4.4 Noise

4.4.1 Environmental Setting

Introduction

This section describes the existing setting and noise conditions within the study corridor and evaluates potential construction, direct, indirect, and cumulative noise impacts of the proposed project.

Noise Terminology

Noise is generally defined as unwanted sound. It may be loud, unpleasant, unexpected, or undesired sound typically associated with human activity that interferes with or disrupts the normal noise-sensitive on-going activities of others. Although exposure to high noise levels has been demonstrated to cause hearing loss, the principal human response to environmental noise is annoyance. The response of individuals to similar noise events is diverse and influenced by the type of noise, the perceived importance and suitability of the noise in a particular setting, the time of day and type of activity during which the noise occurs, and the sensitivity of the individual. The response to vibration is similar. First, the vibration needs to be of sufficient magnitude to be perceived, and, second, it typically would have to interfere with a desirable activity to cause annoyance.

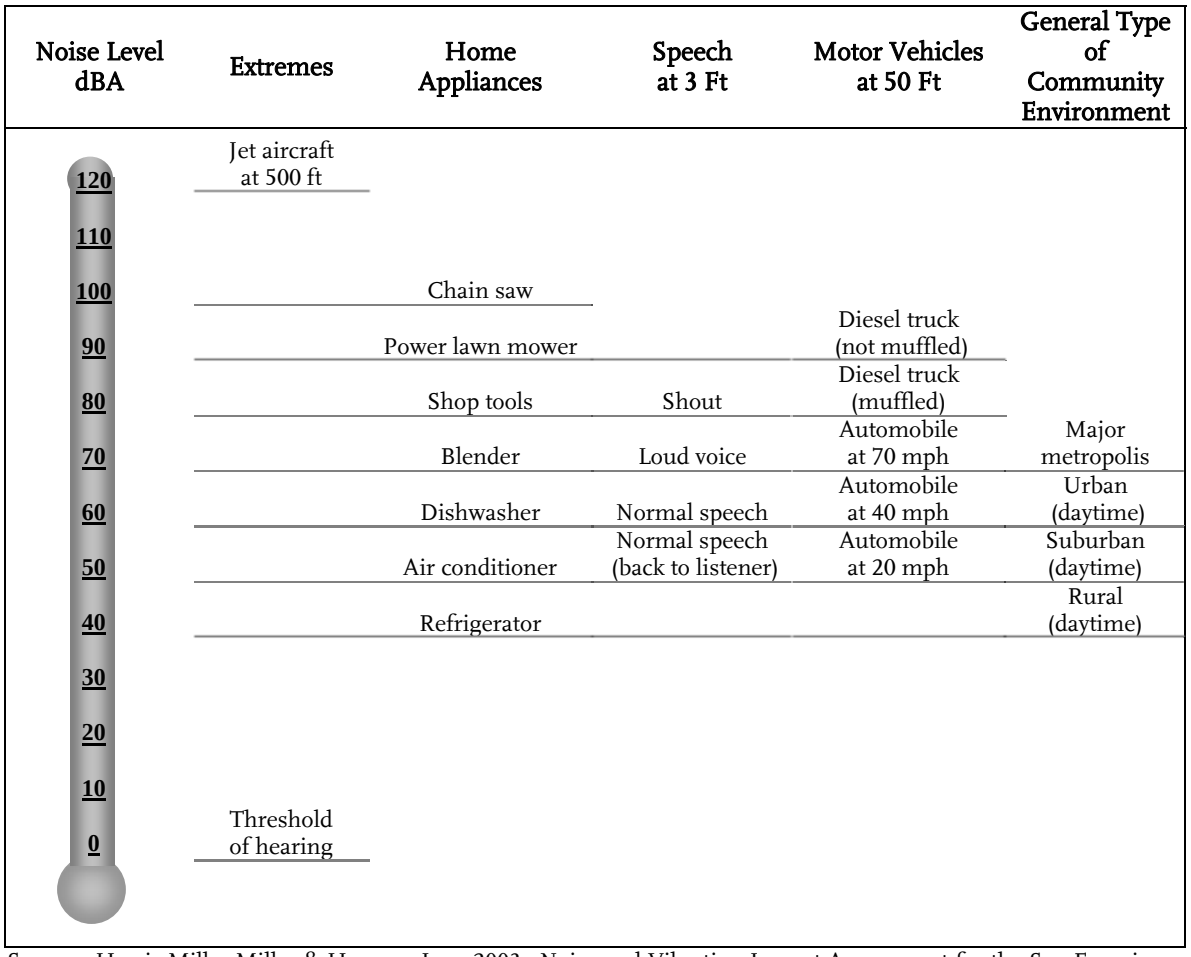
Sound is a physical phenomenon consisting of minute vibrations that travel through a medium such as air that are sensed by the human ear. Sound is generally characterized by frequency and intensity. Frequency describes the sound's pitch and is measured in hertz (Hz); intensity describes the sound's level, volume, or loudness and is measured in decibels (dB). Sound frequency is a measure of how many times each second the crest of a sound pressure wave passes a fixed point. For example, when a drummer beats a drum, the skin of the drum vibrates at a certain number of times per second. Vibration of the drum skin at a rate of 100 times (or cycles) per second generates a sound pressure wave that is said to be oscillating at 100 Hz, and this pressure oscillation is perceived as a tonal pitch of 100 Hz. Sound frequencies between 20 Hz and 20,000 Hz are within the range of sensitivity of the best human ear.

Sound from a tuning fork contains a single frequency and may, therefore, be referred to as a *pure tone*. However, most sounds heard in the environment do not consist of a single frequency but rather a broad band of frequencies differing in individual sound levels. The method commonly used to quantify environmental sounds consists of evaluating all the frequencies of a sound according to a weighting system that reflects that human hearing is less sensitive at low frequencies and extremely high frequencies than at the mid-range frequencies. This frequency-dependent modification is called A-weighting, and the decibel level measured is called the A-weighted sound level (dBA). In practice, the level of a noise source is conveniently measured

using a sound level meter that includes a filter corresponding to the dBA curve.

For informational purposes, typical community sound levels are presented in Figure 4.4-1.

Figure 4.4-1. Sound Levels of Typical Noise Sources



Source: Harris Miller Miller & Hanson, Inc. 2003. Noise and Vibration Impact Assessment for the San Francisco Bay Area Rapid Transit District (BART) Warm Springs Extension Project. Draft report. February. (HMMH Report No. 298760-01.) Burlington, MA. Prepared for ICF.

A sound level of 0 dBA is approximately the threshold of human hearing and is barely audible under extremely quiet listening conditions. Normal speech has a sound level of approximately 60 dBA. Sound levels above about 120 dBA begin to be felt inside the human ear as discomfort and eventually pain at still higher levels.

In general, human sound perception in a community environment is such that a change in sound level of 3 dB is just noticeable, a change of 5 dB is clearly noticeable, and a change of 10 dB is perceived as doubling or halving the sound level; this relation holds true for loud sounds and for quiet sounds. Because of the logarithmic scale of the decibel unit, sound levels cannot be

added or subtracted arithmetically and are somewhat cumbersome to handle mathematically. However, a simple rule of thumb is useful in dealing with sound levels: if a sound's physical intensity is doubled, the sound level increases by 3 dB, regardless of the initial sound level. For example, 60 dB plus 60 dB equals 63 dB, and 80 dB plus 80 dB equals 83 dB. As mentioned earlier, however, a perception of doubling of sound level requires about a 10-decibel increase.

Although the A-weighted sound level may adequately indicate the level of environmental noise at any instant in time, community noise levels vary continuously. Most environmental noise includes a mixture of noise from distant sources that create a relatively steady background noise in which no particular source is identifiable. A single descriptor called the L_{eq} (equivalent sound level) is used to describe the average acoustical energy in a time-varying sound. L_{eq} is the energy-mean A-weighted sound level present or predicted to occur during a specified interval. It is the "equivalent" constant sound level that a given source would need to produce to equal the fluctuating level of measured sound. It is often desirable to also know the range of acoustic levels of the noise source being measured. This is accomplished through the L_{max} and L_{min} noise descriptors. They represent the root-mean-square maximum and minimum obtainable noise levels measured during the monitoring interval. The L_{min} value obtained for a particular monitoring location represents the quietest moment occurring during the measurement period and is often called the *acoustic floor* for that location. Likewise, the loudest momentary sound during the measurement is represented by L_{max}.

