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**Noise and Vibration**

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## 12 Noise and Vibration

This chapter considers the effects of changes in noise on areas within and surrounding the Project Area that would result from implementation of the Cornfield Arroyo Seco Specific Plan and Redevelopment Plan (Proposed Alternative). Initial noise impacts would arise from demolition and construction, although these effects would be temporary. Permanent changes to the noise climate could result from the new land use development that would result from the implementation of the Proposed Alternative.

Table 12-1 provides an explanation of the acoustical terminology used within this chapter.

**Table 12-1: Acoustical Terminology**

Term	Definition	
Decibels on the A scale (dBA)	The unit generally used for measuring environmental, traffic, or industrial noise is the A-weighted sound pressure level in decibels, denoted dBA. An A-weighting network can be built into a sound-level measuring instrument so that sound levels in dBA can be read directly from a meter. The weighting is based on the frequency response of the human ear and has been found to correlate well with human subjective reactions to various sounds. It is worth noting that an increase or decrease of approximately 10 dB corresponds to a subjective doubling or halving of the loudness of a noise, and a change of 2 to 3 dB is subjectively barely perceptible.	
Equivalent continuous sound level (L <sub>eq</sub> )	An index for assessment for overall noise exposure is the equivalent continuous sound level, L <sub>eq</sub> . This is a notional steady level that would, over a given period of time, deliver the same sound energy as the actual time-varying sound over the same period. Hence, fluctuating levels can be described in terms of a single figure level.	
Day-night average sound level (L <sub>dn</sub> )	The day-night average sound level, L <sub>dn</sub> , describes a receptor's cumulative noise exposure from all events over a full 24 hours, with events between 10 p.m. and 7 a.m. increased by 10 dB to account for greater nighttime sensitivity to noise.	
Community noise equivalent level (CNEL)	The community noise equivalent level, CNEL, describes a receptor's cumulative noise exposure from all events over a full 24 hours, with events between 7 p.m. and 10 p.m. increased by 5 dB, and 10 p.m. and 7 a.m. increased by 10 dB, to account for greater nighttime sensitivity to noise.	
Typical noise levels	Noise Level dBA	Example
	130	Threshold of pain
	120	Jet aircraft takeoff at 300 feet
	110	Chainsaw at 3 feet
	100	Inside disco
	90	Heavy trucks at 15 feet
	80	Sidewalk of busy street
	70	Loud radio (in typical residential unit)
	60	Office or restaurant
	50	Residential unit heater at 3 feet
	40	Living room
	30	Theatre
	20	Remote countryside on still night
	10	Sound insulated test chamber
	0	Threshold of hearing
Vibration	Vibration may be expressed in terms of displacement, velocity, and acceleration. Velocity and acceleration are most commonly used when assessing structure-borne noise or human comfort issues, respectively. Vibration amplitude may be quantified as a peak value, or as a root mean squared (rms) value. Vibration amplitude can be expressed as an engineering unit, peak particle velocity (PPV), or as a ratio on a logarithmic scale. The PPV is defined as the maximum instantaneous positive or negative peak of the vibration signal. PPV is often used in monitoring of blasting and building construction vibration since it is related to the stresses that are experienced by buildings.	

Source: Arup North America Ltd., 2011.

## 12.1 Existing Conditions

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### 12.1.1 Environmental Setting

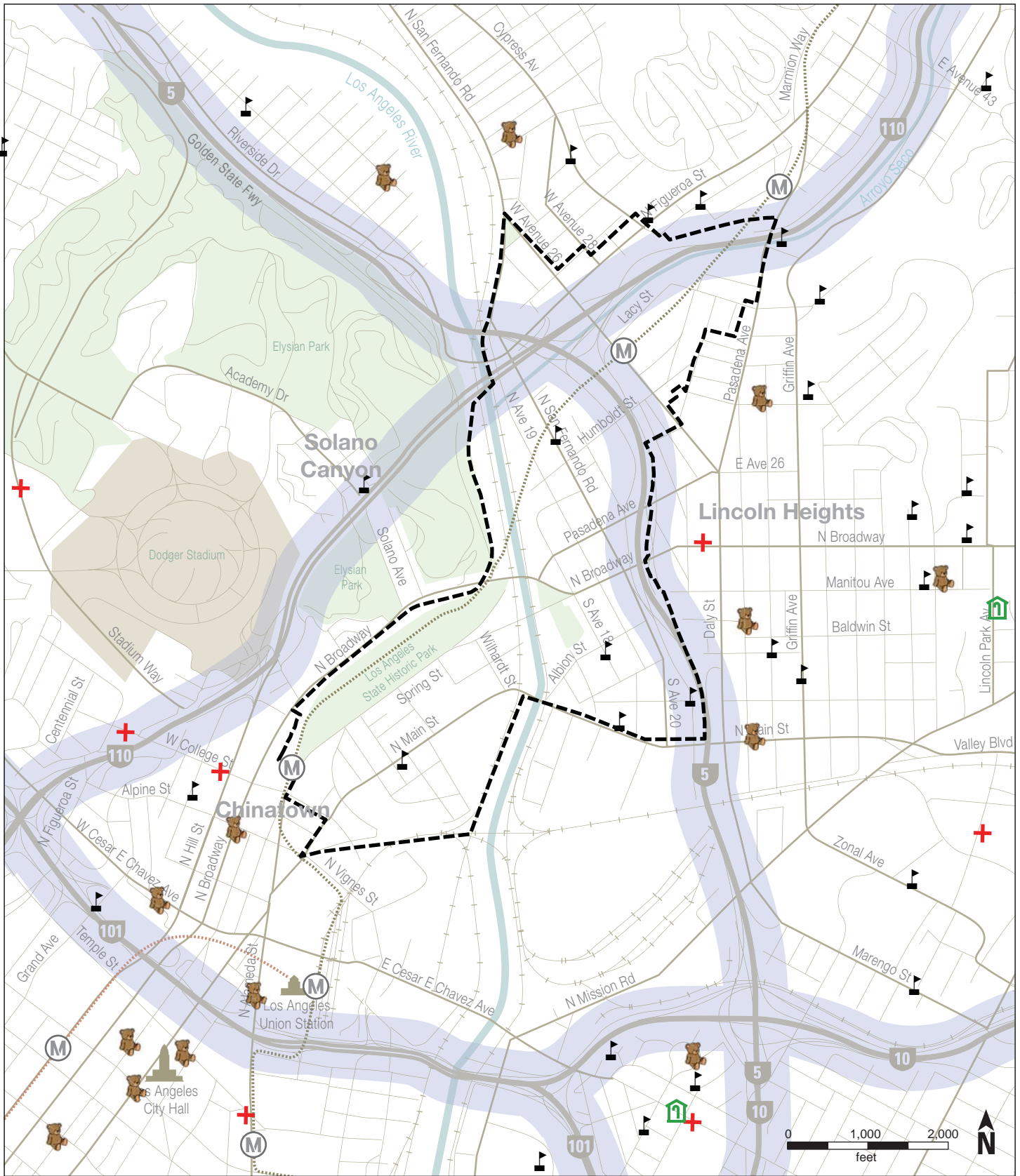
The Project Area is located within Los Angeles City Council District 1. Land use in the Project Area is currently 58 percent industrial, 27 percent residential, and 13 percent commercial, with the remaining area comprising other uses.

