

of ACMs. A licensed asbestos abatement contractor shall remove all friable asbestos using approved abatement methods. In addition, the licensed asbestos abatement contractor shall be responsible for compliance of all asbestos-related regulations of SCAQMD, in particular Rule 1403 – Asbestos Emissions from Demolition/Renovation Activities (see also mitigation measure 3.11-5 – Hazardous Materials).

Non-friable asbestos can be disposed of as solid waste along with other construction debris as long as the landfill is permitted to accept non-friable asbestos waste.

3.13 Noise

This section evaluates potential noise and vibration impacts on nearby noise-sensitive areas resulting from the proposed project alternatives. For detailed analysis, please refer to the *Noise Technical Study for 1st Street Viaduct and Street Widening Project* (Parsons, 2004d).

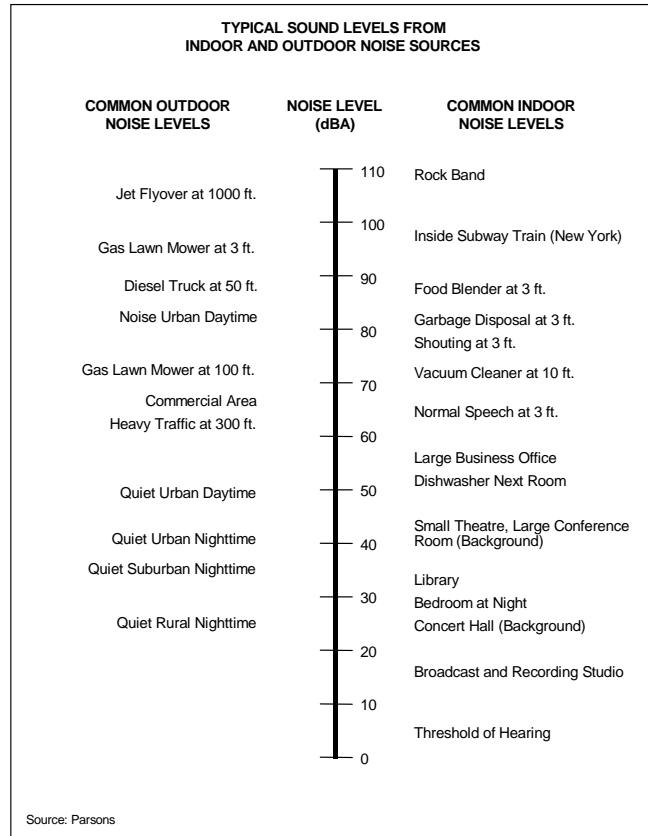
3.13.1 Affected Environment

3.13.1.1 Fundamentals of Noise

Noise is defined as sound that is loud, unpleasant, unexpected, or undesired. A continuous sound can be described by its frequency (pitch) and its amplitude (loudness). The loudness of sound increases and decreases with increasing and decreasing amplitude. These units are called decibels (dB).

Because decibels are logarithmic units, sound pressure levels (L_p) cannot be added or subtracted by ordinary arithmetic means. When two sounds of equal L_p are combined, they will produce a combined L_p , which is 3 dB greater than the original individual L_p . In other words, sound energy must be doubled to produce a 3-dB increase. If two sound levels differ by 10 dB or more, the combined L_p is equal to the higher L_p ; in other words, the lower sound level does not increase the higher sound level.

Sound pressure level alone is not a reliable indicator of loudness. The frequency, or pitch, of a sound also has a substantial effect on how humans will respond. Although the intensity (energy per unit area) of the sound is a purely physical quantity, the loudness or human response is determined by the characteristics of the human ear. In general, the healthy human ear is most sensitive to sounds between 1,000 Hertz (Hz) and 5,000 Hz, and it perceives a sound within that range as being more intense than a sound of higher or



**Figure 3.13-1
Typical A-Weighted Noise Levels**

lower frequency with the same magnitude. To approximate the frequency response of the human ear, a series of L_p adjustments is usually applied to the sound level at different frequencies. These adjustments are referred to as a weighting network. The A-scale weighting network approximates the frequency response of the average young ear when listening to most ordinary sounds. Noise levels for traffic noise reports are typically reported in terms of A-weighted decibels (dBA). In environmental noise studies, A-weighted sound pressure levels are commonly referred to as noise levels. Figure 3.13-1 shows typical A-weighted noise levels.

Noise in our daily environment fluctuates over time. Some noise levels occur in regular patterns; others are random. Some noise levels fluctuate rapidly, others slowly. Some noise levels vary widely; others are relatively constant. Various noise descriptors have been developed to describe time-varying noise levels. The following is a list of the noise descriptors most commonly used in traffic noise analysis:

- **Equivalent Sound Level (L_{eq})** – L_{eq} represents an average of the sound energy occurring over a specified period. L_{eq} is, in effect, the steady-state sound level that, in a stated period, would contain the same acoustical energy as the time-

varying sound that actually occurs during the same period. The 1-hour A-weighted equivalent sound level, $L_{eq}(h)$, is the energy average of the A-weighted sound levels occurring during a 1-hour period.

- **Percentile-Exceeded Sound Level (L_x)** – L_x represents the sound level exceeded for a given percentage of a specified period. For example, L_{10} is the sound level exceeded 10 percent of the time, and L_{90} is the sound level exceeded 90 percent of the time.
- **Maximum Sound Level (L_{max})** – L_{max} is the highest instantaneous sound level measured during a specified period.

3.13.1.2 Federal, State, and Local Policies and Procedures

The noise impact evaluation criteria for this study follow the Noise Abatement Criteria (NAC) established by FHWA in the *Procedures for Abatement of Highway Traffic Noise and Construction Noise* (23 CFR Part 772, 2003), criteria adopted by Caltrans in the *Traffic Noise Analysis Protocol* (Caltrans, 1998a) and the *Technical Noise Supplement (TeNS)* (Caltrans, 1998b), and the City of Los Angeles noise criteria/standards (City of Los Angeles, 1988).

FHWA Regulations

Title 23, Part 772 of the *Code of Federal Regulations* (23 CFR 772) provides procedures for conducting highway-project noise studies and implementing noise abatement measures to help protect the public health and welfare, establishes NAC, and includes requirements for information to be given to local officials for use in planning and designing highways. Under this regulation, noise abatement must be considered if the project is predicted to result in a traffic noise impact. A traffic noise impact is considered to occur when the project results in a substantial noise increase or when the predicted noise levels approach or exceed the NAC specified in the regulation. 23 CFR 772 does not specifically define what constitutes a substantial increase or the term approach; rather, it leaves interpretation of these terms to the State highway agencies. Noise abatement measures that are reasonable, feasible, and likely to be incorporated into the project must be identified. Noise impacts for which no apparent solution is available must also be identified. Table 3.13-1 presents the FHWA NAC.