To describe the time-varying character of environmental noise, the statistical noise descriptors L_{10}, L_{50}, and L_{90} (or other percentile values) may be used. They are the noise levels equaled or exceeded 10, 50, and 90 percent, respectively, of the time during the measured interval. The percentile descriptors are most commonly found in nuisance noise ordinances to allow for different noise levels for various portions of an hour. For example, the L_{50} value would represent 30 minutes of an hour period, the L_{25} would be associated with 15 minutes of an hour, and so on.

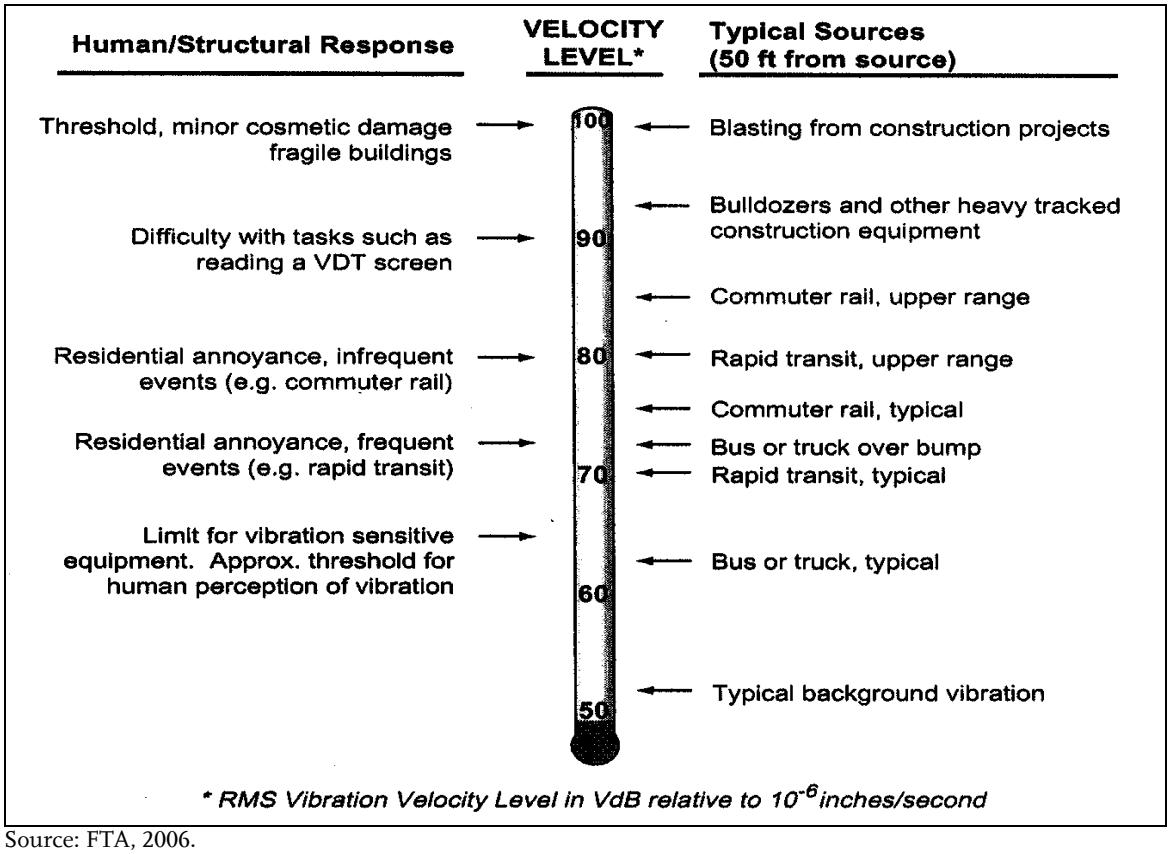
Other descriptors of noise are commonly used to help determine noise/land use compatibility and to predict an average community reaction to adverse effects of environmental noise, including traffic-generated and industrial noise. One of the most universal descriptors is the Day-Night Average Sound Level (DNL or L_{dn}). The L_{dn} noise metric represents a 24-hour period and applies a time-weighted factor designed to penalize noise events that occur during nighttime hours, when relaxation and sleep disturbance is of more concern than during daytime hours. Noise occurring during the daytime hours between 7:00 a.m. and 10:00 p.m. receives no penalty. Noise occurring between 10:00 p.m. and 7:00 a.m. is penalized by adding 10 dB to the measured level. In California, the use of the Community Noise Equivalent Level (CNEL) descriptor is also permitted (and is used by the City of Los Angeles and County of Los Angeles). CNEL is similar to L_{dn}, except CNEL adds a 5-dB penalty for noise occurring during evening hours between 7:00 p.m. and 10:00 p.m. and adds a 10-dBA penalty for noise occurring during the hours of 10:00 p.m. to 7:00 a.m.

Vibration Terminology

Groundborne vibration is a small, rapidly fluctuating motion transmitted through the ground. The strength of groundborne vibration diminishes (or "attenuates") fairly rapidly over distance. Some soil types transmit vibration quite efficiently; other types (primarily "sandy" soils) do not. There are several basic measurement units commonly used to describe the intensity of ground vibration. The descriptors used by the Federal Transit Administration (FTA), one of the agencies which has thoroughly examined and set forth criteria and methodologies for community vibration analysis, are peak particle velocity, abbreviated PPV, in units of inches per second (IPS) and the velocity decibel, abbreviated VdB. The velocity parameter (rather than acceleration or displacement) best correlates with human perception of vibration. Thus, the response of humans, buildings and sensitive equipment to vibration is described in this section in terms of the root-mean square (RMS) velocity level in VdB units relative to one micro-inch per second. As a point of reference, the average person can just barely perceive vibration velocity levels below 70 VdB (typically in the vertical direction).

A comparison of common groundborne vibration levels is shown in Figure 4.4-2. Typical background vibration levels are between 50 and 60 VdB, whereas the levels for minor cosmetic damage to fragile buildings or blasting are generally 100 VdB.

Figure 4.4-2. Typical Levels of Groundborne Vibration



Source: FTA, 2006.

Physical Setting

The proposed project would take place along Wilshire Boulevard between Valencia Street and Centinela Avenue in the City of Los Angeles, including the portion between Veteran Avenue and Federal Avenue (0.8 mile) that is under the jurisdiction of the County of Los Angeles. The portion of Wilshire Boulevard within the City of Beverly Hills (between San Vicente Boulevard and one block west of Whittier Drive) is not included as part of the proposed project. The project corridor location (total of 9.9 miles long) is shown in Figures 2-1 and 2-2 in Chapter 2.0.

Existing Land Use

A variety of land uses are located adjacent to the Wilshire corridor. The corridor is densely developed with an abundance of various commercial uses. The majority of land uses located adjacent to the Wilshire corridor consist of parcels zoned for office, retail, commercial, residential, or institutional uses (e.g., museums). Commercial development and some multi-family residential uses front both sides of the corridor and the intersecting north/ south streets.

The eastern portion of the Wilshire corridor, which is located in the Westlake community of the City of Los Angeles includes mainly commercial office and retail (small businesses and strip malls) uses, interspersed with some residential uses, parking lots and community facilities. This portion of the segment also includes MacArthur Park and Lafayette Park. This segment also consists of a mix of mid-rise (8 to 10 stories) and low-rise buildings.

A long, narrow corridor of commercial activity exists along Wilshire Boulevard in the Wilshire Community Plan Area. The commercial activities along this corridor are comprised of professional offices and retail (strip mall and small businesses), interspersed with a few multi-family residential areas. Additionally, the corridor includes public attractions, such as Museum Row, Hancock Park, and the La Brea Tar Pits. The structures fronting Wilshire Boulevard contain numerous high-rise (20 stories) and mid-rise office buildings.

The segment of the Wilshire corridor located within the community of Westwood consists of multi-family housing, both high-medium and medium density residential uses. High-rise condominium towers are located along Wilshire Boulevard between the Los Angeles Country Club and Malcolm Avenue. Near Westwood Boulevard, the high-rise office corridor along Wilshire Boulevard serves as a regional business center with financial institutions and corporate headquarters.

The segment of the Wilshire corridor within the West Los Angeles community consists of commercial land uses, primarily strip mall development. The majority of commercial facilities are either small-scale and free standing or mini-mall type buildings designed to primarily serve local neighborhoods. The Los Angeles Veterans Administration and Hospital

Complex and the Los Angeles National Cemetery are located to the south and north of this segment of the corridor, respectively.

