR = high-speed rail
Hz = hertz
NB =northbound
SB =southbound
SR = State Route

Table 6-11 Residential Ground-Borne Noise Assessment

Location	Side of Track	Closest Receiver(s) Distance to Near Track (feet)	Maximum Train Speed (mph)	HSR Ground-Borne Noise Levels (dBA)		No. of Effects
				Project Levels	FRA Impact Criteria	
Winona Avenue to N Buena Vista Street	NB	247	90	23	35	0
Winona Avenue to N Buena Vista Street	SB	112	90	31	35	0
N Buena Vista Street to N Parish Place	NB	No ground-borne noise-sensitive receivers				
N Buena Vista Street to N Parish Place	SB	63	90	37	35	3
N Parish Place to Burbank Boulevard	NB	No ground-borne noise-sensitive receivers				
N Parish Place to Burbank Boulevard	SB	70	90	36	35	1
W Olive Avenue to Alameda Avenue	NB	No vibration-sensitive receivers				
W Olive Avenue to Alameda Avenue	SB	No vibration-sensitive receivers				

Source: California High-Speed Rail Authority, 2018
dBA = A-weighted decibel(s)
FRA = Federal Railroad Administration
HSR = high-speed rail
mph = miles per hour
NB =northbound
SB =southbound
SR = State Route

Table 6-12 Institutional Ground-Borne Noise Assessment

Location	Name	Side of Track	Distance to Near Track (feet)	Train Speed (mph)	HSR Ground-Borne Noise Levels (dBA)[1]		No. of Effects
					Project Levels	FRA Impact Criteria	
N Buena Vista Street to N Parish Place	Monterey High School	SB	569	90	16	40	0
W Olive Avenue to Alameda Avenue	Six01 Studio	SB	84	125	38	25	1
W Olive Avenue to Alameda Avenue	Stage Red Recording Studio	SB	454	125	20	25	0
W Olive Avenue to Alameda Avenue	Rocco Guarino Studio	SB	730	125	7	25	0
Western Avenue to Grandview Avenue	DisneyToon Studios	SB	54	125	39	25	1
Tyburn Street to SR 2	The Echo Theater Company	SB	33	125	42	35	1

Location	Name	Side of Track	Distance to Near Track (feet)	Train Speed (mph)	HSR Ground-Borne Noise Levels (dBA)[1]		No. of Effects
					Project Levels	FRA Impact Criteria	
Tyburn Street to SR 2	Swing House	SB	36	125	45	25	1
Tyburn Street to SR 2	Independent Shakespeare Company	SB	35	125	45	25	1

Source: California High-Speed Rail Authority, 2018
[1] Maximum 1/3-octave band vibration velocity level over the frequency range between 8 Hz and 80 Hz.
FRA = Federal Railroad Administration
HSR = high-speed rail
Hz = hertz
NB =northbound
SB =southbound
SR = State Route

The results for this subsection show project-related ground-borne vibration impacts at one residence and ground-borne noise impacts at four residences in close proximity to the shallow tunnel alignment along the Burbank Airport Station to Alameda Avenue subsection. In addition, both ground-borne vibration and ground-borne noise impacts are projected at the Six01 Studio on the southbound side of the alignment between W Olive Avenue and Alameda Avenue, the DisneyToon Studios on the southbound side of the proposed alignment between Western Avenue and Grandview Avenue, and the Independent Shakespeare Company and Swing House on the southbound side of the proposed alignment between Tyburn Street and SR 2. Ground-borne noise impacts are also projected at The Echo Theater Company on the southbound side of the proposed alignment between Tyburn Street and SR 2.

6.8 Relocation of Existing Railroad Tracks

6.8.1 Noise Effects

As described in Section 2.2.2, existing freight and passenger trains that currently operate along the west bank of the Los Angeles River would be relocated to the east side of the Los Angeles River. This has the potential to increase noise levels over existing conditions at five receptors, including three single-family homes (located northwest of the N Avenue 18 and Barranca Street intersection), one park (located at 262 S Avenue 17) and one church (located at 1721 N Broadway). As part of the proposed project, the single-family homes were identified as severely affected due to operations from the HSR Build Alternative. The park and church were identified as not being affected by HSR Build Alternative operations due to their proximity to major roadways, which are the dominant source of noise at those locations. It is not expected that the relocations of the tracks in this area would change the effect to these receptors.