**Table 3.13-1
Noise Abatement Criteria**

Activity Category	Noise Abatement Criteria (dBA) L _{eq}	Description of Activity Category
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	67 (Exterior)	Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals.
C	72 (Exterior)	Developed lands, properties, or activities not included in Categories A or B above.
D	--	Undeveloped lands.
E	52 (Interior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums.

Source: 23 CFR Part 772, 2003.

Caltrans Protocol

The noise impact analysis for the 1st Street project was conducted following the *Traffic Noise Analysis Protocol* (Caltrans, 1998a) and the *Technical Noise Supplement (TeNS)* (Caltrans, 1998b).

Traffic Noise Analysis Protocol for New Highway Construction and Reconstruction Projects (Protocol): According to the NAC adopted in the *Caltrans Traffic Noise Analysis Protocol*, when traffic noise impacts have been identified, noise abatement measures must be considered. Traffic noise impacts occur when predicted noise levels approach within 1 dBA of, or exceed the NAC shown in Table 3.13-1.

The Caltrans protocol states that if it is predicted there would be traffic noise impacts, all reasonable and feasible noise abatement measures shall be identified and implemented. The abatement must provide a minimum of 5-dB noise reduction for the impacted receivers to be considered feasible. Greater noise reductions are encouraged as long as they can be achieved under the reasonableness guidelines. The overall reasonableness of noise abatement is determined by considering a multitude of factors including, but not necessarily limited to, the cost of abatement, noise abatement benefits, date of development along the highway, and opinions of impact residents.

Normally, noise abatement is not designed for the second-floor level (Caltrans, 1998a). However, noise abatement designed to provide a 5-dB noise reduction for the second-floor level without exceeding the modified allowance is considered within the scope of reasonableness.

“Unusual and extraordinary” noise abatement strategies, such as providing noise insulation of residential units, are rarely employed. It is stated in the Caltrans protocol that when considering extraordinary abatement measures, it must be demonstrated that the affected activities experience traffic noise to a far greater degree than other similar activities adjacent to highway facilities (i.e., private residential units will have post-project exterior noise levels of 75 dBA L_{eq} , or higher), or the project causes a noise level increase of 30 dBA or more over predicted noise levels if no project was constructed.

Caltrans does not provide specific construction noise criteria. However, the Caltrans protocol does recommend that construction noise levels normally shall not exceed the maximum noise levels of 86 dBA (L_{max}) at a distance of 50 ft (15 m). If construction noise is anticipated to be a substantial problem, land uses and activities that could be affected by the construction activity and measures necessary to minimize or eliminate adverse construction noise impacts on the communities shall be examined.

Technical Noise Supplement (TeNS): The Caltrans TeNS provides technical background information on transportation-related noise, in general, and highway traffic noise, in particular. It is designed to elaborate on technical concepts and procedures referred to in the protocol. The procedures recommended in TeNS are in conformance with “industry standards” (Caltrans, 1998b).

The City of Los Angeles Noise Criteria/Standards

The City of Los Angeles noise criteria/standards are applicable to the construction of the proposed project as described below.

Construction Noise Regulations: The City of Los Angeles noise ordinance has noise limits for construction activities. Section 112.05 of the Los Angeles Building Code states that construction and industrial machinery shall not exceed a maximum of 75 dBA at a distance of 50 ft (15 m), except where compliance is technically infeasible. "The burden of proving that compliance is technically infeasible shall be upon the person or persons charged with a violation of this section. Technical infeasibility shall mean that said noise limitations cannot be complied with despite the use of mufflers, shields, sound barriers, and/or any other noise reduction device or technique during the operation of the equipment."

In addition, Section 41.40 of the Los Angeles Municipal Code restricts construction activities during different hours of the day. According to this code, no person shall perform any construction or repair work that makes loud noises that disturb persons occupying sleeping quarters in any place of residence between the hours of 9:00 p.m. of

one day and 7:00 a.m. of the following day. Furthermore, the code prohibits any person other than an individual homeowner engaged in the repair or construction of his single-family dwelling from performing any construction or repair work on land occupied by residential buildings, or within 500 ft (152 m) of land so occupied, before 8:00 a.m. or after 6:00 p.m. on any Saturday nor at any time on any Sunday. In the event that the tight project construction schedule would necessitate construction activities to occur outside of the hours allowed by the City’s noise ordinance, a variance shall be obtained.

Land-Use Noise Regulations: Table 3.13-2 lists the City of Los Angeles noise standards. A violation of these standards would occur if the ambient noise levels were exceeded by more than 5 dBA. The ambient noise is measured when the alleged noise source of concern, or that which is to be introduced, is not operating. The standard sets the minimum ambient noise level at 50 dBA during daytime and 40 dBA at night in residential areas, unless measured higher.

**Table 3.13-2
City of Los Angeles Noise Standards**

Zone	Presumed Ambient Noise Levels, dBA	
	Day (7:00 a.m. to 10:00 p.m.)	Night (10:00 p.m. to 7:00 a.m.)
Residential, agricultural	50	40
Commercial	60	55
Public use	65	65
Light manufacturing	70	70
<p>Notes: Noise Limitation: No equipment or machinery shall be operated in any manner as to create any noise that would cause the noise level at any occupied property to exceed the ambient noise level by more than 5 dB.</p> <ul style="list-style-type: none"> • At the boundary line between two zones, the presumed ambient noise level of the quieter zone shall be used. • Adjustments to Source Noise: Where the sound alleged to be offending is of a type or character set forth below, the following decibel values shall be the sound level measurement of the offending noise: <ul style="list-style-type: none"> a. Add 5 dBA to any steady, pure tone with audible fundamental frequency or overtones above 200 Hz. b. Add 5 dBA from any repeated, impulsive noise. c. Subtract 5 dBA from any noise occurring 15 minutes or less in any period of 60 consecutive minutes between the hours of 7:00 a.m. and 10:00 p.m. of any day. 		

Source: City of Los Angeles, 1988.