The Project Area is adjacent to the Los Angeles County Metropolitan Transportation Authority (Metro) Railyard and the neighborhoods of Lincoln Heights, Chinatown, and Solano Canyon. Lincoln Heights predominantly contains single-family homes with retail along North Broadway and a small number of multifamily apartments. Chinatown comprises a mix of retail, multifamily apartments, and community facilities, with retail uses predominating along Broadway and Hill Street. Solano Canyon primarily contains detached homes separated from the Project Area and North Broadway by a small number of retail establishments.

Major noise sources within and surrounding the Project Area include vehicular road traffic noise and freight and passenger rail. The main traffic routes include the Golden State Freeway/Interstate Highway 5 (I-5) and the Pasadena Freeway/State Route 110 (SR 110). I-5 runs north-south through the eastern side of the Project Area, with entrances and exits at North Broadway, Pasadena Avenue, and West Avenue 26 near Lacy Street. SR 110 runs east-west through the northern part of the Project Area. Freeway entrances and exits to and from SR 110 are located at the northern perimeter of the Project Area, as well as connections to the I-5.

The Metro Gold Line cuts across the northern portion of the Project Area, and Metrolink regional passenger service and freight rail services run through the Project Area on either side of the Los Angeles River. In addition to the Metro Gold Line, the Project Area is also served by 11 bus routes, with bus connectivity to the heart of the site along Main Street and North Broadway.

There are a number of noise sensitive receptors within and surrounding the Project Area, including schools, medical facilities, and retirement facilities. The noise sensitive receptors within and surrounding the Project Area are depicted on Figure 12-1.



**Legend**

-  Old Age / Retirement Facility
-  Medical Facility
-  School
-  Day Care
-  300 foot Buffer from Freeway
-  Project Area Boundary
-  Metro Line and Station

**Sources**

City of Los Angeles, 2011; Arup, 2011.

**Figure 12-1**  
**Location of Sensitive Receptors**  
**in the Vicinity of the Site**

Cornfield Arroyo Seco Specific Plan and  
 Redevelopment Plan Draft EIR  
 June 13, 2011

12.1.1 Airborne Noise

Noise measurements were made to determine the existing noise environment in and around the site. The noise measurements consisted of attended spot measurements and long-term monitoring. The attended spot measurements were made over 15-minute sampling periods between 7:00 am and 5:00 pm to capture peak and off-peak noise conditions.

The long-term noise monitor was on the site for four days, and was configured to log a noise measurement after every 15 minutes of sampling. Figure 12-2 shows the noise measurement locations. Appendix 12A details the results of the noise survey. Appendix 12B provides a list of instruments used during the noise survey.

The 24-hour day-night sound level ( $L_{dn}$ ) has been calculated for the long-term monitoring location, and the results from the spot noise measurements are given in terms of equivalent continuous noise level ( $L_{Aeq,15min}$ ). The results are in Tables 12-2 and 12-3.