Throughout the rest of the RSA, the existing non-electrified tracks would be relocated east within the existing right-of-way between Olive Avenue and the Metrolink CMF. The slight displacement of the trains within the existing right-of-way would result in a very slight increase in noise to receptors on the east of the existing rail corridor compared to existing conditions. Thus, when the new HSR trains under the proposed project are introduced, the noise increase would not create any new effects under the FTA guidance manual thresholds.

6.8.2 Vibration Effects

To evaluate the effects the relocation of trains would have on existing vibration levels, an assessment was conducted to estimate changes in existing vibration levels at sensitive locations along the proposed HSR alignment. At the time of this study, access was limited to public rights-of-way; therefore, direct measurements of existing train vibration levels were not possible. However, using the vibration propagation data from the measurements conducted at the sites described in Section 5.4.2 and the commuter rail locomotive force density contained in Figure 11-2 of the FTA guidance manual, it was determined that there would be a slight reduction in the vibration levels in the VSAs to the west of the proposed alignment. For the VSAs to the east of the proposed alignment, there would be a slight increase in the vibration levels. However, the vibration levels would still be below the threshold and no new effects would be created due to the relocation of the existing trains.

6.9 Stations

6.9.1 Burbank Airport Station

6.9.1.1 Noise Effects

Construction

There are no sensitive receptors within 1,000 feet of the proposed Burbank Airport Station. Therefore, no construction noise effects are projected.

Operation

There are no sensitive receptors within the screening distance of 250 feet from the proposed Burbank Airport Station. Therefore, no operational noise effects are projected.

6.9.1.2 Vibration Effects

Construction

There are no sensitive receptors within 1,000 feet of the proposed Burbank Airport Station. Therefore, no construction vibration effects are projected.

Operation

There would be no vibration effects associated with the station. All operational effects are discussed above.

6.9.2 Los Angeles Union Station

6.9.2.1 Noise Effects

Construction

An apartment complex is located within 1,000 feet of the proposed HSR station at LAUS to the west. Construction crew commutes and the transport of construction equipment and materials to the project site would incrementally raise noise levels on local roads leading to the site. The pieces of construction equipment would be moved on-site, where they would remain for the duration of each construction phase, and would not add to the daily traffic volumes in the project vicinity. However, the projected construction traffic volume would be minimal when compared to existing traffic volumes on affected local streets. Therefore, short-term construction-related worker commutes and equipment transport noise effects would be less than substantial.

Assuming a small set of construction equipment that would operate simultaneously as a worst-case scenario, the worst-case composite noise level during this phase of construction would be 87 dBA L_{eq} at a distance of 50 feet from the construction boundary. Residences within a distance of 112 feet from the construction boundary would be exposed to noise levels greater than 80 dBA L_{eq} during daytime hours. Residences within a distance of 353 feet from the construction boundary would be exposed to noise levels greater than 70 dBA L_{eq} during nighttime hours. No residential uses would be located within these distances. Therefore, project construction activities would result in no effect to sensitive uses.

Operation

There are no sensitive receptors within 250 feet of the proposed HSR station at LAUS. Therefore, no operational noise effects are projected.

6.9.2.2 Vibration Effects

Construction

Vibration effects associated with construction activities at LAUS have the potential to affect residential or other sensitive structures in the surrounding area. Land uses within the distances shown in Table 6-3 would experience annoyance or interference with vibration-sensitive activities. No residential or fragile structures are located within 135 feet of the construction boundary of LAUS. Therefore, construction at LAUS would not result in annoyance or damage to residential or fragile structures, and no vibration effects from construction-related activities would occur.

Operation

There would be no vibration effects associated with the station. All operational effects are discussed above.