3.13.1.3 Existing Noise Environment

Noise-Sensitive Receptors

Noise measurements are taken to determine existing peak-hour noise levels. A noise sensitive receiver or receptor is a location selected for determining noise impacts. Selection of measurement locations and noise receptors is based on the following criteria:

- Locations expected to receive the highest noise impacts, such as the first row of houses.
- Locations that are acoustically representative and equivalent of the area of concern.
- Locations that represent areas where frequent human land use occurs or is likely to occur in the foreseeable future.
- Sites clear of major obstruction and contamination (for measurements).

Noise measurements for the 1st Street project were conducted in conformance with Caltrans' *Technical Noise Supplement* (Caltrans, 1998b).

Project noise engineers visited the project area on July 28 and August 19, 2003, to identify noise-sensitive receptor locations in the area. Noise measurements were conducted at representative receptor sites on August 19, 2003, to assess the ambient noise levels along the project corridor.

Based on the criteria mentioned above, the following locations (Figure 3.13-2) are considered noise-sensitive receptors:

- The Los Angeles Hompa Hongwanji Betsuin Buddhist Temple located on the north side of 1st Street between Garey Street and Vignes Street.
- The historic Pickle Works residential structure located on the north side of 1st Street, west of Vignes Street.
- The Hispanic Urban Center & New Hope Christian Fellowship Church located on the north side of 1st Street, east of Mission Road.
- A day-care center (Plaza Child Observation & Development Satellite Center), located on the north side of 1st Street between Mission Road and Utah Street.
- Two community service centers (Aliso Village Hope VI Work Source Portal and Boyle Heights Youth Opportunity Movement Community Development Department & International Institute of LA Aliso-Pico Multi-Purpose Center) located on the north side of 1st Street, east of Utah Street.

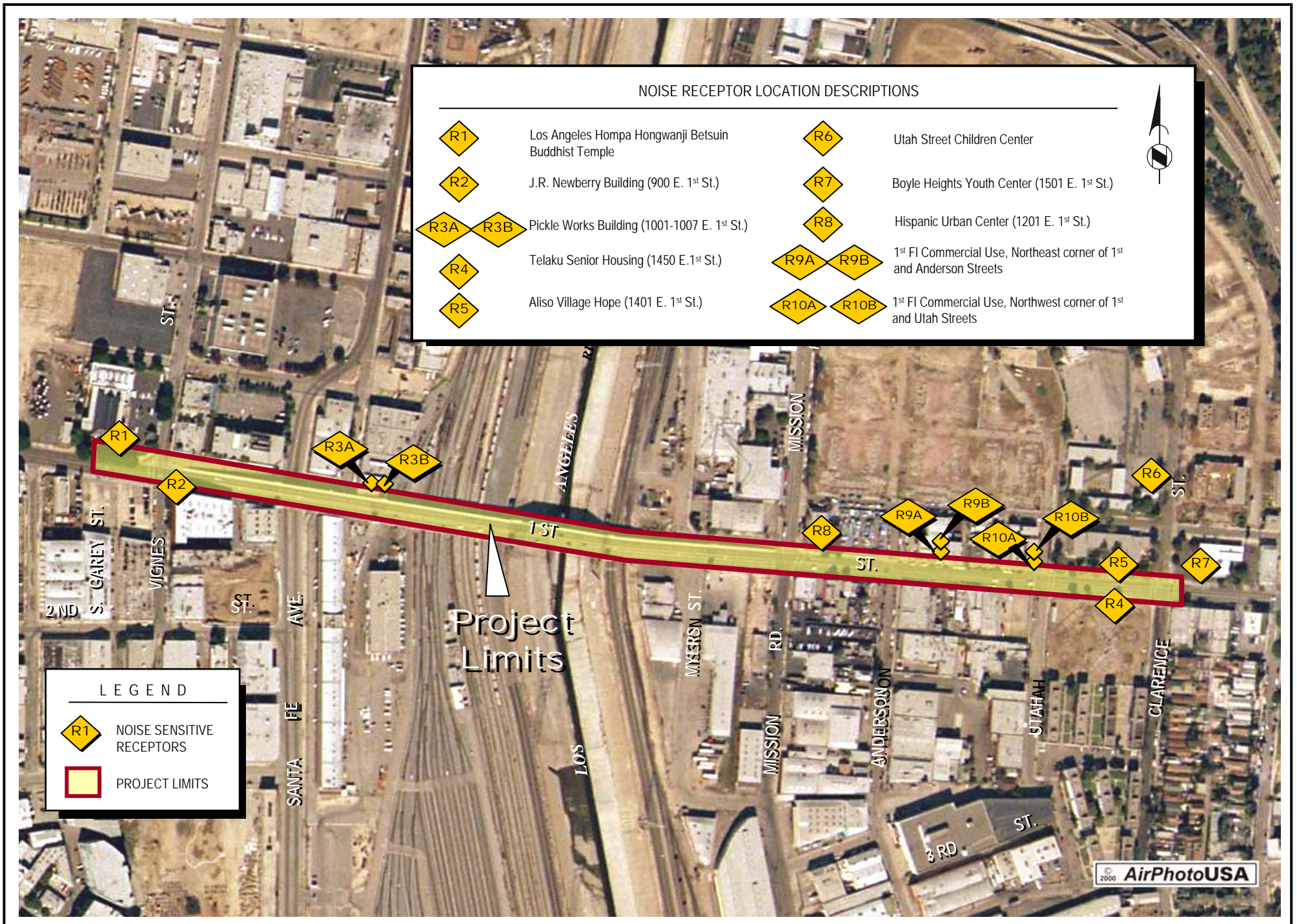


Figure 3.13.2 Location of Noise Sensitive Receptors

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- The historic J. R. Newberry Company residential building and a senior housing apartment building (Telacu Pico Aliso Apartments) located on the south side of 1st Street.

Except for the temple and the Boyle Heights Youth Center, observations during site visits showed that there are no outdoor-use areas for the receptors fronting 1st Street.

Existing Noise Levels

Existing 15-minute interval ambient noise measurements were taken at six representative noise receptor locations within the project limits (Figure 3.13-2). Due to the lack of secure locations to leave the instruments unattended outdoors for an extended period of time, 24-hour long-term noise measurements along the project corridor were not undertaken. The short-term noise measurements were conducted during morning or afternoon peak noise hours in an attempt to capture the highest noise levels of a typical day. The measurements were conducted during morning and afternoon hours where traffic volume was observed to be highest but remained free flowing – a condition referred to as Level of Service (LOS) C or better by traffic engineers. LOS C generally represents the condition when the highest noise levels would be generated. The ambient noise levels, measured in L_{eq} , ranged between 62 and 72 dBA, which is typical for areas located adjacent to a four-lane roadway. All noise measurements were conducted according to the guidelines outlined in FHWA's *Measuring of Highway Related Noise*, FHWA-DP-96-045-1R.