**Table 12-2: 24-Hour Day-Night Sound Level Results**

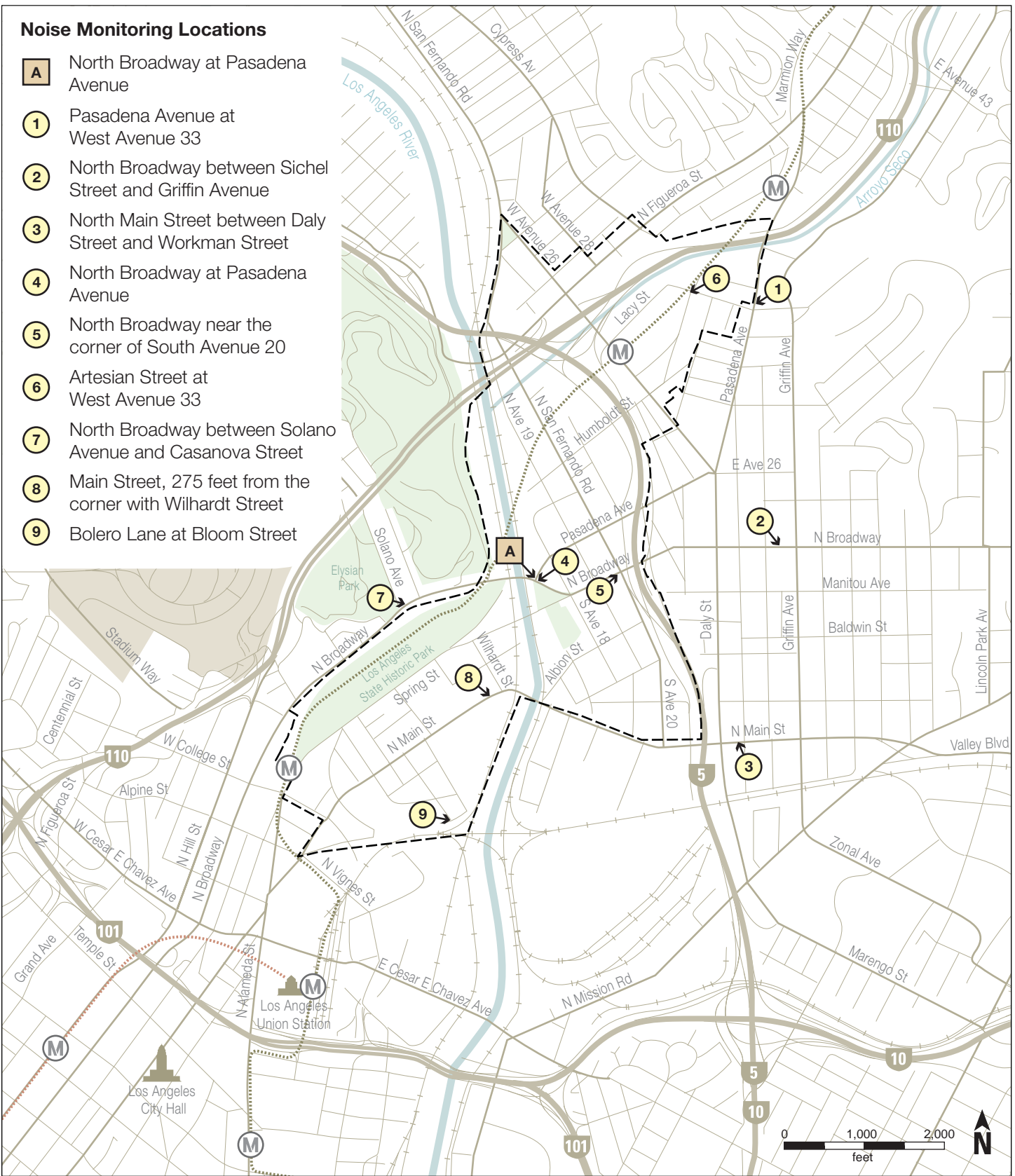
Long-Term Noise Monitor	Description of Location	24 Hour Day-Night Sound Level (dBL <sub>dn</sub> )
A	North Broadway at Pasadena Avenue, approximately 30 feet from the roadway. Measurement taken at 15 feet above grade.	71

Source: Arup North America Ltd., 2011.

Generally the predominant noise climate in and around the Project Area is dominated by traffic noise, with the exception of areas in close proximity to the Metro Railyard and the existing rail lines where rail and industrial noises are intermittently audible. The noisiest locations are close to the major roadways that run through the Project Area, such as Main Street, North Broadway, and San Fernando Road.

### Noise Monitoring Locations

- A** North Broadway at Pasadena Avenue
- 1** Pasadena Avenue at West Avenue 33
- 2** North Broadway between Sichel Street and Griffin Avenue
- 3** North Main Street between Daly Street and Workman Street
- 4** North Broadway at Pasadena Avenue
- 5** North Broadway near the corner of South Avenue 20
- 6** Artesian Street at West Avenue 33
- 7** North Broadway between Solano Avenue and Casanova Street
- 8** Main Street, 275 feet from the corner with Wilhardt Street
- 9** Bolero Lane at Bloom Street



### Legend

- Noise Monitoring Locations**
- A** Long Term Location
- #** Spot Location
- - -** Project Area Boundary
- M** Metro Line and Station

### Source

Arup, 2011.

**Figure 12-2**  
**Noise Monitoring Locations**

Cornfield Arroyo Seco Specific Plan and  
Redevelopment Plan Draft EIR  
April 18, 2011

**Table 12-3: Measured Noise Levels at Selected Locations**

Spot Measurement Location Number	Measurement Location	Dominant Sources of Noise	dBL <sub>Aeq, 15min</sub>
1	Pasadena Avenue at West Avenue 33	Pasadena Avenue	70
2	North Broadway between Sichel Street and Griffin Avenue	North Broadway	69
3	North Main Street between Daly Street and Workman Street	North Main Street and I-5	68
4	North Broadway at Pasadena Avenue	North Broadway and Pasadena Avenue	69
5	North Broadway near the corner of South Avenue 20	North Broadway	70
6	Artesian Street at West Avenue 33	Railway and Industrial	71
7	North Broadway between Solano Avenue and Casanova Street	North Broadway	73
8	Main Street, 275 feet from the corner with Wilhardt Street	Main Street	72
9	Bolero Lane at Bloom Street	Railway and Industrial	64

Source: Arup North America Ltd., 2011.