Ambient Noise Levels

A sound level survey was conducted on December 4, 2009 to evaluate existing sound levels and assess potential project noise impacts on the surrounding area. Short-term sound levels were measured at existing and future noise-sensitive receptors adjacent to the project area, as shown in Figures 4.4-3 and 4.4-4.

Short-term (one hour or less) attended sound level measurements were taken with a Rion NL-21 Sound Level Meter (SLM). This instrument is categorized as Type 2, Precision Grade. Noise was measured at eight representative locations (ST-1 through ST-8) along the project alignment. Noise measurements were taken at or adjacent to several schools (ST-1, ST-3, ST-4) located along Wilshire Boulevard, adjacent to nearby residences (ST-2, ST-5, ST-7, ST-8) along Wilshire Boulevard, and at a park on the north side of Wilshire Boulevard (ST-6).

The sound-measuring instrument used for the survey was set to the *Slow* time response and the dBA scale for all of the noise measurements. To ensure accuracy, the laboratory calibration of the instrument was field checked before and after each measurement period using an acoustical calibrator. The accuracy of the acoustical calibrator is maintained through a program established through the manufacturer and traceable to the National Institute of Standards and Technology. The sound measurement instrument meets the requirements of the American National Standard S 1.4-1983 and the International Electrotechnical Commission Publications 804 and 651. In all cases, the microphone height was five feet above the ground and the microphone was equipped with a windscreen.

During the field measurements, physical observations of the predominant noise sources were noted. The noise sources in the project area typically consisted of traffic sounds, distant children playing, distant people talking, and other community noises. The results of the sound level measurements are summarized in Table 4.4-1. As shown in Table 4.4-1, measured noise levels varied from 63 dBA L_{eq} at ST-6 to 76 dBA L_{eq} at ST-8, when rounded to whole numbers as is customary for community noise measurements.[103]

[103] Noise measurements and most noise modeling calculations are conducted using instrumentation and models that provide data to the tenth of a decibel. However, it is generally the state of the practice to round to whole numbers in recognition of the fact that the actual level of scientific precision which can be relied upon in the community noise setting is on the order of whole decibels.

Figure 4.4-3. Noise Measurement/Modeling Locations East

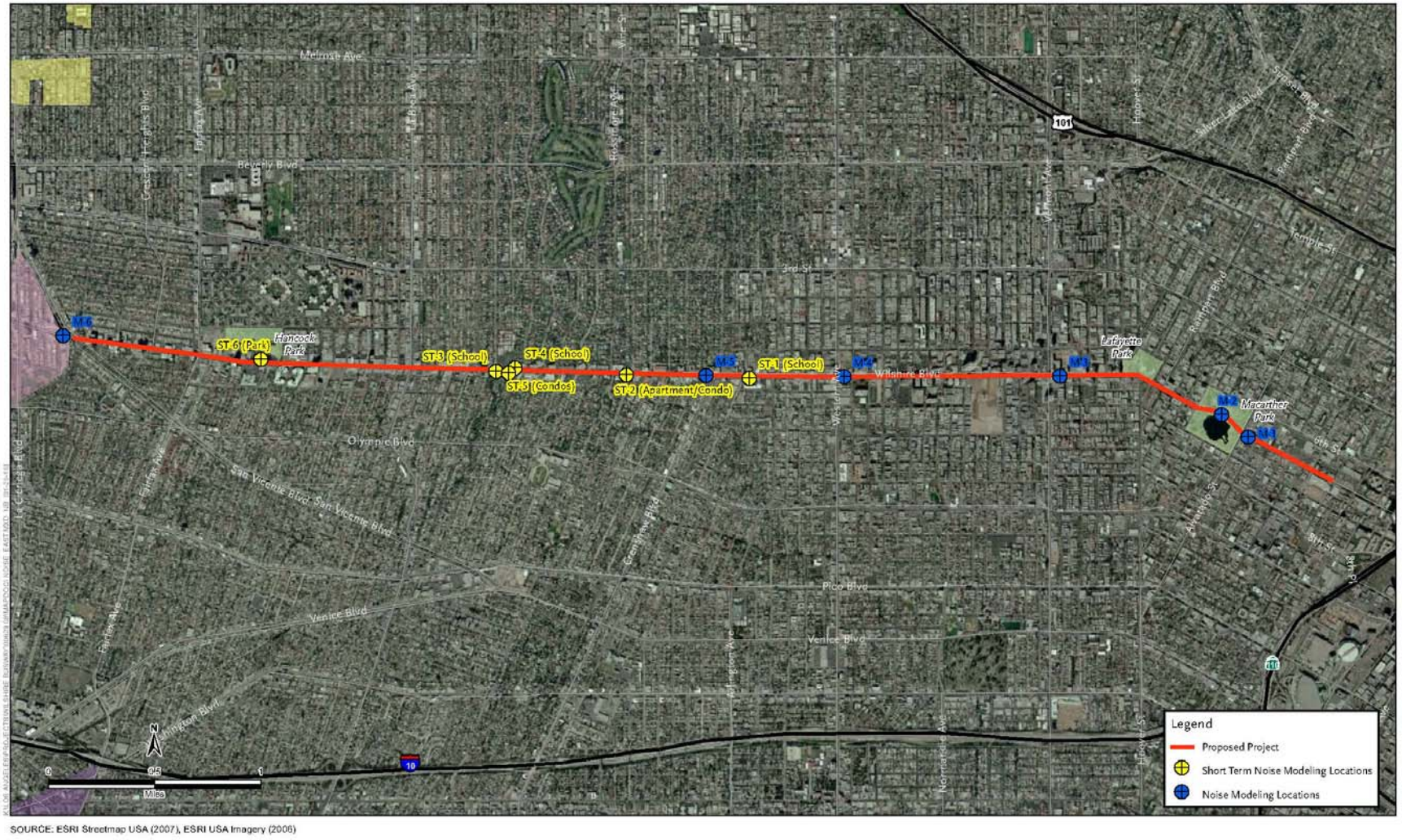


Figure 4.4-4. Noise Measurement/Modeling Locations West

SOURCE: ESRI Streetmap USA (2007), ESRI USA Imagery (2006)

Table 4.4-1: Short-Term Sound Level Measurement Results

Site ID	Measurement Location	Measurement Period			Noise Sources	Measurement Results (dBA)					
		Date	Start Time	Duration (mm:ss)		L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}
ST-1	Across from 4049 Wilshire Blvd., in front of Wilshire Park Elementary; set back approx. 50' from centerline of Wilshire Boulevard.	12-4-09	10:28	15:00	Traffic, distant children playing	71.4	82.6	58.3	63.7	70.4	74.4
ST-2	4460 Wilshire (residential building); set back approx. 75' from centerline of Wilshire Boulevard.	12-4-09	11:56	15:00	Traffic	75.1	85.1	53.8	64.5	73.7	78.3
ST-3	In front of 4900 Wilshire (Wilshire Private School); set back approx. 40' from centerline of Wilshire Boulevard.	12-4-09	12:56	15:00	Traffic, distant children playing	72.8	85.7	53	65.1	71.1	76
ST-4	Southeast corner of John Burroughs Middle School campus; set back approx. 60' from centerline of Wilshire Boulevard	12-4-09	13:45	15:00	Traffic	70.1	83.1	56.9	62.6	69.3	72.7
ST-5	4848 Wilshire (residential building); set back approx. 80' from centerline of Wilshire Boulevard.	12-4-09	14:39	15:00	Traffic, distant children playing	71.9	81.6	52.6	66.4	70.7	74.6

Table 4.4-1: Short-Term Sound Level Measurement Results (Continued)

Site ID	Measurement Location	Measurement Period			Noise Sources	Measurement Results (dBA)					
		Date	Start Time	Duration (mm:ss)		L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}
ST-6	Southern portion of Hancock Park and La Brea Tar Pits, north of Wilshire; set back approx. 100' from centerline of Wilshire Boulevard.	12-4-09	15:38	15:00	Traffic, distant people talking	63.2	77.3	52.8	57.4	61.3	66.1
ST-7	10530 Wilshire Blvd. (residential building); set back approx. 75' from centerline of Wilshire Boulevard.	12-4-09	17:10	15:00	Traffic	75	84.1	57.5	66.5	74.3	77.9
ST-8	10833 Wilshire Blvd. (residential building); set back approx. 75' from centerline of Wilshire Boulevard.	12-4-09	18:43	15:00	Traffic, distant people talking	75.8	84.2	60.1	69.8	75.2	78.3

Source: ICF, 2009.