Existing noise levels were calculated at all 10 noise-sensitive sites, including the 6 measurement locations, using the SOUND2000 traffic noise model and existing traffic data. The modeled and measured noise levels were found to be in sufficient agreement for purposes of the analysis. Table 3.13-3 presents existing peak-hour noise levels in the project area, which range from 62 to 73 dBA.

**Table 3.13-3
Summary of Existing Noise Levels**

Site No.	Address/Location	Type of Development (current land uses)	Activity Category and NAC () L _{eq(h)} , dBA ¹	Measured Peak-Hour Noise Level, L _{eq(h)} , dBA ¹	Existing Modeled Peak-Hour Noise Level, L _{eq(h)} , dBA ^{1,2}
R1	Hompa Hongwanji Betsuin Buddhist Temple 815 East 1 st Street	Temple	B (67)	68	69
R2	J. R. Newberry Building 900 East 1 st Street	Multi-Family Residence	B (67)	72	73
R3A ³	Pickle Works Building 1001-1007 East 1 st Street	Multi-Family Residence	B (67)	–	73
R4	Senior Housing 1450 East 1 st Street	Multi-Family Residence	B (67)	70	71
R5	Aliso Village Hope 1401 East 1 st Street	Institutional	B (67)	66	68
R6	Utah Street Children’s Center	School	B (67)	62	62
R7	Boyle Heights Youth Center 1505 East 1 st Street	Institutional/ Playground	B (67)	67	71
R8A ⁴	Hispanic Urban Center Building 1201 East 1 st Street	Institutional/ Residential	B (67)	–	72
R9A ⁴	1 st Floor Commercial Use Northeast corner of 1 st and Anderson Streets	Commercial/ Residential	B (67)	–	72
R10A ⁴	1 st Floor Commercial Use Northwest corner of 1 st and Utah Streets	Commercial/ Residential	B (67)	–	73

¹ All noise levels are expressed in hourly L_{eq}, dBA.
² All noise levels calculated assume that traffic volumes include: 4% Medium Trucks and 2.7% Heavy Trucks.
³ R3A is located at the present south façade of the building at the same elevation as the roadway, approximately 35 ft from the existing centerline.
⁴ R8A, R9A, and R10A are located at the existing south façades of buildings on the north side of 1st Street between Mission Road and Clarence Street.

Source: Parsons

Traffic Noise Modeling

The Caltrans highway noise prediction computer model, SOUND 2000, PC Version 3.2 (Caltrans, 2003a) was used for the noise computations. This model is based on the highway traffic noise prediction method specified in FHWA-RD-77-108 (FHWA, 1978). The SOUND 2000 input requirements and basic computational procedures are provided in the *Noise Technical Study for 1st Street Viaduct and Street Widening* (Parsons, 2004d).

3.13.2 Permanent Impacts

3.13.2.1 No Build Alternative

There would be no direct noise impacts under the proposed No Build Alternative.

3.13.2.2 Build Alternatives 1 and 2

Noise levels generated upon project completion and during operation of the improved facility would be primarily from vehicular and LRT traffic on 1st Street in the project area. To assess the potential operation-phase noise impacts of the project, in addition to the measured noise levels, the vehicular traffic noise levels were predicted at various representative sensitive locations (see Figure 3.13-2) along and near 1st Street for the existing condition (Year 2003) and the future (Year 2025) No Build and Build Alternatives.

Buildings on the north side of 1st Street, between Mission Road and Utah Street, would be partially demolished and reconstructed under the build alternatives with similar setbacks as the current condition. The noise levels at these buildings were analyzed in the computer model at their future locations under the build alternatives.

For the purpose of this study, the No Build Alternative noise levels were used as the baseline or basis for comparisons. The projected increase in noise levels generated by the project alternatives over the baseline levels was used to assess potential impacts. The LRT was assumed to be in existence and in operation by Year 2007. Its noise levels are included in both the No Build and Build Alternatives in analyzing the potential effects of vehicular traffic noise resulting from the 1st Street Viaduct and Street Widening Project.

Table 3.13-4 presents the predicted LRT noise levels at each of the noise-sensitive receptor locations. These noise levels were estimated by making certain distance adjustments using the LRT hourly noise levels (hourly L_{eq}) at similar receptor locations listed in the *FSEIS/FSEIR* (FTA/MTA, 2002). Note that since the existence of the LRT is part of the baseline condition, this study assumes that the LRT noise levels were predicted and incorporated in the Los Angeles Eastside Corridor *FSEIS/FSEIR*. The LRT noise levels were not calculated as part of this study. As shown in Table 3.13-4, the LRT noise levels are higher in areas where special trackwork is indicated (Receptors R4 through R7).

**Table 3.13-4
Predicted LRT Noise Levels**

Site Number	Address/Location	Special Trackwork Present?	LRT-Generated Noise Level, L_{eq}^1
R1	Hompa Hongwanji Betsuin Buddhist Temple, 815 East 1 st Street	No	61
R2	J. R. Newberry Building, 900 East 1 st Street	No	62
R3A	Pickle Works Building, 1001-1007 East 1 st Street	No	67
R3B	Pickle Works Building – Future, 1001-1007 East 1 st Street	No	60
R4	Senior Housing, 1450 East 1 st Street	Yes	70
R5	Aliso Village Hope, 1401 East 1 st Street	Yes	66
R6	Utah Street Children's Center	Yes	60
R7	Boyle Heights Youth Center, 1505 East 1 st Street	Yes	69
R8B	1 st Floor Hispanic Urban Center Building (Future), 1201 East 1 st Street	No	68
R9B	1 st Floor Commercial use (Future) Northeast corner of 1 st and Anderson Streets	No	62
R10B	1 st Floor Commercial use (Future) Northwest corner of 1 st and Utah Streets	No	62

¹ All noise levels are expressed in peak-hour L_{eq} , dBA and are based on levels published in the Los Angeles Eastside Corridor FSEIS/FSEIR (FTA/MTA, 2002).

Table 3.13-5 presents predicted noise levels using the traffic data for the future No Build (baseline) and future Build Alternatives. Both the future No Build and Build Alternatives' predicted noise levels include the noise produced by the LRT operation.