The Project Area is not within an airport noise exposure contour of 65dB when measured on the community noise equivalent level scale (65dB CNEL) or greater. Therefore, in accordance with the noise and vibration goals of the City of Los Angeles General Plan (General Plan), impact assessment of airport noise to the land use changes that would occur as a result of the implementation of the Proposed Alternative is not required.



### 12.1.2 Groundborne Vibration

Groundborne vibration from the Metro Gold Line and the Metrolink regional passenger service railroad and the freight railroad alignment are the major sources of groundborne vibration within the Project Area. Groundborne vibration from vehicular traffic rarely causes a disturbance within buildings located in urban environments unless the pavement surface is uneven, or the receptor is highly sensitive (e.g., a scientific research establishment) to groundborne vibration.

An increase in the frequency of railroad schedule is not expected due to implementation of the Proposed Alternative. Therefore, groundborne vibration levels at existing sensitive receptors are not expected to increase as a result of implementation of the Proposed Alternative. Assessment of groundborne vibration to existing sensitive receptors will not result in impacts. Therefore, impact assessment of groundborne vibration to existing sensitive receptors has not been undertaken as it is not appropriate for analysis in this Draft Environmental Impact Report (EIR).

The proposed alignment for California High Speed rail is through the Project Area. California High Speed Rail is not part of this Proposed Alternative; it is part of a statewide plan to provide a high-speed train railroad in California. Therefore, the potential impact that may result from implementation of California High Speed Rail is not within the scope of this Draft EIR, and is not further discussed in this chapter.

### 12.1.3 Regulatory Setting

#### 12.1.3.1 Federal Transit Administration

Provided below are groundborne vibration criteria established by the Federal Transit Administration (FTA) that should be applied when assessment of measured groundborne vibration levels is undertaken at vibration sensitive receptors. The criteria should be used unless superseded at the time of assessment by an equivalent applicable federal, State, or City of Los Angeles threshold.

There are no State or City of Los Angeles criteria for acceptable levels of vibration in buildings that result from external sources of groundborne vibration. The next appropriate source of acoustical criteria is the FTA. The FTA provides vibration targets based on land use type and daily frequency of train events (FTA, 2006). The targets that apply to the Project Area are in Table 12-4.

**Table 12-4: Federal Transit Administration Vibration Impact Criteria**

<b>Groundborne Vibration and Noise Impact Criteria for General Assessment</b>		
<b>Land Use Category</b>	<b>Groundborne Vibration Impact Levels (VdB re 1 micro-inch/sec)</b>	<b>Groundborne Vibration Impact Levels (dB re 20 micro-Pascal)</b>
	<b>Frequent Events<sup>1</sup></b>	<b>Frequent Events<sup>1</sup></b>
<b>Category 1:</b> Buildings where vibration would interfere with interior operations (e.g., buildings for the performing arts, laboratories that house equipment sensitive to vibration)	65 VdB	N/A
<b>Category 2:</b> Residences and buildings where people normally sleep	72 VdB	35 dBA
<b>Category 3:</b> Institutional land uses with primarily daytime use	75 VdB	40 dBA

Note:

“Frequent Events” is defined as more than 70 vibration events of the same source per day. Most rapid transit projects fall in this category.

Source: Transit Noise and Vibration Impact Assessment (FTA, 2006).

12.1.1.3.2 State of California Regulations

The following regulations from the California Building Standards Code (California Code of Regulations [CCR] Title 24, Part 2, Chapter 12) form the basis of the acoustical criteria and goals applicable to the Project Area:

- 1208A.8.2 Allowable Interior Noise: Interior noise levels attributable to exterior sources shall not exceed 45 decibels in any habitable room. The noise metric shall be either the  $L_{dn}$  or the community noise equivalent level (CNEL), consistent with the Noise Element of the local General Plan.<sup>1</sup>

*Note:  $L_{dn}$  is the preferred metric for implementing these standards*

- 1208A.8.4 Other Noise Source: Residential structures to be located where the  $L_{dn}$  CNEL exceeds 60 decibels shall require an acoustical analysis showing that the proposed design would limit exterior noise to the prescribed allowable interior level. The Noise Element of the local General Plan shall be used to the greatest extent possible to identify sites with noise levels potentially greater than 60 decibels.
- 1208A.8.5 Compliance: If interior allowable noise levels are met by requiring that windows be unopenable or closed, the design for the structure must also specify a ventilation or air-conditioning system to provide a habitable interior environment. The ventilation system must not compromise the dwelling unit or guest room noise reduction.

<sup>1</sup>  $L_{dn}$  and CNEL are stated in dBA.

### 12.1.3.3 City of Los Angeles Regulations

#### **City of Los Angeles Municipal Code**

The City of Los Angeles Municipal Code has noise ordinances to monitor and regulate noise. The relevant applicable clauses are reproduced below:

- Section 111.02. Sound level measurement procedure and criteria:
  - b. Where the sound alleged to be offending is of a type or character set forth below, the following values shall be added to the sound level measurement of the offending noise:
    1. Except for noise emanating from any electrical transformer or gas metering and pressure control equipment existing and installed prior to the effective date of the ordinance enacting this chapter, any steady tone with audible fundamental frequency or overtones have 200 Hz, +5dB.
    2. Repeated impulsive noise, +5dB.
    3. Noise occurring more than 5 but less than 15 minutes in any period of 60 consecutive minutes between the hours of 7:00 a.m. and 10:00 p.m. of any day, -5dB.
    4. Noise occurring five 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, -5dB.
- Section 112.02. Air conditioning, refrigeration, heating, and pumping, and filtering equipment:
  - a. It shall be unlawful for any person, within any zone of the City of Los Angeles to operate any air conditioning, refrigeration or heating equipment for any residence or other structure or to operate any pumping, filtering or heating equipment for any pool or reservoir 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 5dB.
- Section 41.40. Noise due to construction, excavation work – when prohibited:
  - a. No person shall, between the hours of 9:00 P.M. and 7:00 A.M. of the following day, perform any construction or repair work of any kind upon, or any excavating for, any building or structure, where any of the foregoing entails the use of any power driven drill, riveting machine excavator or any other machine, tool, device or equipment which makes loud noises to the disturbance of persons occupying sleeping quarters in any dwelling hotel or apartment or other place of residence. In addition, the operation, repair or servicing of construction equipment and the job-site delivering of construction materials in such areas shall be prohibited during the hours herein specified. Any person who knowingly and willfully violates the foregoing provision shall be deemed guilty of a misdemeanor punishable as elsewhere provided in this Code. (Amended by Ordinance No. 158,587, Eff. 1/29/84.)

**City of Los Angeles General Plan Policy Applicable to Noise and Vibration**

The Noise Element of the General Plan contains compatibility guidelines for community noise environments, and also states applicable goals and polices that should be met. The relevant applicable clauses are set forth in Table 12-5 and Table 12-6.

**Table 12-5: City of Los Angeles General Plan Objectives and Policies for Noise**

	Description
Objective 1	(Airports and Harbor): Reduce airport and harbor related noise impacts.
Policy 1.1	Incompatibility of airports declared by Los Angeles County to be “noise problem airports” (LAX, Van Nuys and Burbank) and land uses shall be reduced to achieve zero incompatible uses within a CNEL of 65 dB airport noise exposure area, as required by the California Department of Transportation pursuant to the California Code of Regulations Title 21, Section 5000, et seq., or any amendment thereto.
Objective 2	(Nonairport): Reduce or eliminate nonairport related intrusive noise, especially relative to noise sensitive uses.
Policy 2.2	Enforce and/or implement applicable city, state, and federal regulations intended to mitigate proposed noise producing activities, reduce intrusive noise, and alleviate noise that is deemed a public nuisance.
Objective 3	(Land Use Development): Reduce or eliminate noise impacts associated with proposed development of land and changes in land use.
Policy 3.1	Develop land use policies and programs that will reduce or eliminate potential and existing noise impacts.

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

**Table 12-6: Guidelines for Community Noise Exposure**

Land Use Category	Day/Night Average 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 any buildings 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 should be discouraged. A detailed analysis of noise reduction requirements must be made and noise insulation features included in the design of a project.

**U = Clearly Unacceptable** – New construction or development generally should not be undertaken.

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

## 12.2 Standards of Significance

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The criteria for determining the significant impacts associated with noise and vibration have been developed based upon establishing which criteria contained in the various City of Los Angeles requirements relate to compliance with the California Environmental Quality Act (CEQA). These are primarily based on the City of Los Angeles CEQA Thresholds. For purposes of this Draft EIR, an alternative may have a significant impact on noise if it would cause:

- Exterior noise levels that are above the upper value of normally acceptable category for various land uses, according to the Noise Element of the City of Los Angeles General Plan.
- Noise levels in habitable rooms of 45 dBL<sub>dn</sub> or higher.
- Exterior noise levels caused by construction within the Project Area that are in excess of the City of Los Angeles Municipal Code construction noise criteria.
- Noise from operation of property within the Project Area that exceeds the City of Los Angeles Municipal Code Standards.
- An increase in noise levels by 3 decibels or more within the “normally unacceptable” or “clearly unacceptable” categories, or any increase of 5 decibels or more.
- Construction activities would exceed the ambient noise level by 5 dBA at a noise sensitive use between the hours of 9:00 pm and 7:00 am Monday through Friday, before 8:00 am or after 6:00 pm on Saturday, or at any time on Sunday.

## 12.3 Potential Noise and Vibration Impacts

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This section begins with a description of assumptions that have been incorporated in the analysis of potential noise and vibration impacts. Then potentially significant noise and vibration impacts of implementing the Proposed Alternative when compared with the existing conditions in the Project Area are presented, followed by impacts of the Proposed Alternative that are considered to be less than significant. Impacts that are considered to be significant are accompanied by an explanation of why the application of a standard resulted in a determination that the impact would be significant. When a significant impact has been set forth, mitigation measures to address that potential impact are also presented, along with a determination of whether the impact will continue to be significant after implementation of the mitigation measure. The section concludes with a description of the potential impacts of the No Project Alternative.

### 12.3.1 Assumptions

#### 12.3.1.1 Operational Groundborne Vibration

Guidance from the Transit Noise and Vibration Impact Assessment (FTA, 2006) was used in the assessment of groundborne vibration to sensitive receptors in the Project Area. A screening level assessment of groundborne vibration in the Project Area has been undertaken.

The FTA guidance sets out methods for vibration impact assessment and impact significance criteria. The criteria are provided in terms of vibration velocity level, in decibels (VdB), referenced to 1 micro-inch per second (considered to be the threshold of human perception to vibration). The guidance includes three different levels of detail for groundborne vibration assessment:

- Screening assessment: A standard table of impact distances is used to determine if groundborne vibration from a project would affect sensitive land uses. More detailed analysis would be required if any sensitive land uses were within the screening distances.
- General assessment: This level of assessment builds on the screening assessment, adjusting for factors such as distance from rail track and structural properties of the sensitive receptor. The general level deals only with the overall VdB and dBA. It does not consider the frequency spectrum of the vibration or noise.
- Detailed assessment: This is the most complex assessment method, and is generally required only if vibration is considered to be a significant issue at the site.