During the field measurements, physical observations of the predominant noise sources were noted. The noise sources in the project area typically consisted of traffic sounds, distant children playing, distant people talking, and other community noises. The results of the sound level measurements are summarized in Table 4.4-1. As shown in Table 4.4-1, measured noise levels varied from 63 dBA L_{eq} at ST-6 to 76 dBA L_{eq} at ST-8, when rounded to whole numbers as is customary for community noise measurements.[104]

Existing Vibration Setting

Similar to the environmental setting for noise, the vibration environment is dominated by traffic-related vibration from nearby sources. Heavy trucks or other vehicles can generate groundborne vibration of varying magnitude, depending on vehicle type, weight, pavement and geological conditions.

[104] Noise measurements and most noise modeling calculations are conducted using instrumentation and models that provide data to the tenth of a decibel. However, it is generally the state of the practice to round to whole numbers in recognition of the fact that the actual level of scientific precision which can be relied upon in the community noise setting is on the order of whole decibels.

Vibration levels were not readily perceptible at noise/vibration-sensitive land uses in the project vicinity.

4.4.2 Regulatory Setting

Federal

While there are no federal noise requirements or regulations applicable to the local actions of the City or County of Los Angeles, the FTA and Federal Railroad Administration (FRA) both recommend thorough noise and vibration assessments through comprehensive guidelines for any mass transit or high-speed railroad projects that would pass by residential areas. Since FTA is the lead agency under NEPA for the proposed project, a noise and vibration assessment per federal NEPA guidelines is included in Chapter 7 of this document.

State

The State of California, Governor's Office of Planning and Research has published recommended guidelines for the preparation and content of the noise element of a general plan. Each jurisdiction is required to consider these guidelines when developing the general plan noise element and determining acceptable noise levels within the community. The purpose of the noise element is to limit the exposure of the community to excessive noise levels.

A noise element must identify and appraise noise problems in the community by analyzing and quantifying current and projected noise levels for all stationary and mobile noise sources in the community. Noise contours are then developed and shown for all the noise sources in the community and are eventually used as a guide for establishing a pattern of land uses that minimizes the exposure of community residents to excessive noise.

California Department of Transportation

Because neither the state nor the local municipalities maintain regulatory standards for vibration sources, potential structural damage and human annoyance associated with vibration from construction activities were evaluated based on Caltrans vibration limits (see Table 4.4-2). A vibration level of 0.10 inches per second peak particle velocity (PPV) was used to evaluate impacts on nearby receptors since this level represents the boundary between barely perceptible and distinctly perceptible vibration as recognized by Caltrans and others.

Table 4.4-2. Reaction of People and Damage to Buildings at Various Continuous Vibration Levels

Vibration Level - Peak Particle Velocity (ppv) (in/sec)	Human Reaction	Effect on Buildings
0.006–0.019	Threshold of perception; possibility of intrusion	Vibrations unlikely to cause damage of any type
0.08	Vibrations readily perceptible	Recommended upper level of the vibration to which ruins and ancient monuments should be subjected
0.10	Level at which continuous vibrations begin to annoy people	Virtually no risk of "architectural" damage to normal buildings
0.20	Vibrations annoying to people in buildings (this agrees with the levels established for people standing on bridges and subjected to relative short periods of vibration)	Threshold at which there is a risk of "architectural" damage to normal dwelling-houses with plastered walls and ceilings; special types of finish such as lining of walls, flexible ceiling treatment, etc., would minimize "architectural" damage
0.4–0.6	Vibrations considered unpleasant by people subjected to continuous vibrations and unacceptable to some people walking on bridges	Vibrations at a greater level than normally expected from traffic, but would cause "architectural" damage and possibly minor structural damage

Source: California Department of Transportation, *Transportation- and Construction-Induced Vibration Guidance Manual*, 2004.

Local

The proposed project lies primarily within the jurisdiction of the City of Los Angeles, with the exception of the 0.8 mile segment of Wilshire Boulevard between Veteran Avenue and Federal Avenue within the jurisdiction of the County of Los Angeles. The City and County of Los Angeles have established policies and regulations concerning the generation and control of noise that could adversely affect its citizens and noise-sensitive land uses.

The following noise regulations are nonetheless provided as information about the existing local regulatory framework in the City and County of Los Angeles with regards to noise.

City of Los Angeles Noise Ordinance (Municipal Code)

The Los Angeles Noise Ordinance is part of the Los Angeles Municipal Code, which specifies hours for construction activities.[105] The Los Angeles Noise Ordinance states that construction or other noise-generating activity shall not disturb the occupied sleeping quarters of any dwelling, hotel, apartment, or other place of residence between 9:00 p.m. and 7:00 a.m., or occur on or within

[105] City of Los Angeles. 2004. *Municipal Code*. Chapter IV, Article 1, Section 41.40, Construction Activities. October 24. Available: <http://lacodes.lacity.org/NXT/gateway.dll?f=templates&fn=default.htm>.

500 feet of residential property between 6:00 p.m. and 8:00 a.m. on Saturdays or federal holidays or at any time on Sundays.[106] Additionally, the operation, repair, or servicing of construction equipment, as well as the job-site delivery of construction materials, is prohibited between 6:00 p.m. and 8:00 a.m. on Saturdays and anytime on Sundays.[107] Los Angeles noise standards are applied to actions related to conditional use activities and when considering certain noisy commercial uses, such as automobile repair businesses, cleaning establishments, and carpentry shops.[108] Daytime noise limits apply from 7:00 a.m. to 10:00 p.m., and nighttime noise limits apply from 10:00 p.m. to 7:00 a.m.[109] The Los Angeles Municipal Code states that "between the hours of 10:00 p.m. and. 7:00 a.m. of the following day, no person shall operate any lawn mower, backpack blower, lawn edger, riding tractor, or any other machinery, equipment, or other mechanical or electrical device, or any hand tool, which creates a loud, raucous or impulsive sound, within any residential zone or within 500 feet of a residence."[110] Further, the code states that "no person shall operate or cause to be operated any machinery, equipment, tools, or other mechanical or electrical device, or engage in any other activity in such manner as to create any noise which would cause the noise level on the premises of any other occupied property, or, if a condominium, apartment house, duplex, or attached business, within any adjoining unit, to exceed the ambient noise level by more than five (5) decibels."[111]

The noise ordinance also specifies the maximum noise level for powered equipment or powered hand tools.[112] Any powered equipment or powered hand tool that produces a maximum noise level exceeding 75 dBA at a distance of 50 feet from construction and industrial machinery is prohibited. However, the above noise limitation shall not apply where compliance is technically infeasible.

Public entertainment and loudspeakers/amplification equipment are also regulated for maximum noise levels. No sound may be generated by sound-amplifying equipment that exceeds 95 dBA unless a conspicuous and legible sign is located on the outside of each public entrance that warns of the high sound levels and the danger to hearing that may occur.[113] Furthermore, no sound-amplifying equipment may be used within 500 feet of a residential zone, except when used by a school for regularly scheduled operative functions or by a church for customary purposes, between the hours of 4:30 p.m. and 9:00 a.m. the next day. In areas zoned for uses other than residential uses, sound-amplifying equipment may not be used for commercial purposes between the hours of 9:00 p.m. and 8:00 a.m. the next day and for non-commercial purposes between the hours of 10:00 p.m. and

[106] *Ibid.* Chapter XI, Noise Standards. October 24. Available: <http://lacodes.lacity.org/NXT/gateway.dll?f=templates&fn=default.htm>.
[107] *Ibid.* Chapter IV, Article 1, Section 41.40 – Construction Activities. October 24. Available: <http://lacodes.lacity.org/NXT/gateway.dll?f=templates&fn=default.htm>.
[108] *Ibid.*
[109] *Ibid.*
[110] *Ibid.* Chapter IX, Section 112.04. October 24. Available: <http://lacodes.lacity.org/NXT/gateway.dll?f=templates&fn=default.htm>.
[111] *Ibid.*
[112] *Ibid.*, Section 112.05.
[113] *Ibid.*, Section 112.06.

7:00 a.m. the next day. The only sounds allowed to be generated by sound-amplifying equipment shall be human speech, music, or both, and no sound equipment may be operated upon any property adjacent to or within 200 feet of any school, church, or hospital while in use.[114] Governmental agencies and permittees are exempt from this section of the City's municipal code.