As shown in Table 3.13-5, the expected increase in overall noise levels due to the project (Year 2025 – Build Alternatives 1 and 2), in comparison to the overall Year 2025 No Build noise levels, would be no more than 2 dBA. Approximately the same level of increment, not more than 2 dBA, is noted between the existing vehicular traffic noise levels and those of the build alternatives. This difference in noise levels would normally be imperceptible to the human hearing system.

The noise modeling results are summarized below:

Under Build Alternatives 1 and 2, the roadway centerline in front of the temple, located on the north side of 1st Street west of Vignes Street (Receptor R1), would be shifted slightly north, bringing it closer to the temple. This also results in the LRT being moved closer to the temple than originally planned by MTA (baseline); however, this minor shift would not increase the peak noise hour noise levels at the exterior of the temple due to

**Table 3.13-5
Predicted Traffic Noise Levels**

Site No.	Address/Location	Future Conditions – Year 2025 ²						Noise Increase or Decrease (Traffic + LRT)	Activity Category and NAC () L _{eq(h)} , dBA ¹	Impact Type (S, A/E, or NONE) ⁶
		No Build			Alternatives 1 and 2					
		Traffic Only Peak Hour L _{eq(h)} , dBA ¹	LRT Only Peak Hour L _{eq(h)} , dBA ¹	Traffic + LRT Peak Hour L _{eq(h)} , dBA ¹	Traffic Only Peak Hour L _{eq(h)} , dBA ¹	LRT Only Peak Hour L _{eq(h)} , dBA ¹	Traffic + LRT Peak Hour L _{eq(h)} , dBA ¹			
R1	Hompa Hongwanji Betsuin Buddhist Temple 815 East 1 st Street	70	61	71	71	61	71	0	B (67)	A/E
R2	J. R. Newberry Company Building 900 East 1 st Street	72	62	72	74	62	74	2	B (67)	A/E
R3A ³	Pickle Works Building 1001-1007 East 1 st Street	71	67	72	N/A	N/A	N/A	N/A	N/A	N/A
R3B ⁴	Pickle Works Building – Future 1001-1007 East 1 st Street	67	60	68	70	60	70	2	B (67)	A/E
R4	Senior Housing 1450 East 1 st Street	70	70	73	70	70	73	0	B (67)	A/E
R5	Aliso Village Hope 1401 East 1 st Street	67	66	70	67	66	70	0	B (67)	A/E
R6	Utah Street Children’s Center	61	60	64	61	60	64	0	B (67)	NONE
R7	Boyle Heights Youth Center 1505 East 1 st Street	69	69	72	69	69	72	0	B (67)	A/E
R8B ⁵	Hispanic Urban Center Building (Future) 1201 East 1 st Street	72	63	73	72	63	73	0	B (67)	A/E
R9B ⁵	1 st Floor Commercial Use (Future) Northeast corner of 1 st and Anderson Streets	71	62	72	71	62	72	0	B (67)	A/E
R10B ⁵	1 st Floor Commercial Use (Future) Northwest corner of 1 st and Utah Streets	71	62	72	71	62	72	0	B (67)	A/E

¹ All noise levels are expressed in hourly L_{eq} dBA.

² All noise levels calculated assume that traffic volumes include: 4% Medium Trucks and 2.7% Heavy Trucks.

³ R3A is located at the present south façade of the building at the same elevation as the roadway, approximately 35 ft from the existing centerline. R3A will be taken by either project Build Alternative.

⁴ R3B is located at the future south façade of the building at the same elevation as the roadway, approximately 75 ft from the Alternative 1 centerline. The No Build level reported at R3B is at 85 ft from the existing centerline and outdoors.

⁵ R8B, R9B, and R10B are located at the future south façades of buildings on the north side of 1st Street between Mission Road and Clarence Street after partial demolition and reconstruction.

⁶ S = Substantial increase (12 dB or more); A/E = Approach or Exceed NAC.

Source: Parsons, 2004d.

noise levels contributed by the LRT. However, the future noise level would be 71 dBA for both build alternatives at this site, exceeding the FHWA NAC of 67 dBA and impacting the outdoor-use area in front of the temple. Noise abatement measures were therefore considered for this area.

The noise level at the residential J. R. Newberry Company Building located at 900 East 1st Street on the south side of Vignes Street (Receptor R2), is anticipated to increase by 2 dBA – from 72 dBA under the No Build Alternative to 74 dBA under the Build Alternatives. These noise levels exceed the NAC. Since there is no frequent human outdoor-use area facing 1st Street at this location, where lowered noise levels would be of benefit, noise abatement measures were not considered. Using the guidelines published in the FHWA Highway Traffic Noise Analysis and Abatement Policy and Guidance (FHWA, 1995), a building attenuation of 25 dB can be expected. Therefore, the interior noise levels of the J. R. Newberry Company Building are not anticipated to exceed the 52 dBA interior NAC.

At Receptor R3 (R3A and R3B), which represents the exterior of the Pickle Works building, located at 1001-1007 East 1st Street immediately north of the 1st Street Viaduct, the noise level at the closest façade of the building would be decreased from 72 dBA under the No Build Alternative to 70 dBA under Build Alternatives 1 and 2. This slight decrease in noise level is due to the proposed partial demolition of the building, which would set the new building's façade approximately 5 to 10 ft (1.5 to 3 m) away from the new viaduct for both build alternatives. The noise level at Receptor R3B, the future building façade, would increase from 68 to 70 dBA, exceeding the NAC. There is no outdoor-use area of frequent human use where lowered noise levels would be of benefit at this location; hence, noise abatement measures were not considered necessary. Based on the building type and published FHWA guidelines, the interior noise levels of the Pickle Works building are not expected to exceed the Caltrans and FHWA NAC either.

Since there would be no changes in the predicted traffic volumes along 1st Street between Mission Road and Clarence Street, no increase in noise levels is anticipated at Receptors R4 through R10. No noise impact to the Utah Street Children's Center (Receptor R6) is predicted, but noise levels at the remainder of the sites would exceed the NAC. Of these locations, only the Boyle Heights Youth Center (Receptor R7) has a noise-sensitive outdoor land use – a playground area. The future noise level at this location would be 72 dBA, exceeding the NAC of 67 dBA, and impacting the outdoor-use area with frequent outdoor human use where lowered noise levels would be of benefit. Thus, noise abatement measures were considered for this property.

3.13.3 Temporary Impacts

3.13.3.1 Construction Noise Impacts

Noise impacts from construction activities for the project are a function of the noise generated by construction equipment, the location and sensitivity of nearby land uses, and the timing and duration of the noise-generating activities. For environmental impact analysis purposes, a potential construction equipment list for each phase of project construction was developed. It is expected that the overall noise levels during the construction period would be elevated temporarily and intermittently over that of the existing ambient noise levels. Although Caltrans has standard specification limits for construction noise levels, the more stringent City of Los Angeles noise ordinance is used for assessing construction noise impacts for this project.