6.10 Electric Power Utility Improvements

As discussed above in Section 2, the transformation and distribution of electricity throughout the HSR system would occur in three types of stations: TPSSs, switching stations, and paralleling stations. No TPSSs are proposed in the Burbank to Los Angeles Project Section. However, effects related to noise and vibration associated with the switching and paralleling stations may occur.

Electric power utilities within the proposed HSR right-of-way would be relocated to outside the right-of-way. Relocation of utilities would be limited to areas in direct conflict with the HSR construction and right-of-way but may require the complete abandonment or removal and the reconstruction of a utility facility. Modification of existing high-voltage lines and towers within their existing rights-of-way and easements may require temporary high-voltage-line bypasses outside these rights-of-way or easements to construct the relocations.

6.10.1 Noise Effects

Potential short-term noise effects from construction and long-term operational noise effects are evaluated below.

6.10.1.1 Construction

Construction crew commutes and the transport of construction equipment and materials to the project site would incrementally raise noise levels on local roads leading to the site. The pieces of construction equipment would be moved on-site, where they would remain for the duration of each construction phase, and would not add to the daily traffic volumes in the project vicinity. However, the projected construction traffic volume would be minimal when compared to existing traffic volumes on affected local streets.

Assuming a dozer, drill rig, flatbed truck, crane, and concrete mixer truck would be used to perform electric power utility improvements and would operate simultaneously as a worst-case scenario, the worst-case composite noise level during this phase of construction would be 87 dBA L_{eq} at a distance of 50 feet from the construction boundary. Residences and schools within a distance of 108 feet from the construction boundary would be exposed to noise levels greater than 80 dBA L_{eq} during daytime hours. Residences within a distance of 342 feet from the construction boundary would be exposed to noise levels greater than 70 dBA L_{eq} during nighttime hours. Schools would not be affected during nighttime hours because they would not be in operation. Residences and schools within these distances from the construction boundary would be affected by noise generated from construction-related activities that is greater than the recommended FRA construction noise criteria.

6.10.1.2 Operation

Long-term operational noise effects from the proposed electric power utility improvements would generate corona noise. However, this corona noise would not exceed noise standards in the local cities and counties. No noise effects would occur from the operation of the improved electric power utility, and no mitigation measures are required.

6.10.2 Vibration Effects

Potential short-term vibration effects from construction and long-term vibration effects are evaluated below.

6.10.2.1 Construction

Electric power utility improvements would require drilling and bulldozing, and land uses located within the distances shown in Table 6-3 would experience annoyance or interference with vibration-sensitive activities. If land uses are located within the distances shown in Table 6-3, mitigation measures would be required.

6.10.2.2 Operation

The long-term operations from electrical power utility improvements would not generate vibration levels. Therefore, no long-term operational vibration effects would occur and no mitigation measures are required.

6.11 Cumulative Effects

This section presents potential cumulative effects based on current knowledge of the Burbank to Los Angeles Project Section. Subsequent to this technical report, the Authority will further refine the cumulative effects described herein and present the information in Section 3.19 of the EIR/EIS.

6.11.1 Traffic Noise Levels

Traffic noise is considered one of the primary noise sources at noise-sensitive receivers near the proposed project. Many different traffic projects are planned throughout the project section in the reasonably foreseeable future. Traffic volumes typically increase by 2 percent every year due to the natural increase in population. From 2016 to 2040, traffic noise exposure will increase by about 2.2 dBA CNEL at noise-sensitive receivers as a result of the 2 percent annual increase in traffic volume. The increase of 2.2 dBA CNEL represents the sum of the noise from all planned traffic projects in the reasonably foreseeable future through 2040. It is safe to assume that most of the planned traffic projects are a result of the anticipated growth in the community and will be reflected in the increase of 2.2 dBA CNEL in ambient noise levels at noise-sensitive receivers near the project section.

6.11.2 Railroad Noise Levels

An increase in railroad capacity can also be attributed to the natural growth in population and associated demand for products. A report titled *Challenges and Opportunities in Implementation of the Future California Rail Network* (Massachusetts Institute of Technology 2015) states that the line from Burbank to LAUS is owned by the Southern California Regional Rail Authority, but UPRR also operates about 10 trains per day on that section of track, enabled by trackage rights, as it is the link between Los Angeles and the Central California coast. Due to the current low volume of freight trains on the corridor, even with a conservative assumption of doubling the number of trains to 20 per day, the increase related to freight train activities would be rather small, at most 1 dBA CNEL.