Screening distances depend upon land use and the source of vibration. The FTA guidance used for screening distances associated with five different sources of transport-related vibration is shown in Table 12-7.

A screening assessment of groundborne vibration was used.

**Table–12-7: Federal Transit Administration Screening Distances for Vibration Assessment**

Type of Project	Critical Distance (in feet) for Land Use Categories* (Distance from Right-of-Way or Property Line)		
	Category 1	Category 2	Category 3
Conventional commuter railroad	600	200	120
Rail rapid transit	600	200	120
Light-rail transit	450	150	100
Intermediate-capacity transit	200	100	50
Bus projects	100	50	--

Notes:

Category 1: Performing arts buildings; buildings that house vibration-sensitive equipment (such as laboratories, hospitals, and institutions)

Category 2: Residential, hotels, and hospitals

Category 3: Schools, churches, and institutions that do not house vibration-sensitive equipment

Source: Transit Noise and Vibration Impact Assessment (FTA, 2006).

#### 12.3.1.2 Construction Noise

Construction noise impacts have been evaluated using the Federal Highway Administration (FHWA) reference noise levels for various construction equipment and activities (FHWA, 2006). Construction noise and vibration impacts have been determined using the guidance in the Transit Noise and Vibration Impact Assessment (FTA, 2006).

#### 12.3.1.3 Traffic Noise

The analysis of existing and future traffic noise levels is based upon noise measurements at the site and traffic noise predictions following the methodology in the Department of Housing and Urban Development (HUD) Noise Assessment Guidelines (HUD, 1991). Traffic volume data used for the noise analysis were taken from the transportation analysis presented in Chapter 4.

#### 12.3.1.4 Rail Noise

The Proposed Alternative does not include additional railroads or changes to schedules on exiting light-rail transit routes. As an increased frequency in rail schedules is not anticipated, an assessment of railway noise has not been performed.

#### 12.3.2 Potential Noise and Vibration Impacts of the Proposed Alternative

##### 12.3.2.1 Potentially Significant Noise and Vibration Impacts of the Proposed Alternative

**Impact Noise and Vibration 1: Changes to Land Use Districts that would result from the implementation of the Proposed Alternative would allow the development of noise-sensitive land uses in some areas with existing ambient noise levels in excess of Normally Acceptable, Conditionally Acceptable, or Clearly Unacceptable noise levels according to the City of Los Angeles' Guidelines for Noise Compatible Land Use. This potential impact is considered to be significant.**

Existing ambient noise levels throughout the Project Area are high, and are not predicted to change significantly with the implementation of the Proposed Alternative.

The California Building Code (CBC) requires that interior noise levels attributable to exterior sources shall not exceed 45 dBL<sub>dn</sub> in any residential unit or hotel guest room. The CBC also requires that an acoustical analysis be carried out that shows that the maximum interior limit is achieved where exterior noise levels are above 60 dBL<sub>dn</sub>. Because the noise measurements indicate that exterior noise levels would regularly be above 60 dBL<sub>dn</sub>, this potential impact is considered to be significant.

**Mitigation Measure Noise and Vibration 1a: Before the City grants planning approval for any residence, hospital, or nursing home on parcels of land adjacent to Spring Street, North Broadway, Main Street, San Fernando Road, I-5, or SR 110, the City of Los Angeles shall require developers to conduct a detailed acoustical analysis and submit it to the Department of City Planning or other appropriate department in the City of Los Angeles.**

- All exterior windows having a line of sight of a major or secondary highway shall be constructed with double-pane glass and use exterior wall construction, which provides a Sound Transmission Coefficient (STC) value of 50, as determined in accordance with the requirements of the American Society for Testing and Materials (ASTM) E90 and ASTM E413, or any amendment thereto.
- The applicant, as an alternative, may retain an acoustical engineer to submit evidence, along with the application for a building permit, identifying any alternative means of sound insulation sufficient to mitigate interior noise levels below a CNEL of 45 dBA in any habitable room.



**Additionally, the City of Los Angeles shall require that new residential developments incorporate best practice measures to minimize noise levels in exterior living spaces, including but not limited to**

- **Locating exterior living spaces away from busy roadways**
- **Incorporating noise-screening elements in the building design such as barrier walls, and/or locating exterior living spaces set back from the façade on higher levels**

**Mitigation Measure Noise and Vibration 1b: Before the City of Los Angeles grants planning approval for any commercial land use on parcels of land adjacent to North Broadway and Main Street, the City of Los Angeles shall require developers to conduct an acoustical analysis and submit it to the Department of City Planning or other appropriate department in the City of Los Angeles. Construction of buildings for commercial use on land that is exposed to noise levels above the City of Los Angeles' noise standard shall only be undertaken after a detailed analysis of the noise reduction requirement is made and needed noise insulation features are included in the design.**

**Mitigation Measure Noise and Vibration 1c: Before the City of Los Angeles grants planning approval for any public parks land use on parcels within the Project Area, the City of Los Angeles shall require developers to conduct an acoustical analysis and submit it to the Department of City Planning or other appropriate department in the City of Los Angeles. Public parks shall use grading, barrier walls, or setback distance to mitigate traffic noise from adjacent roads.**

**Mitigation Measure Noise and Vibration 1d: Before the City of Los Angeles grants planning approval for any school, library, or church land use on parcels of land within the Project Area, the City of Los Angeles shall require developers to conduct an acoustical analysis and submit it to the Department of City Planning or other appropriate department in the City of Los Angeles. Schools shall use grading, barrier walls, or setback distance to mitigate traffic noise from adjacent roads.**

**In addition to these mitigation measures, the following mitigation should be considered where applicable:**

- **Wall and floor-ceiling assemblies separating commercial tenant spaces, residential units, and public places, shall have an STC value of at least 50, as determined in accordance with ASTM E90 and ASTM E413.**

**Even with the implementation of these mitigation measures, this potential impact may remain significant and unavoidable in some cases.**

Achieving the 45 dBL<sub>dn</sub> interior noise standard for habitable rooms would require consideration of the acoustical design of buildings. Residential, hospital, or nursing home land uses on parcels of land adjacent to Spring Street, North Broadway, Main Street, San Fernando Road, I-5, or SR 110 would require acoustically insulating construction to mitigate external noise. Examples of acoustically insulating construction are masonry façade constructions, double-glazed windows, and doors fitted with acoustical seals.