Build Alternative 1

Construction of the proposed Build Alternative 1 is anticipated to occur over an approximate 30-month period. Normally, construction noise differs with various construction activities, and each type of construction activity has its own noise characteristics based on the mix of construction equipment in use. As shown in Table 3.13-6, the highest construction noise levels for this project would be expected to be generated during Phases 2 and 3, involving bridge substructure and bridge superstructure construction activities. The noise levels are expected to be highest during these two construction phases primarily due to the noisier equipment fleet, such as impact pile drivers, and more pieces of equipment that would be operating at the same time.

Table 3.13-6 presents the noise level of individual equipment and the overall noise level for each of the construction activities predicted at various distances from the center of the construction activity for Build Alternative 1. In computing the L_{eq} for equipment noise, it was assumed that the equipment would be operating at, or near, maximum sound levels 30 percent of the time during operation. All construction activities were assumed to be occurring daily during daytime hours that are not restricted by City and County noise ordinances, except Sundays and holidays. It was assumed that no construction activity would occur on Sundays and holidays.

**Table 3.13-6
Estimated Construction Noise Levels for Build Alternative 1**

Construction Activity Equipment	Number of Equipment Vehicles	Sound Level (L _{max}) at 50 ft (15 m), dBA	Effective Usage Factor ¹	L _{eq} (h) at 50 ft (15 m), dBA	L _{eq} (h) at 100 ft (30 m), dBA	L _{eq} (h) at 175 ft (53 m), dBA
CONSTRUCTION PHASE 1						
Building Demolition						
Front End Loader	3	85	0.11	76	69	65
Backhoe	2	74	0.08	63	57	52
Hydraulic Hammer	2	90	0.08	79	73	68
Air Compressor	1	66	0.15	58	52	47
Dump Truck	4	71	0.15	63	57	52
Overall L_{eq} =				81	75	70
Street Demolition						
Front End Loader	1	85	0.11	76	69	65
Backhoe	2	74	0.23	68	62	57
Hydraulic Hammer	1	88	0.11	79	72	68
Air Compressor	1	66	0.11	57	50	46
Pavement Breaker	2	82	0.23	76	70	65
Dump Truck	3	71	0.34	66	60	55
Overall L_{eq} =				82	76	71
CONSTRUCTION PHASES 2 AND 3						
Bridge Substructure (Phase 2) and Bridge Superstructure (Phase 3)						
Hydraulic Excavator	1	83	0.15	75	69	64
Roller	1	76	0.23	70	64	59
Crane (40 ton)	1	75	0.11	66	59	55
Impact Piling Hammer	1	101	0.15	93	87	82
Air Compressor	1	66	0.15	58	52	47
Drill Rig and Auger	1	80	0.23	74	68	63
Concrete Pump (small)	1	75	0.23	69	63	58
Gas Engineer Vibrator	2	81	0.45	78	72	67
Chain Saw	1	75	0.08	64	58	53
Backhoe	1	83	0.15	75	69	64
Truck Crane (150 ton)	1	83	0.08	72	66	61
Dump Truck	1	80	0.11	71	64	60
Overall L_{eq} =				93	87	82
CONSTRUCTION PHASE 4						
Demolition of Northern Side of Bridge for Widening						
Backhoe	1	74	0.15	66	60	55
Flatbed Truck	1	73	0.08	62	56	51
Concrete Saw	1	83	0.08	72	66	61
Hydraulic Hammer	1	90	0.15	82	76	71
Dump Truck	2	71	0.15	63	57	52
Front End Loader	2	76	0.23	70	64	59
Overall L_{eq} =				83	77	72
CONSTRUCTION PHASE 5						
South Bridge Railing						
Asphalt Paver	1	84	0.04	70	64	59
Tandem Roller (10 tons)	1	76	0.04	62	56	51
Roller (Pneumatic Wheel)	1	76	0.04	62	56	51
Curb Paver	1	89	0.04	75	69	64
Crane (25 tons)	1	75	0.04	61	55	50
Overall L_{eq} =				76	70	65
¹ Effective usage factor is a result of the fraction of time that a piece of equipment operates at its noisiest mode multiplied by the total number of pieces of equipment.						

Source: Parsons, 2004d.

In computing the L_{eq} for equipment noise, it was assumed that the equipment would be operating at, or near, maximum sound levels 30 percent of the time during operation, except for the impact driver, for which 10 percent was assumed. All construction activities were assumed to be occurring daily during daytime hours that are not restricted by City and County noise ordinances. It was assumed that no construction activity would occur on Sundays and holidays. If it became necessary to operate outside of the listed hours due to scheduling constraints, a variance would be required to be approved by the City.

Overall noise levels for Build Alternative 1 at a 50-ft (15-m) distance from construction activities would range between 76 and 93 dBA, as shown in Table 3.13-6. Table 3.13-7 summarizes the noise levels that can be expected at various receptor sites during different independent construction phases and periods with overlapping phases for Build Alternative 1.

**Table 3.13-7
Summary of Construction Noise Levels at Receptor Sites –
Build Alternative 1**

Receptor Site	Construction Noise Levels for Various Phases, L_{eq} , dBA				
	Phase 1	Phases 2 and 3	Phase 4	Phase 5	Phases 4 and 5
R1 – Temple	82	68	71	73	75
R2 – J.R. Newberry Building	74	70	78	92	92
R3B – Pickle Works Building	86	76	85	79	86
R4 – Elderly Housing	79	67	57	60	62
R5 – Aliso Village Hope Resource Center	82	67	57	59	61
R6 – Children’s Center	71	65	55	58	60
R7 – Youth Center	86	65	55	60	61
R8B – Hispanic Urban Center	86	73	73	74	77

*Bold values indicate exceedance of City’s construction noise limit.

Source: Parsons, 2004d.

Build Alternative 2

Construction of the proposed Build Alternative 2 is anticipated to occur over an approximate 39-month period. Table 3.13-8 presents the noise levels of individual equipment and the overall noise level for each of the construction activities at various distances from the center of the construction activity for Build Alternative 2. Overall noise levels for Build Alternative 2 at a 50-ft (15-m) distance from construction activities, as shown in Table 3.13-8, would range between 76 and 91 dBA, with the highest noise levels occurring when impact piling activity is taking place. Table 3.13-9 summarizes the

noise levels that can be expected at various receptor sites during different independent construction phases and periods with overlapping phases for Build Alternative 2.