6.11.3 Cumulative Ambient Noise Levels

Future reasonably foreseeable traffic and railway projects would have the most incremental effects on the cumulative ambient noise environment at noise-sensitive receivers in 2040. The estimated contribution from traffic and railway projects to the cumulative noise exposure would result in an increase of 3.5 dBA CNEL in ambient noise levels in areas near the Burbank to Los Angeles Project Section. An increase of 3.5 dBA is considered cumulatively significant. As a result of the increase in ambient noise levels, the cumulative plus project noise exposure for the year 2040 will be analyzed.

6.11.4 Cumulative Plus Project Noise Levels

The future existing noise exposures would increase by 3.5 dBA CNEL. The increase of 3.5 dBA CNEL will be applied to all of the noise-sensitive receivers where ambient noise levels were measured for the Burbank to Los Angeles Project Section.

6.11.5 Cumulative Plus Project Noise Effects

Based on FRA guidance, the effects from HSR Build Alternative operations are based solely on existing conditions. A cumulative analysis was completed to provide information regarding the potential noise level increase as compared to year 2040 conditions. Due to the increase in traffic and rail noise described above, ambient noise levels are expected to increase by 3.5 dBA by 2040. Because FRA noise effects are based on a comparison of noise level impacts associated with the project as compared to ambient noise levels during the year in question, the increase in ambient noise without the project could cause an effect currently identified as severe to be moderate or no effect. Table 6-13 also shows the predicted noise effects and total number of receptors, with existing noise levels for comparison.

Table 6-13 Existing and Cumulative Noise Effects

Level of Impact	Existing FRA Impact[1]	2040 Cumulative FRA Impact[1]
Severe Impact	212 receptors	190 receptors
Moderate Impact	718 receptors	521 receptors

Source: California High-Speed Rail Authority, 2018
[1] With no mitigation.
FRA = Federal Railroad Administration

7 PROJECT IMPACT AVOIDANCE AND MINIMIZATION FEATURES

The HSR Build Alternative incorporates standardized HSR features to avoid and minimize impacts. These features are referred to as impact avoidance and minimization features the Authority would implement these measures during project design and construction to avoid or reduce impacts.

The following impact avoidance and minimization features would be implemented prior to project initiation to avoid or minimize adverse effects on noise and vibration.

NV-IAMF#1: Noise and Vibration

Prior to construction, the contractor would prepare and submit to the Authority a noise and vibration technical memorandum documenting how the FTA and FRA guidelines for minimizing construction noise and vibration impacts would be employed when work is being conducted within 1,000 feet of sensitive receptors. Typical construction practices contained in the FTA and FRA guidelines for minimizing construction noise and vibration impacts include the following:

1. Construct noise barriers, such as temporary walls or piles on excavated material, between noisy activities and noise sensitive resources
2. Route truck traffic away from residential streets, when possible
3. Construct walled enclosures around especially noisy activities or around clusters or noise equipment
4. Combine noisy operations so that they occur in the same period
5. Phase demolition, earthmoving, and ground impacting operations so as not to occur in the same time period
6. Avoid impact pile driving where possible in vibration-sensitive areas

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8 REFERENCES

California Department of Transportation (Caltrans). 2011. *Traffic Noise Analysis Protocol for New Highway Construction, Reconstruction, and Retrofit Barrier Projects.* Sacramento, California: Division of Environmental Analysis. www.dot.ca.gov/hq/env/noise/pub/ca_tnap_may2011.pdf (accessed December 2019).

California High-Speed Rail Authority (Authority). 2010. *Palmdale to Los Angeles Project Section Preliminary Alternatives Analysis.* July 2010. www.hsr.ca.gov/docs/programs/statewide_rail/proj_sections/Palmdale_LA/Palmdale_to_LA_Preliminary_Alternatives_Analysis_Report_7_8_10.pdf (accessed May 9, 2017).