The 45 dBL<sub>dn</sub> interior noise requirement must be achieved when rooms are ventilated. It would not be possible to naturally ventilate all residential units or hotel guest rooms using operable windows where exterior noise levels exceed 55 dBL<sub>dn</sub>. Suggested ventilation options to meet the internal noise requirement are provided in Table 12-8.

**Table 12-8: Suggested Residential Ventilation Methods**

External Noise Level (dBL <sub>dn</sub> )	Suggested Ventilation Method
Greater than 65	Sealed façade and mechanical ventilation
55 to 65	Sound attenuating passive ventilators
Less than 55	Openable windows

Source: Arup North America Ltd, 2011.

The acoustical analysis required by Noise and Vibration Mitigation Measure 1 shall include consideration of these methods.

While the implementation of the required mitigation will reduce interior noise levels to acceptable levels, it may not be possible to reduce noise levels in exterior living spaces to the Normally Acceptable levels contained in the Noise Element of the General Plan. Based on this, it has been determined that even with the implementation of these mitigation measures, the impact may remain significant and unavoidable.

The Proposed Alternative has performance standards that regulate noise within the different designated districts. The standards limit noise generated by different types of activities, such as industrial, commercial, and residential, depending upon the district. Prior to project approval of development allowed by the Proposed Alternative, each specific project within the Project Area will be evaluated against these standards.

**Impact Noise and Vibration 2: The construction associated with implementation of the Proposed Alternative would result in short-term construction noise and vibration. This potential impact is considered to be significant.**

The construction associated with implementing the Proposed Alternative could temporarily increase levels of existing groundborne vibration. Groundborne vibration levels from construction equipment that could be used to develop new land uses in the project Area are shown in Table 12-9.

Also during construction, noise will be produced by the operation of heavy-duty equipment and various other construction activities. Similar to other projects in the City of Los Angeles, pile driving could be used in conjunction with drilling for foundations of the buildings. Construction noise levels were estimated using FTA guidance (FTA, 2006), which provides a method for calculating noise levels from multiple pieces of equipment operating at multiple locations using reference noise levels for individual pieces of equipment. The noise levels associated with equipment that may be used during the various project construction phases are shown in Table 12-10.

As discussed in Section 12.1.1, sensitive receptors exist within and around the Project Area. In particular, residential land uses in the Lincoln Heights, Chinatown, and Solano County neighborhoods as well as the existing residential uses in the Project Area are indicative of nearby sensitive receptors. Schools are also located within the Project Area. Construction noise and vibration would affect surrounding uses to varying degrees throughout the construction phase of implementation of the Proposed Alternative, including impacts from demolition (also involving removal of any contaminated waste), site grading, excavation for infrastructure and building foundations, pile driving, building construction, and paving and landscaping installation.

Pile driving noise and vibration could be audible within buildings on and near the site. It is possible that during the day some local residences will be occupied, and occupants of commercial offices, schools, and medical facilities could be affected by pile driving activities.

**Table 12-9: Vibration Source Levels for Construction Equipment**

Construction Equipment		PPV at 25 feet (in/sec)	Approximate VdB at 25 feet
Pile driver (impact)	Upper range	1.518	112
	Typical	0.644	104
Pile driver (sonic)	Upper range	0.734	105
	Typical	0.170	93
Vibratory roller		0.210	94
Hoe ram		0.089	87
Large bulldozer		0.089	87
Caisson drilling		0.089	87
Loaded trucks		0.076	86
Jackhammer		0.035	79
Small bulldozer		0.003	58

Note:

PPV = peak particle velocity

Source: Transit Noise and Vibration Impact Assessment (FTA, 2006).

**Table 12-10: Estimated Construction Equipment Noise Levels**

Estimated Construction Noise Levels (in dBA)			
Construction Equipment	8-hour $L_{eq}$		
	25 feet	50 feet	100 feet
<b>Demolition</b>			
Track hoe	96	90	84
Crane	94	88	82
Excavator	91	85	79
Water truck	94	88	82
<b>Site Work</b>			
Crawler tractor	91	85	79
Grader	91	85	79
Loader	91	85	79
Compactor	88	82	76
Water truck	94	88	82
Pile driver	107	101	95
<b>Foundations</b>			
Backhoe	86	80	74
Loader	91	85	79
Forklift	85	79	73
Water truck	94	88	82
<b>Utilities</b>			
Backhoe	86	80	74
Water truck	94	88	82
Forklift	85	79	73
<b>Slab on Grade</b>			
Skip loader	88	82	76
Bobcat tractor	90	84	78
Forklift	85	79	73
<b>Steel Erection</b>			
Crane	94	88	82
Air compressor	87	81	75
Generator	87	81	75
Forklift	85	79	73
<b>Decking/Slabs</b>			
Generator	87	81	75
Forklift	85	79	73
Concrete pump	88	82	76
<b>Completion</b>			
Forklift	85	79	73

Note:

$L_{eq}$  = equivalent continuous noise level

Source: Arup North America Ltd, 2011 based upon Transit Noise and Vibration Impact Assessment (FTA, 2006).