**Table 3.13-8
Estimated Construction Noise Levels for Build Alternative 2**

Construction Activity Equipment	Number of Equipment Vehicles	Sound Level (L _{max}) at 50 ft (15 m), dBA	Effective Usage Factor ¹	L _{eq} (h) at 50 ft (15 m), dBA	L _{eq} (h) at 100 ft (30 m), dBA	L _{eq} (h) at 200 ft (61 m), dBA
CONSTRUCTION PHASE 1						
Building Demolition						
Front End Loader	3	85	0.34	80	74	68
Backhoe	3	74	0.23	68	62	55
Hydraulic Hammer	3	90	0.23	84	78	71
Dump Truck	4	71	0.30	66	60	54
Overall L_{eq} =				85	79	73
Street Demolition						
Front End Loader	1	85	0.15	77	71	65
Backhoe	2	74	0.30	69	63	57
Jack Hammer	1	88	0.15	80	74	68
Air Compressor	1	66	0.23	60	54	47
Pavement Breaker	2	82	0.45	79	73	66
Dump Truck	3	71	0.56	69	62	56
Overall L_{eq} =				84	78	72
CONSTRUCTION PHASE 2						
New Parallel Bridge Construction						
Hydraulic Excavator	1	83	0.19	76	70	64
Roller	1	76	0.23	70	64	57
Crane (40 ton)	1	75	0.15	67	61	55
Impact Piling Hammer	1	101	0.08	90	84	78
Air Compressor	1	66	0.15	58	52	46
Drill Rig and Auger	1	80	0.23	74	68	61
Concrete Pump (small)	1	75	0.23	69	63	56
Gas Engineer Vibrator	2	81	0.45	78	72	65
Chain Saw	1	75	0.11	66	59	53
Backhoe	1	83	0.15	75	69	63
Truck Crane (150 ton)	1	83	0.11	74	67	61
Dump Truck	1	80	0.15	72	66	60
Overall L_{eq} =				91	85	79
CONSTRUCTION PHASE 3						
Street Improvements						
Asphalt Paver	1	84	0.04	70	64	58
Tandem Roller (10 tons)	1	76	0.04	62	56	50
Roller (Pneumatic Wheel)	1	76	0.04	62	56	50
Curb Paver	1	89	0.04	75	69	63
Crane (25 tons)	1	75	0.04	61	55	49
Overall L_{eq} =				76	70	64
¹ Effective usage factor is a result of the fraction of time that a piece of equipment operates at its noisiest mode multiplied by the total number of pieces of equipment.						

Source: Parsons, 2004d.

**Table 3.13-9
Summary of Construction Noise Levels at Receptor Sites –
Build Alternative 2**

Receptor Site	Construction Noise Levels for Various Phases, L _{eq} , dBA				
	Phase 1	Phase 2	Phases 1 and 2	Phase 3	Phases 2 and 3
R1 – Temple	84	66	84	63	74
R2 – J.R. Newberry Building	76	68	77	82	85
R3B – Pickle Works Building	88	74	84	69	87
R4 – Elderly Housing	81	65	81	50	60
R5 – Aliso Village Hope Resource Center	84	65	84	49	60
R6 – Children’s Center	73	63	72	48	59
R7 – Youth Center	88	63	88	50	58
R8B – Hispanic Urban Center	88	71	89	64	77

*Bold values indicate exceedance of City’s construction noise limit.

Source: Parsons, 2004d.

3.13.3.2 Construction Vibration Impacts

Construction activity can result in varying degrees of ground vibration, depending on the equipment and methods employed. Operation of construction equipment causes ground vibrations that diminish in strength with distance. Construction vibration varies greatly depending on the construction phases, type and condition of equipment used, and layout of the construction site.

Construction vibration levels are governed primarily by the heaviest pieces of equipment, such as impact pile drivers and pavement breakers. Table 3.13-10 lists the various types of construction equipment anticipated for this project and typical vibration levels of the equipment at various distances in peak particle velocity (PPV) levels. Since the construction equipment is mobile, the intensities of vibration perceived would vary greatly depending on the spatial relationship between the source and the receiver. The worst vibration impacts would generally occur during street demolition and viaduct foundation construction activities involving pavement breakers and pile drivers, respectively.

**Table 3.13-10
Typical Construction Equipment Vibration Levels**

Construction Equipment	Peak Particle Velocity at Distance, PPV (inch/second)				
	25 ft (8 m)	50 ft (15 m)	75 ft (23 m)	200 ft (61 m)	350 ft (107 m)
Concrete Pump	0.05	0.018	0.010	0.002	0.001
Crane	0.05	0.018	0.010	0.002	0.001
Excavator	0.107	0.038	0.021	0.005	0.002
Front End Loader	0.03	0.011	0.006	0.001	0.001
Impact Pile Driver	1.518	0.537	0.292	0.067	0.029
Pavement Breaker	0.622	0.22	0.120	0.028	0.012
Soil Auger	0.05	0.018	0.010	0.002	0.001

Source: Parsons, 2004d.

Vibration from different construction equipment is normally measured in close proximity to the equipment. Using these measured levels and a soil transfer function, vibration can be predicted at different distances from the construction equipment, as shown in Table 3.13-10.

The Federal Railroad Administration (FRA) provides ground-borne vibration impact criteria for various types of building uses. FRA provides a vibration damage threshold criterion of 0.50-inch/second PPV for fragile buildings and 0.12-inch/second PPV for extremely fragile historic buildings for typical construction equipment (USDOT, 1998). FRA recommends these criteria to be used as a damage threshold for the fragile structures located near the ROW of a transit project.

With the current estimated construction equipment list, the high vibration levels would be caused by the impact pile driver, which would be operational during Phase 2 of the construction (substructure construction). The Pickle Works building, located on the north side of the viaduct, would be the closest receptor to the pile-driving site at a distance of approximately 350 ft (107 m). The predicted vibration level at the closest façade of this building is approximately 0.028 inch/second PPV, which would be below the FRA vibration criterion for “extremely fragile historic buildings.” Therefore, construction vibration is not expected to occur even during impact piling activity, which would generate the highest vibration level among the various pieces of equipment during construction. In addition, the Pickle Works building has undergone seismic retrofitting; thus, damage to the building structure from a short-term vibration impact as a result of pile driving activities is not anticipated.