———. 2011. *Palmdale to Los Angeles Project Section Supplemental Alternatives Analysis*. March 2011. www.hsr.ca.gov/docs/programs/statewide_rail/proj_sections/Palmdale_LA/Palmdale_to_LA_SAA_Report_LAUS_Sylmar_Subsections_3_3_11.pdf (accessed May 9, 2017).

———. 2013. *Technical Memorandum 1.1.21 Typical Cross Sections for 15% Design*. August 2013.

———. 2014. *Palmdale to Los Angeles Project Section Supplemental Alternatives Analysis.* May 2014. www.hsr.ca.gov/docs/programs/statewide_rail/proj_sections/Palmdale_LA/Palmdale_to_LA_ATTACHMENT_Draft_Supp_Alt_Analysis_Report_PalmdaleLA.pdf (accessed May 9, 2017).

———. 2016a. *Burbank to Los Angeles Project Section Supplemental Alternatives Analysis.* April 2016. www.hsr.ca.gov/docs/brdmeetings/2016/brdmtg_041216_Item8_ATTACHMENT_Burbank_to_LA_Supplemental_Alternatives_Analysis.pdf (accessed May 9, 2017).

———. 2016b. *Palmdale to Burbank Project Section Supplemental Alternatives Analysis.* April 2016. www.hsr.ca.gov/docs/brdmeetings/2016/brdmtg_041216_Item7_ATTACHMENT_Palmdale_to_Burbank_Supplemental_Alternatives_Analysis.pdf (accessed May 9, 2017).

———. 2017. *Operations and Service Plan*.

California High-Speed Rail Authority and U.S. Department of Transportation Federal Railroad Administration (Authority and FRA). 2005. *Final Program Environmental Impact Report/Environmental Impact Statement for the Proposed California High-Speed Train System. Volume I: Report.* Sacramento, CA and Washington, D.C.: California High-Speed Rail Authority and U.S. Department of Transportation FRA. August 2005. www.cahighspeedrail.ca.gov/library.asp?p=7226 (accessed May 19, 2015).

———. 2014a. *Final Program Environmental Impact Report/Environmental Impact Statement (EIR/EIS) for the Proposed California High-Speed Train System*. Volume 1, Report. Sacramento and Washington, D.C.: Authority and FRA. April 2014.

———. 2014b. *Project Environmental Impact Report/Environmental Impact Statement (EIR/EIS) for the Proposed California High-Speed Train. Mitigation Monitoring and Enforcement Program Report*. Sacramento and Washington, D.C.: Authority and FRA. June 2014.

———. 2014c. *Fresno to Bakersfield Section: Noise and Vibration Technical Report*.

———. 2019. *Burbank to Los Angeles Project Section: Transportation Technical Report*.

California Transportation Commission. 2016. "High Speed Passenger Train Bond Program (Proposition 1A)." www.catc.ca.gov/programs/hsptbp.htm.

City of Burbank. 2013. Noise Element of the Burbank 2035 General Plan. February 2013. www.burbankca.gov/home/showdocument?id=23448 (accessed December 2019).

City of Glendale. 2007. Noise Element of the General Plan. May. www.glendaleca.gov/home/showdocument?id=828 (accessed December 2019).

City of Los Angeles. General Plan, Noise Element. http://planning.lacity.org/cwd/gnlpln/NoiseElt.pdf (accessed December 2019).

———. Municipal Code, Noise Ordinance. www.amlegal.com/codes/client/los-angeles_ca (accessed December 2019).

County of Los Angeles. 1975. "Noise Element." Los Angeles County General Plan. http://planning.lacounty.gov/assets/upl/project/gp_web80-noise-element.pdf (accessed December 2019).

Federal Highway Administration (FHWA). 2006. Roadway Construction Noise Model. February 15, 2006. www.fhwa.dot.gov/environment/noise/construction_noise/rcnm/ (accessed December 2019).

Federal Railroad Administration (FRA). 1999. Procedures for Considering Environmental Impacts.

———. 2012. *High-Speed Ground Transportation Noise and Vibration Impact Assessment.* October 2012. Washington, D.C.: U.S. Department of Transportation. https://www.fra.dot.gov/eLib/Details/L04090 (accessed December 2019).