City of Los Angeles Noise Element

The City of Los Angeles General Plan Noise Element establishes standards for exterior sound levels based on land use categories.[115] The noise element states that the maximum acceptable outdoor noise exposure level for residential, hospital, and school zones is 65 dBA CNEL and that silencers and mufflers are required on intake and exhaust openings for all construction equipment. Table 4.4-3 summarizes the City's noise compatibility guidelines.

Table 4.4-3. City of Los Angeles Guidelines for Noise Compatible Land Use

Land Use Category	Day-Night Avg. Exterior Sound Level (CNEL dB)						
	50	55	60	65	70	75	80
Residential – Single Family, Duplex, Mobile Home	A	C	C	C	N	U	U
Residential – Multifamily	A	A	C	C	N	U	U
Transient lodging – Motel, Hotel	A	A	C	C	N	U	U
School, Library, Church, Hospital, Nursing Home	A	A	C	C	N	N	U
Auditorium, Concert Hall, Amphitheater	C	C	C	C/N	U	U	U
Sports Arena, Outdoor Spectator Sports	C	C	C	C	C/U	U	U
Playground, Neighborhood Park	A	A	A	A/N	N	N/U	U
Golf Course, Riding Stable, Water Recreation, Cemetery	A	A	A	A	N	A/N	U
Office Building, Business, Commercial, Professional	A	A	A	A/C	C	C/N	N
Agriculture, Industrial, Manufacturing, Utilities	A	A	A	A	A/C	C/N	N

Notes:

A = Normally acceptable. Specified land use is satisfactory, based upon assumption that the buildings involved are conventional construction, without any special noise insulation.

C = Conditionally acceptable. New construction or development only after a detailed analysis of noise mitigation is made and needed noise insulation features are included in the project design. Conventional construction, but with closed windows and fresh air supply systems or air-conditioning, normally will suffice.

N = Normally unacceptable. New construction or development generally should be discouraged. A detailed analysis of noise reduction requirements must be made and noise insulation features included in the design of the project.

U = Clearly unacceptable. New construction or development generally should not be undertaken.

Source: City of Los Angeles General Plan, Noise Element, 1999.

[114] *Ibid*. Chapter XI, Article 5, Section 115.02. October 24. Available: <http://lacodes.lacity.org/NXT/gateway.dll?f=templates&fn=default.htm>.

[115] City of Los Angeles. 1999. *City of Los Angeles General Plan*, Noise Element. Los Angeles, CA.

County of Los Angeles Noise Control Ordinance (Municipal Code)

The County of Los Angeles is chiefly involved in maintaining the health and welfare of its residents in respect to noise through nuisance abatement ordinances and land use planning. The County Noise Control Ordinance, Title 12 of the County Municipal Code, was adopted by the Board of Supervisors in 1977 "...to control unnecessary, excessive, and annoying noise and vibration in the County of Los Angeles..." It declared that County policy was to "...maintain quiet in those areas which exhibit low noise levels and to implement programs aimed at reducing noise in those areas within the county where noise levels are above acceptable values."[116] On August 14, 2001, the Board of Supervisors approved an ordinance amending Title 12 of the County Code to prohibit loud, unnecessary, and unusual noise that disturbs the peace and/or quiet of any neighborhood or which causes discomfort or annoyance to any reasonable person of normal sensitivity residing in the area. Regulations can include requirements for sound barriers, mitigation measures to reduce excessive noise, or the placement and orientation of buildings, and can specify the compatibility of different uses with varying noise levels,[117] as shown in Table 4.4-4.

Table 4.4-4. County of Los Angeles Exterior Noise Standards

Noise Zone	Designated Noise Zone Land Use (Receptor Property)	Time Interval	Exterior Noise Level (dB)
I	Noise-sensitive area, designated to ensure exceptional quiet	Anytime	45
II	Residential properties, zoned as such in the County Code Title 22	10:00 p.m. to 7:00 a.m. (nighttime)	45
		7:00 a.m. to 10:00 p.m. (daytime)	50
III	Commercial properties, zoned as such in the County Code Title 22	10:00 p.m. to 7:00 a.m. (nighttime)	55
		7:00 a.m. to 10:00 p.m. (daytime)	60
IV	Industrial properties, zoned as such in the County Code Title 22	Anytime	70

Source: Section 12.08.390 of Los Angeles County Municipal Code (a portion of the Noise Control Ordinance).

Operating or causing the operation of any tools or equipment in construction, drilling, repair, alteration or demolition work between weekday hours of 7:00 p.m. and 7:00 a.m., or at any time on Sundays or holidays, such that the sound therefrom creates a noise disturbance across a residential or commercial real-property line, except for emergency work of public service utilities or by variance issued by the health officer, is prohibited. The contractor shall conduct construction activities in such a manner that the

[116] County of Los Angeles Noise Control Ordinance (Municipal Code). Section 12.08.010.
[117] County of Los Angeles. 1975. *City of Los Angeles General Plan,* Noise Element. Los Angeles, CA.

maximum noise levels at the affected buildings will not exceed those listed in Tables 4.4-5 and 4.4-6.

Table 4.4-5. County of Los Angeles Maximum Noise Levels for Short-term Operation (less than 10 days) of Mobile Equipment

	Single-family Residential	Multi-family Residential	Semiresidential/Commercial
Daily, except Sundays and legal holidays, 7:00 a.m. to 8:00 p.m.	75dBA	80dBA	85dBA
Daily, except 8:00 p.m. to 7:00 a.m. and all day Sunday and legal holidays	60dBA	65dBA	70dBA

Source: Section 12.08.440 of Los Angeles County Municipal Code (a portion of the Noise Control Ordinance).

Table 4.4-6. County of Los Angeles Maximum Noise Levels for Long-Term Operation (periods of 10 days or more) of Stationary Equipment

	Single-family Residential	Multi-family Residential	Semiresidential/Commercial
Daily, except Sundays and legal holidays, 7:00 a.m. to 8:00 p.m.	60dBA	65dBA	70dBA
Daily, 8:00 p.m. to 7:00 a.m. and all day Sunday and legal holidays	50dBA	55dBA	60dBA

Source: Section 12.08.440 of Los Angeles County Municipal Code (a portion of the Noise Control Ordinance).

Operating or permitting the operation of any device that creates vibration which is above the vibration perception 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 inches/second over the range of 1 to 100 Hertz.[118]

County of Los Angeles Noise Element

The County of Los Angeles General Plan Noise Element was first adopted by the County Board of Supervisors in 1974, and was updated in 1975. The Noise Element sets the goals and policy direction for the management of noise in Los Angeles County, to limit the exposure of the general public to excessive noise levels. The Noise Element incorporates the standards in the County Noise Ordinance of the Municipal Code and is the policy and planning tool for regulating noise in the County's area of jurisdiction. As

[118] County of Los Angeles Noise Control Ordinance (Municipal Code). Section 12.08.560.

such, the County's goals, policies, and implementation actions which apply to noise regulation are the following:

Goal N-1 is to have an environment that is protected from unacceptable levels of noise through the following policies:

- **Policy N 1.1:** Ensure the compatibility of land uses throughout the County to minimize the exposure to excessive noise levels.
- **Policy N 1.2:** Employ effective noise abatement measures to achieve acceptable levels of noise as defined by the Los Angeles County Exterior Noise Standards.
- **Policy N 1.3:** Ensure cumulative impacts related to noise do not exceed excessive levels.

In turn, the following implementation action has been identified to carry out these polices:

Implementation Action N 1.1
Identify significant noise issues in the County and create a working project list. Examples will include the need for sound walls and noise barriers, buffering, etc. This list can be used to identify funding sources and for grant applications.

4.4.3 Thresholds of Significance

The CEQA Guidelines and the corresponding Appendix G checklist were used to determine whether constructing and operating the project would result in a significant noise impact. Accordingly, for the purposes of this EIR, a noise impact generated by constructing or operating the project would be considered significant if it would result in:

- exposure of persons to, or generation of, noise levels in excess of standards established in local general plans (i.e., 65 dBA CNEL exterior (50 dBA CNEL for County)/45 dBA CNEL interior for long-term, operational noise) or noise ordinances;
- a substantial permanent increase in ambient noise in the project vicinity (an increase of 5 to 10 dBA is generally considered substantial) that adversely affects noise-sensitive uses or activities;
- a substantial temporary or periodic increase in ambient noise levels in the project vicinity (an increase of 15 dBA is generally considered substantial for this type of noise increase) that adversely affects noise-sensitive uses or activities; or
- exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels (i.e., groundborne vibration in excess of 0.2 inch PPV is considered significant).