Besides the impact pile driver, operation of the pavement breakers during the street demolition activity would generate high vibration levels. During this equipment operation, the closest building structure would be the Buddhist Temple, which is approximately 75 ft (23 m) from the edge of the roadway. At this distance, the vibration level caused by the pavement breaker could be as high as 0.12-inch/second PPV. This level would be below the FRA vibration damage threshold criteria of 0.50-inch/second for a fragile building; therefore, no property damage is expected.

3.13.4 Avoidance, Minimization, and Compensation Measures

3.13.4.1 Traffic Noise Abatement

Among the exterior-impacted receptor sites within the project area, two receptor locations have an outdoor frequent human use area where lowered noise levels would be of benefit – the Los Angeles Hompa Hongwanji Betsuin Buddhist Temple (Receptor R1) and the Boyle Heights Youth Center (Receptor R7). Other exterior-impacted receptor sites (Receptors R2 through R6, and R8 through R10) do not have outdoor areas of frequent human use where lowered noise levels would be of benefit. Therefore, soundwalls were not considered as a means of abatement at those locations. For these reasons, no noise exterior abatement measures were considered or required at the sites represented by Receptors R2 through R6, and R8 through R10.

As for interior noise levels for the typical buildings located adjacent to 1st Street, using published FHWA guidelines for building noise reduction factors, it is estimated that the building structure would provide an indoor-outdoor attenuation factor of approximately 25 dB if the windows are closed. Therefore, noise impacts inside these buildings are not anticipated. In addition, according to Caltrans Protocol, the post-project exterior noise levels at these sites would not exceed 75 dBA; hence, they do not qualify for “unusual and extraordinary” noise abatement strategies such as noise insulation.

A barrier analysis was conducted to assess the feasibility and reasonableness of the considered abatement measures for Receptors R1 and R7. All required barrier heights and locations given would provide at least a 5-dB attenuation.

The determination of “reasonableness” of the barriers, which is based on cost and number of benefited residences, was assessed and is subject to change based on the final project design. In addition, the views of the public and whether these barriers are practical to construct, given the location of the receptors and the barriers, would be taken into consideration.

Table 3.13-11 presents the results of the barrier analysis. Soundwall SW-1 would be 10 ft (3 m) high and would be located along the property line of the temple. Soundwall SW-2 would be 8 ft (2.4 m) high and would be located on the property line of the Boyle Heights Youth Center. Both barriers would achieve the required 5-dB attenuation and bring the peak-hour noise levels below 65 dBA. The barrier heights of each wall would break the line-of-sight from each receptor to 11.5-ft-high (3.5-m-high) truck exhaust stacks on the roadway, as required by the Caltrans protocol. These heights were calculated using the LOSPC Version 1.353 software included in the SOUND 2000 software package (Caltrans, 2003a).

Using Caltrans guidelines, the reasonable allowances for soundwalls SW-1 and SW-2 are determined to be \$33,000 and \$35,000, respectively. Each wall would benefit one “frontage unit” as defined in the Caltrans Protocol. The total reasonable allowance for abatement for both barriers is \$68,000.

**Table 3.13-11
Summary of Barrier Analysis**

Site No.	Predicted Peak-House Noise Levels ¹													Barrier No.
	Without Barrier	With Barrier 6 ft (1.8 m)		With Barrier 8 ft (2.4 m)		With Barrier 10 ft (3.0 m)		With Barrier 12 ft (3.7 m)		With Barrier 14 ft (4.3 m)		With Barrier 16 ft (4.9 m)		
	L _{eq(h)}	L _{eq(h)}	I.L.	L _{eq(h)}	I.L.	L _{eq(h)}	I.L.	L _{eq(h)}	I.L.	L _{eq(h)}	I.L.	L _{eq(h)}	I.L.	
R1	71	65	6	64	7	63 ^{R,T}	8	62	9	61	10	61	10	SW-1
R7	72	66	6	63 ^{R,T}	9	60	12	59	13	57	15	56	16	SW-2

¹ All noise levels are expressed in hourly L_{eq}, dBA.
 I.L. – Insertion Loss.
 T – Minimum barrier height required to break the line-of-sight to an 11.5-ft-high (3.5-m-high) truck stack.
 R – Required height based on Caltrans *Traffic Noise Analysis Protocol*.

Source: Parsons, 2004d.

Based on the above analysis, if deemed appropriate by the City and Caltrans, the following abatement measure would be implemented:

3.13-1: If deemed reasonable and acceptable, installation of sound barriers at two locations: the 10-ft-high (3-m-high) soundwall (SW-1) would be located along the property line of the temple, and the 8-ft-high (2.4-m-high) soundwall (SW-2) would be located on the property line of the Boyle Heights Youth Center.

3.13.4.2 Construction Noise Minimization Measures

Noise impacts are expected to occur during the construction period. The City’s noise ordinance and standard specifications for public works construction identify several measures designed to minimize noise impacts. Among these measures are the following,

which would be implemented to minimize noise impacts during project construction of either build alternative.

- 3.13-2: Require the contractor to comply with all appropriate provisions of the City Noise Ordinances including, but not limited to, the restrictions on hours of construction and mechanical equipment noise levels.
- 3.13-3: Require the contractor to utilize construction methods or equipment that would generate the lowest noise level.
- 3.13-4: Require the contractor to use noise-attenuating jackets around pavement breakers and hydraulic hammers.
- 3.13-5: Require the contractor to schedule construction such that the absolute minimum number of pieces of equipment would be operating at the same time in the same vicinity whenever possible to reduce the number of concurrent noise sources.
- 3.13-6: Require the contractor to schedule the duration and timing of construction activities to minimize noise impacts on exposed individuals.
- 3.13-7: Require the contractor to keep area residents and businesses informed of the schedule, duration, and progress of the construction, to minimize public objections of unavoidable noise. The contractor shall notify communities in advance of the construction and of the expected noise impacts during the construction period.

3.14 Energy

This section assesses the potential impacts to energy resources, including fossil fuels, that would be expected to result from implementation of the project alternatives.

3.14.1 Affected Environment

Southern California has had the benefit of sufficient energy supplies to serve the rapid growth that has taken place over the past 50 years. Much of the energy consumed in the region is for residential, commercial, and transportation purposes. The California Energy Commission (CEC) tracks and forecasts energy use according to CEC Forecast Regions. In southern California, the CEC's Los Angeles Forecast Region includes the counties of Imperial, Los Angeles, Orange, Riverside, San Bernardino, and Ventura (CEC, 1999). Transportation energy for motor vehicles is primarily provided by direct combustion of