Federal Transit Administration (FTA). 2018. Office of Planning and Environment. *Transit Noise and Vibration Impact Assessment Manual*. FTA Report No. 0123. https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/research-innovation/118131/transit-noise-and-vibration-impact-assessment-manual-fta-report-no-0123_0.pdf (accessed December 2019).

Governor's Office of Planning and Research. 2003. *California General Plan Guidelines.* Sacramento, CA. www.opr.ca.gov (accessed December 2019).

International Organization for Standardization. ISO 9613-2:1996, *Acoustics – Attenuation of Sound during Propagation Outdoors – Part 2: General Method of Calculation,* Ed.: ISO Geneva, Switzerland.

Los Angeles–San Diego–San Luis Obispo (LOSSAN) Rail Corridor Agency. 2012. *LOSSAN Rail Corridor Strategic Implementation Plan*. April 2012.

Metrolink. 2016. *2016 Metrolink Schedule* (effective October 3, 2016).

Massachusetts Institute of Technology. 2015. *Challenges and Opportunities in Implementation of the Future California Rail Network*. https://esd.mit.edu/WPS/2015/esd-wp-2015-10.pdf (accessed December 2019).

Plotkin, K.J., K.W. Bradley, J.A. Molino, K.G. Helbing, and D.A. Fisher. 1992. *The Effect of Onset Rate on Aircraft Noise Annoyance,* Volume. 1: Laboratory Experiments, U.S. Air Force Systems Command, Report No. AL-TR-1992-0093. May 1992.

San Diego Association of Governments. 1988. *Draft Comprehensive Species Management Plan for the Least Bell's Vireo.* Prepared by RECON Regional Environmental Consultants. January 1988.

Stusnick, E., and K. Bradley. 1992. *The Effect of Onset Rate on Aircraft Noise Annoyance.* U.S. Air Force Report No. AL/OE-TR-1993-0170, October 1992.

U.S. Department of Transportation and Federal Highway Administration (FHWA). 2010. *Highway Traffic Noise Analysis and Abatement Policy and Guidance.* Washington, D.C.: Office of Environment and Planning, Noise and Air Quality Branch. December 2010. https://www.fhwa.dot.gov/environment/noise/regulations_and_guidance/analysis_and_abatement_guidance/revguidance.pdf (accessed December 2019).

9 PREPARER QUALIFICATIONS

Project Role	Name, Credential	Qualifications
LSA, Inc.		
Associate / Senior Noise Specialist	J.T. Stephens	15 years of experience B.S., Acoustical Engineering, Purdue University
Senior Noise Specialist	Jason Lui	15 years of experience M.S., Environmental Studies, California State University, Fullerton
Cross-Spectrum Acoustics, Inc.		
Partner/Founder	Lance Meister	20 years of experience B.S, Civil Engineering, Temple University
Principal Acoustical Consultant	David Towers, P.E.	40 years of experience M.S., Mechanical Engineering, Purdue University B.S., Mechanical Engineering, Columbia University
Acoustical Consultant	Scott Edwards	6 years of experience B.S., Acoustical Engineering, University of Hartford
Acoustical Consultant	Joelle Suits	1 year of experience M.S., Mechanical Engineering, University of Texas at Austin B.S., Mechanical Engineering, University of Colorado at Colorado Springs
STV Incorporated		
QA/QC Reviewer	Doreen Zhao, AICP	6 years of experience M.U.R.P., Urban and Regional Planning, University of California, Los Angeles B.S., Business Management, Arizona State University

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APPENDIX A: NOISE AND VIBRATION MEASUREMENT LOCATIONS

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APPENDIX B: FIELD NOISE MEASUREMENT DOCUMENTATION AND DETAIL

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APPENDIX C: CONSTRUCTION EQUIPMENT LIST BY CONSTRUCTION PHASE

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APPENDIX D: NOISE AND VIBRATION IMPACTS

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APPENDIX E: FIELD TRANSFER MOBILITY MEASUREMENT AND DOCUMENTATION DETAIL

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