Generally, exposure of persons to noise increases in excess of the thresholds above has the greatest potential for resulting in a significant impact when

normal noise-sensitive activities, such as sleep or relaxation, are disturbed or disrupted.

4.4.4 Environmental Impacts

Methodology

Potential impacts from short-term and long-term stationary and mobile noise sources associated with the proposed project were quantitatively assessed. The sources included on-site construction activities and on-site and off-site activities associated with the project. Changes in noise level at adjacent noise-sensitive land uses attributable to the project were evaluated.

The expected traffic noise levels at existing noise-sensitive receptors were predicted using the Federal Highway Administration's (FHWA's) Traffic Noise Model (TNM®). TNM® is the FHWA's computer program for highway traffic noise prediction and analysis. The most current version of TNM® (Version 2.5) was used for this project. The parameters used to estimate vehicular traffic noise were the typical distance between roadway centerline and receiver; typical average daily traffic (ADT) volumes and posted speed limits; percentages of automobiles, medium trucks, and heavy trucks; roadway grade; and site conditions (terrain or structural shielding and ground propagation characteristics).[119]

Impact N1: Exposure to noise levels in excess of applicable standards and to substantial permanent increase in ambient noise in the project vicinity.

The proposed project would result in less-than-significant noise impacts as a result of construction activities and projected operational conditions.

Construction Impacts

The results of the short-term noise level measurements taken to assess existing conditions show that the existing noise levels are higher than the recommended levels for sensitive receptors by the City or County. The dominant noise source in the project area is vehicular traffic. All of the noise measurements exceeded 65 dBA L_{eq}, with the exception of site ST-6, where the receiver was 100 feet from the roadway centerline.

The proposed project would increase noise temporarily along the corridor during construction. Noise during construction would primarily be generated from construction equipment. The elements of the project that would involve construction activity consist of the following:

- From Valencia Street to Western Avenue (approximately 2.5 miles), existing curb lanes would be converted to peak period bus lanes with the

[119] Federal Highway Administration. 2004. *Traffic Noise Model* (TNM®), Version 2.5.

installation of signage indicating access for buses and right-turns only, during peak periods.

- From Western Avenue to Fairfax Avenue (approximately 3.0 miles), curb lanes would be reconstructed/resurfaced and converted to peak period bus lanes. The curb lanes in this segment have deteriorated to the point that both buses and vehicles seldom use the lanes because of extreme rough and uneven pavement conditions. The curb lanes would undergo reconstruction of the roadway base (below the pavement surface),curb and gutters, where damaged, would be repaved/resurfaced, and new signage installed signaling the use of the curb lanes for buses and right-turns only, during peak periods.
- From Fairfax Avenue to the Beverly Hills city limits at the intersection of San Vicente Boulevard and Wilshire Boulevard (approximately 0.6 mile), existing curb lanes would be converted to peak period bus lanes with the installation of signage indicating access for buses and right-turns only during peak periods. The lanes in this segment need only minor surface repairs.
- From the Beverly Hills city limits, west of the intersection of Wilshire Boulevard and Santa Monica Boulevard, to Comstock Avenue (approximately 0.5 mile), existing curb lanes would be converted to peak period bus lanes with the installation of signage indicating access for buses and right-turns only, during peak periods.
- From Comstock Avenue to Malcolm Avenue (approximately 1.0 miles), various curb improvements, including jut-out removal and realignment of curbs, would be necessary. This would allow the realignment of curbs to create new curb lanes, thereby adding peak period bus lanes, with accompanying signage indicating access for buses and right-turns only during peak periods.
- From Malcolm Avenue to Sepulveda Boulevard (approximately 0.8 mile), existing curb lanes would be converted to peak period bus lanes with the installation of signage indicating access for buses and right-turns only, during peak periods.
- From Sepulveda Boulevard to Bonsall Avenue (approximately 0.2 mile), no bus lanes would be implemented. However, at Sepulveda Boulevard, the eastbound left-turn pocket would be lengthened by approximately 470 feet to accommodate a greater number of vehicles that are currently queued in the No. 1 eastbound traffic lane, resulting in full use of the No. 1 lane for through traffic movements.
- From Bonsall Avenue to Federal Avenue (approximately 0.4 mile), in order to accommodate an eastbound peak period bus lane, the sidewalk widths on both sides of Wilshire Boulevard would be reduced to a uniform width. Both eastbound and westbound lanes would be restriped. Wilshire Boulevard between Interstate 405 and Federal Avenue is bordered by the Veterans Administration (VA) property. The sidewalk widths on both sides of Wilshire Boulevard in this segment vary between 10 and 15 feet.

- From Federal Avenue to Barrington Avenue (approximately 0.1 mile), both sides of Wilshire Boulevard would be widened by reducing the sidewalk widths on the north and south sides, allowing restriping of the street and creation of a new eastbound peak period bus lane and conversion of the westbound curb lane to a peak period bus lane. The intersection of Wilshire Boulevard and Federal Avenue is extremely congested in the eastbound direction. The widening of this two-block segment would allow buses to pass safely and quickly through the intersection of Wilshire Boulevard and Federal Avenue and provide a contiguous eastbound bus lane from Centinela Avenue to Bonsall Avenue.
- From Barrington Avenue to Centinela Avenue (approximately 0.8 mile), existing curb lanes would be converted to peak period bus lanes with the installation of signage indicating access for buses and right-turns only, during peak periods.

Project construction would increase noise levels temporarily at noise-sensitive locations near the project site. The magnitude of the increases would depend on the type of construction activity, the noise level generated by various pieces of construction equipment, site geometry (i.e., shielding from intervening terrain or other structures), and the distance between the noise source and receiver.

Noise from construction activity is generated by the broad array of powered, noise-producing mechanical equipment used in the construction process. This equipment ranges from hand-held pneumatic tools used for installation of signage and traffic signals, to jack-hammers, rock drills, and pile drivers to break the sidewalk and roadway surface, to compactors, graders, scrapers, and pavers used in roadway reconstruction. The exact complement of noise-producing equipment that would be in use during any particular period has not yet been determined. However, the noise levels from construction activity during various phases of a typical public works and roadway construction project have been evaluated, and their use provides an acceptable prediction of a project's potential noise impacts.

In order to assess the potential noise effects of construction, this noise analysis used data from an extensive field study of various types of industrial and commercial construction projects (U.S. Environmental Protection Agency 1971). Noise levels associated with various construction equipment used for different construction activities required for the proposed project, at a reference distance of 50 feet, are shown in Table 4.4-7. Because of vehicle technology improvements and stricter noise regulations since the field study was published, this analysis will use the average noise levels shown in Table 4.4-8 for the loudest construction phase. This information indicates that the overall average noise level generated on a construction site could be 89 dBA at a distance of 50 feet during the excavation phase. Activities classified as part of the excavation and finishing phases would be part of the project. Specifically, excavation and finishing activities would occur in the following project corridor segments:

Table 4.4-7. Construction Equipment Noise Ranges

			Noise Level (dBA) at 50 feet
Equipment Powered By Internal Combustion Engines	Earth Moving	Compacters (Rollers)	74-75
		Front Loaders	73-85
		Backhoes	73-93
		Tractors	77-95
		Scrapers, Graders	80-93
		Pavers	87-88
		Trucks	83-94
	Materials Handling	Concrete Mixers	75-88
		Concrete Pumps	81-83
		Cranes (Movable)	76-87
		Cranes (Derrick)	86-88
	Stationary	Pumps	70-72
		Generators	70-80
		Compressors	70-80
Impact Equipment		Pneumatic Wrenches	84-88
		Jack Hammers and Rock Drills	80-97
		Pile Drivers (Peaks)	95-105
Other		Vibrator	69-81
		Saws	72-81

Source: U.S. Environmental Protection Agency, 1971.

Table 4.4-8. Typical Noise Levels from Construction Activities for Public Works Roads & Highways, Sewers, and Trenches Projects in Typical Urban Areas

Construction Activity	Average Sound Level at 50 feet (dBA L_{eq})[a]	Standard Deviation (dB)
Ground Clearing	84	6
Excavation	89	6
Foundations	88	8
Erection	79	3
Finishing	84	6
[a] Sound level with all pertinent equipment operating.		

Source: U.S. Environmental Protection Agency, 1971.

- From Western Avenue to Fairfax Avenue, the curb lanes in this segment would undergo reconstruction of the roadway base (below the pavement surface) and resurfaced, and curb and gutters, where damaged, would be reconstructed.
- From Fairfax Avenue to the Beverly Hills city limits at the intersection of San Vicente Boulevard and Wilshire Boulevard, existing curb lanes in this segment need only minor excavation and finishing for surface repairs.
- From Comstock Avenue to Malcolm Avenue, various curb improvements, including jut-out removal excavation for realignment of curbs, would be necessary. Finishing activities for the newly created curb lanes would also be necessary.
- From Sepulveda Boulevard to Federal Avenue, excavation activities would include widening Wilshire Boulevard between Bonsall Avenue and Federal Avenue by reducing the sidewalk widths on both sides of Wilshire Boulevard to a uniform width, and extending the eastbound left-turn pocket at Sepulveda Boulevard by approximately 470 feet. Finishing activities would include the restriping of all east and westbound lanes.
- From Federal Avenue to Barrington Avenue, excavation activities include widening Wilshire Boulevard by reducing the sidewalk widths on the north and south sides, and finishing activities would include the restriping of the street in order to create a new eastbound peak period bus lane and convert the existing westbound curb lane into a peak period bus lane.

The noise levels presented are value ranges; the magnitude of construction noise emission typically varies over time because construction activity is intermittent and the power demands on construction equipment (and the resulting noise output) are cyclical.

Noise levels generated by construction equipment (or by any point source) decrease at a rate of approximately 6 dBA per doubling of distance from the source.[120] Therefore, if a particular construction activity generated average noise levels of 89 dBA at 50 feet, the L_{eq} would be 83 dBA at 100 feet, 77 dBA at 200 feet, 71 dBA at 400 feet, and so on. This calculated reduction in noise level is based on the loss of energy resulting from the geometric spreading of the sound wave as it leaves the source and travels outward. Intervening structures that block the line of sight, such as buildings, would further decrease the resultant noise level by a minimum of 5 dBA. The effects of molecular air absorption and anomalous excess attenuation would reduce the noise level from construction activities at more distant locations at the rates of 0.7 dBA and 1.0 dBA per 1,000 feet, respectively.

Assuming an average noise level of 89 dBA (at 50 feet distance from roadway centerline) during excavation activities for roadway reconstruction of the curb lanes in the segment between Western Avenue and Fairfax Avenue, noise levels would temporarily increase by more than 15 decibels from the typical ambient daytime noise levels measured in the area at four of the six

[120] Harris, Cyril M. 1979. *Handbook of Noise Control*, Second Edition. McGraw-Hill Book Co.

measurement locations (ST-1, ST-3, ST-4, and ST-6). Although the increases in noise levels would be substantial, the increases would be intermittent and temporary during daytime hours as permitted by the City's Noise Ordinance (i.e., 7:00 a.m. to 9:00 p.m. during weekdays, and 8:00 a.m. to 6:00 p.m. on Saturdays). Therefore, it is unlikely that significant impacts on noise-sensitive uses or activities would occur. The other corridor segments with sensitive receptors, including residences in the Westwood area, that would require roadway and/or curb reconstruction or jut-out removal, would not result in an increase in noise from existing levels above the 15-decibel threshold of significance. The existing ambient noise levels in the Westwood area have been measured to be as high as 84.2 dBA (see Table 4.4-1).

Although a less than significant impact would occur, noise control measures are recommended during construction (see Section 4.4.5 below) to reduce the noise levels to the extent practicable in order to minimize the impact on nearby sensitive receptors.

Operational Impacts

The proposed project would convert existing curb lanes on Wilshire Boulevard to bus and right-turn only operation in the peak periods on weekdays. To implement the proposed project, curb lanes would be repaired or reconstructed, where necessary, and restriped and signed as peak period bus lanes. In other areas, curbside bus lanes would be added as new lanes to Wilshire Boulevard by widening or jut-out removal. There are no proposed improvements that would result in a change in operational noise output, excluding changes related to traffic noise. Traffic noise impacts are discussed below.

Project-Related Traffic Noise

Project-related traffic could alter noise levels in the surrounding area. Noise from motor vehicle traffic associated with the proposed project was analyzed using the data from the project's traffic study[121]. The worst-case scenario with regards to traffic volumes were input into the TNM model. ADT volumes for the Existing Year, Opening Year Without Project, Opening Year With Project, Horizon Year Without Project, and Horizon Year With Project scenarios were used to predict the changes in traffic noise at selected roadway segments. The segments in the traffic analysis and modeled in this noise analysis include the following:

- Wilshire Boulevard between Westlake Avenue and Alvarado Street;
- Wilshire Boulevard between Alvarado Street and Park View Street;
- Wilshire Boulevard between Shatto Place and Vermont Avenue;
- Wilshire Boulevard between Oxford Avenue and Western Avenue;
- Wilshire Boulevard between Crenshaw Boulevard and Lorraine Boulevard;
- Wilshire Boulevard between San Vicente Boulevard and Tower Drive;

[121] Iteris. 2010. *Wilshire Boulevard Bus Rapid Transit Project Traffic Impact Analysis.*

- Wilshire Boulevard between Beverly Glen Boulevard and Holmby Avenue;
- Wilshire Boulevard between Glendon Avenue and Westwood Boulevard;
- Wilshire Boulevard between Barrington Avenue and Stoner Avenue; and
- Wilshire Boulevard between Saltair Avenue and Bundy Drive.

The modeled locations (M-1 through M-10) were selected in order to assess changes in noise levels along the project corridor on Wilshire Boulevard.

The predicted traffic noise levels for the Existing scenario are presented in Table 4.4-9. The existing traffic noise levels at noise-sensitive land uses were found to range from approximately 68 dBA CNEL at M-1 and M-2 to approximately 71 dBA CNEL at M-7 at a reference distance of 75 feet.

Opening Year Without Project and Opening Year With Project traffic noise levels were predicted using TNM® and are presented in Table 4.4-9. As the table shows, opening year traffic noise levels (without the project) are predicted to increase from approximately 0 to 2 dBA compared to existing levels as a result of changes in future traffic volumes. Opening Year Without Project traffic noise levels would range from approximately 67 dBA CNEL at M-2 to 71dBA CNEL at M-7 at a distance of 75 feet. Under Opening Year With Project conditions, predicted noise levels would range from approximately 67 dBA CNEL at M-2 to 71 dBA CNEL at M-7 at a distance of 75 feet.

Horizon Year Without Project and Horizon Year With Project traffic noise levels were also predicted using TNM® and are presented in Table 4.4-9. As the table shows, horizon year traffic noise levels without the project are predicted to increase from 0 to 2 dBA compared to existing levels as a result of changes in future traffic volumes. Horizon Year Without Project traffic noise levels would range from approximately 69 dBA CNEL at M-2 to 72 dBA CNEL at M-7 at a distance of 75 feet. Under Horizon Year With Project conditions, predicted noise levels would range from approximately 67dBA CNEL at M-1 and M-2 to 71 dBA CNEL at M-7 at a distance of 75 feet.

According to the noise modeling results, the proposed project would not cause an exceedance of City of Los Angeles or County of Los Angeles noise standards or materially worsen an existing standard violation. With Project noise levels in both the opening year and horizon year are predicted to decrease from what they would be Without Project at most locations, and increase only slightly in others. Therefore, traffic noise associated with the proposed project would be considered a less than significant impact.

The CNEL metric was used as it is the metric used by the City of Los Angeles and County of Los Angeles with regards to noise thresholds. In addition, it should be noted that the above analysis is conservative since by using the CNEL metric, a worst-case scenario assumption of noise changes during the 24-hour period is used; however, the proposed project would only have a potential to affect conditions during a.m. and p.m. peak periods. The CNEL metric used by the City and County of Los Angeles also applies a more stringent requirement during evening and late night hours, and the proposed project would not change overnight noise conditions.

Table 4.4-9. Predicted Traffic Noise Levels – Proposed Project

Receptor #	Receptor Location	Modeled Existing Noise Level (dBA CNEL)	Modeled Opening Year (2010) without Project Noise Level (dBA CNEL)	Modeled Opening Year (2010) with Project Noise Level (dBA CNEL)	Modeled Horizon Year (2020) without Project Noise Level (dBA CNEL)	Modeled Horizon Year (2020) with Project Noise Level (dBA CNEL)	Estimated Maximum Increase Over Existing Noise Level With Project (dBA)	Criterion Noise Level (dBA CNEL)	Future Traffic Noise Level Exceeds Local General Plan Guidelines?
M-1	Wilshire Blvd between Westlake Ave to Alvarado St	68	69	67	69	67	-1	Permanent Increase of 5 to10 dBA from existing dBA	No
M-2	Wilshire Blvd between Alvarado St to Park View St	68	69	67	69	67	-1	Permanent Increase of 5 to10 dBA from existing dBA	No
M-3	Wilshire Blvd between Shatto Pl to Vermont Ave	69	70	69	70	70	0	Permanent Increase of 5 to10 dBA from existing dBA	No
M-4	Wilshire Blvd between Oxford Ave to Western Ave	69	69	69	70	69	0	Permanent Increase of 5 to10 dBA from existing dBA	No
M-5	Wilshire Blvd between Crenshaw Blvd to Lorraine Blvd	70	71	70	71	70	0	Permanent Increase of 5 to10 dBA from existing dBA	No
M-6	Wilshire Blvd between San Vicente Blvd to Tower Dr	70	71	71	71	71	0	Permanent Increase of 5 to10 dBA from existing dBA	No

Table 4.4-9. Predicted Traffic Noise Levels – Proposed Project (Continued)

Receptor #	Receptor Location	Modeled Existing Noise Level (dBA CNEL)	Modeled Opening Year (2010) without Project Noise Level (dBA CNEL)	Modeled Opening Year (2010) with Project Noise Level (dBA CNEL)	Modeled Horizon Year (2020) without Project Noise Level (dBA CNEL)	Modeled Horizon Year (2020) with Project Noise Level (dBA CNEL)	Estimated Maximum Increase Over Existing Noise Level With Project (dBA)	Criterion Noise Level (dBA CNEL)	Future Traffic Noise Level Exceeds Local General Plan Guidelines?
M-7	Wilshire Blvd between Beverly Glen Blvd to Holmby Ave	71	71	71	72	71	0	Permanent Increase of 5 to10 dBA from existing dBA	No
M-8	Wilshire Blvd between Glendon Ave to Westwood Blvd	70	71	71	71	71	1	Permanent Increase of 5 to10 dBA from existing dBA	No
M-9	Wilshire Blvd from Barrington Ave to Stoner Ave	70	70	70	70	70	0	Permanent Increase of 5 to10 dBA from existing dBA	No
M-10	Olympic Blvd between Saltair Ave to Bundy Dr	70	70	70	70	70	0	Permanent Increase of 5 to10 dBA from existing dBA	No

Source: ICF International, 2010.

Impact N2: Exposure to excessive groundborne vibration or groundborne noise levels.

The proposed project would result in less-than-significant groundborne vibration or groundborne noise impacts as a result of construction activities and projected operational conditions.

Construction Impacts

Both construction and operation of roadway and transit projects can generate groundborne vibration. Vibratory compactors or rollers, pile drivers and pavement breakers can generate perceptible vibration. Heavy trucks can also

generate groundborne vibration, which vary depending on vehicle type, weight, and pavement conditions. The FTA has published standard vibration levels and peak particle velocities for construction equipment operations. The RMS velocity level and peak particle velocities for construction equipment are listed in Table 4.4-10.

Table 4.4-10. Vibration Velocities for Construction Equipment[122]

Equipment	Approximate RMS Velocity Level at 25 ft, (VdB)	Approximate Peak Particle Velocity at 25 ft, (inch/second)	Approximate Peak Particle Velocity at 100 ft, (inch/second)
Large Bulldozer	87	0.089	0.011
Caisson drilling	87	0.089	0.011
Loaded trucks	86	0.076	0.010
Jackhammer	79	0.035	0.004
Small bulldozer	58	0.003	0.0004

Source: FTA, 1995.

Vibration levels due to construction activity at nearby sensitive receptors would be temporary and would be well below the significance criteria of 0.2 inches per second Peak Particle Velocity as demonstrated in Table 4.4-10; thus, construction vibration and groundborne noise impacts would be less than significant.

Operational Impacts

With regards to operational impacts under the proposed project, groundborne vibration in the project vicinity would continue to be generated by vehicles traveling along the local roadways, as they do in the existing condition. Vibration from a typical bus or truck would be approximately 65 VdB at a reference distance of 50 feet (as shown in Figure 4.4-2), or approximately 56 VdB at a distance of 100 feet. The threshold of perception for groundborne vibration is 65 VdB.

Only the following three segments of the project corridor would result in a change in the distance from the nearest travel lanes to the adjacent land uses:

- From Comstock Avenue to Malcolm Avenue (approximately 1.0 miles), various curb improvements, including jut-out removal and realignment of curbs, would be necessary. This would allow the realignment of curbs to create new curb lanes, thereby adding peak period bus lanes, with accompanying signage to indicate that the use of the curb lanes would be for buses and right-turns only during peak periods.
- From Bonsall Avenue to Federal Avenue (approximately 0.4 mile), in order to accommodate an eastbound peak period bus lane, the sidewalk widths on both sides of Wilshire Boulevard would be reduced to a uniform width. Both eastbound and westbound lanes would be restriped.

[122] Federal Transit Administration. 1995. *Transit Noise and Vibration Impact Assessment*, p. 12-9.

Wilshire Boulevard between Interstate 405 and Federal Avenue is bordered by the Veterans Administration (VA) property. The sidewalk widths on both sides of Wilshire Boulevard in this segment vary between 10 and 15 feet.

- From Federal Avenue to Barrington Avenue (approximately 0.1 mile), both sides of Wilshire Boulevard would be widened by reducing the sidewalk widths on the north and south sides, allowing restriping of the street and creation of a new eastbound peak period bus lane and conversion of the existing westbound curb lane into a peak period bus lane. The intersection of Wilshire Boulevard and Federal Avenue is extremely congested in the eastbound direction. The widening of this two-block segment would allow buses to pass safely and quickly through the intersection of Wilshire Boulevard and Federal Avenue and provide a contiguous eastbound bus lane from Centinela Avenue to Bonsall Avenue.

There are no sensitive-receptors adjacent to the south side of Wilshire Boulevard between Sepulveda Boulevard and Federal Avenue. There are also no sensitive receptors adjacent to either side of Wilshire Boulevard between Federal Avenue and Barrington Avenue. The only sensitive receptors adjacent to Wilshire Boulevard within these segments are those located in the segment between Comstock Avenue and Malcolm Avenue.

A doubling of the distance between the vibration source and the sensitive receptor results in a decrease of approximately 9 VdB. Most of the residences and other sensitive-receptors on Wilshire Boulevard between Comstock Avenue and Malcolm Avenue are located approximately 40-50 feet from the nearest travel lane on Wilshire Boulevard. Since the proposed project would only bring the closest travel lane 5 to 10 feet closer to the receptors, the change in vibration levels would not be readily perceivable. Therefore, the proposed project would result in less than significant operational vibration impacts.

4.4.5 Mitigation Measures

Construction

Although construction noise impacts would be less than significant as detailed above in Section 4.4.3, construction noise is unavoidable and could adversely affect nearby residents. However, the noise would be temporary and limited to the duration of the construction. Nonetheless, the following recommended measures ,may be incorporated into the project contract specifications to minimize construction noise impacts:

N-1 To the extent applicable, practicable, and feasible, all noise-producing construction equipment and vehicles using internal combustion engines shall be equipped with mufflers, air-inlet silencers where appropriate, and any other shrouds, shields, or other noise-reducing features in good operating condition that meet or exceed original factory specification. Mobile or fixed "package" equipment (e.g., arc-

welders, air compressors) may be equipped with shrouds and noise control features that are readily available for that type of equipment.

N-2 To the extent applicable, practicable, and feasible, electrically powered equipment shall be used instead of pneumatic or internal combustion powered equipment.

N-3 The use of noise-producing signals, including horns, whistles, alarms, and bells, shall be for safety warning purposes only.

N-4 No project-related public address or music system shall be audible at any adjacent receptor.

The noise control measures listed above would help in reducing the annoyance of high noise levels at adjacent noise-sensitive land uses to the extent practicable during construction.

4.4.6 Level of Significance After Mitigation

All noise impacts were determined to be less than significant without mitigation.

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