**Mitigation Measure Noise and Vibration 2: Section 112.05 and Section 41.40 of the City of Los Angeles Municipal Code has noise ordinances to monitor or regulate construction noise. These ordinances have noise limits for construction activities in conjunction with restrictions to working hours for certain activities.**

To minimize the impact of construction activities associated with implementation of the Proposed Alternative, the City of Los Angeles shall additionally require developers to adhere to the following guidelines as a condition of approving a development permit:

- Construction and demolition shall be restricted to the hours of 7:00 am to 6:00 pm Monday through Friday, and 8:00 am to 6:00 pm on Saturday.
- Demolition and construction activities shall be scheduled so as to avoid operating several pieces of equipment simultaneously, which causes high noise levels.
- The project contractor shall use power construction equipment with state-of-the-art noise shielding and muffling devices.
- Whenever construction occurs adjacent to occupied residences (on- or offsite), temporary barriers shall be constructed around the construction sites to shield the ground floor of the noise-sensitive uses. These barriers shall be of ¾-inch medium density plywood sheeting, or equivalent, and shall achieve an STC of 30 or greater, based on certified sound transmission loss data taken according to American Society for Testing and Materials Test Method E90 or as approved by the City of Los Angeles Building Department.
- Construction equipment staging areas shall be located as far as feasible from residential areas while still serving the needs of construction contractors.
- Quieter “sonic” pile drivers shall be used, unless engineering studies are submitted to the City of Los Angeles showing this is not feasible and cost effective, based on geotechnical considerations.
- Groundborne vibration impacts from construction activities shall be considered in the construction programs to minimize the disturbance to noise-sensitive receptors.
- Routes for heavy construction site vehicles shall be identified to minimize noise and vibration impacts to residences and noise-sensitive receptors. Activities that generate high noise levels — such as pile driving and the use of jackhammers, drills, and impact wrenches — shall be restricted to the hours of 7:00 am to 9:00 pm.

With the implementation of this mitigation measure, this potentially significant impact would be reduced to a level that is less than significant.

There are many feasible construction measures that can be implemented to reduce noise associated with implementation of the Proposed Alternative. When approved construction of new development in the Project Area should be routinely monitored to ensure required noise mitigations are implemented.

**Impact Noise and Vibration 3: Onsite fixed noise sources associated with new development allowed by implementation of the Proposed Alternative could expose noise-sensitive receptors to exterior noise levels that are unacceptable. This potential impact is considered to be significant.**

Implementation of the Proposed Alternative would introduce new fixed sources such as heating, ventilation, and air conditioning (HVAC) equipment and utility transformers to the Project Area. HVAC systems would be installed to service the various proposed building types. Noise generated by HVAC systems can vary significantly depending upon the type and size of equipment. The potential for noise impacts from such equipment would depend upon its proximity to noise-sensitive uses, noise spectrum, the equipment type and size, and whether the equipment would be contained in noise-abating enclosures.

Utility transformers would also be installed to provide electricity within the Project Area. Utility transformers can generate noise levels in excess of 70 dBL<sub>Aeq</sub>, with tonal characteristics, so there is a potential for noise impacts from such equipment.

The City of Los Angeles Municipal Code imposes limitations on noise emissions from fixed sources to prevent disturbance to noise-sensitive land uses.

**Mitigation Measure Noise and Vibration 3: The City of Los Angeles shall require any new development in the Project Area to include noise control measures at fixed sources to reduce impacts to noise-sensitive receptors. Prior to the issuance of building permits, the City of Los Angeles shall require developers to submit engineering and acoustical specifications for project mechanical HVAC and utility transformers (including generators) to the Department of City Planning or other appropriate department, demonstrating that the equipment design (types, location, enclosure, specifications) can control noise to meet the requirements of the City of Los Angeles Municipal Noise Code at nearby residential and other noise-sensitive land uses. With implementation of this mitigation measure, this potentially significant impact would be reduced to a level that is less than significant.**

Examples of noise mitigation that may be required for stationary sources are noise-attenuating enclosures, noise-attenuating barriers, and attenuators fitted to air conditioning equipment. The City of Los Angeles may also control hours of operation to reduce noise impacts during more noise-sensitive times of the day and night.

**Impact Noise and Vibration 4: Changes to Land Use Districts that would result from the implementation of the Proposed Alternative would allow the development of vibration sensitive land uses in close proximity to existing sources of groundborne vibration. This potential impact is considered to be significant.**

The Land Use Districts set forth in the Proposed Alternative allow for the development of vibration sensitive residential and institutional land uses adjacent to the Metro Gold Line and other rail corridors. It is possible that existing groundborne vibration levels within the FTA Screening Distances for Vibration Assessment will exceed maximum acceptable vibration levels for residential and institutional land uses.

**Mitigation Measure Noise and Vibration 4: Before the City of Los Angeles grants approval for any new development within the FTA Screening Distances for Vibration Assessment of an existing rail line, the City of Los Angeles shall require developers to conduct vibration measurements and analysis demonstrating that FTA Groundborne Vibration Impact Criteria for the proposed land use are not exceeded. With the implementation of this mitigation measure, this potentially significant impact would be reduced to a level that is less than significant.**

**When proposing new development adjacent to existing rail lines developers will need to complete focused studies to demonstrate that the new structures will comply with the FTA Ground Vibration Impact Criteria. If the criteria cannot be met then the developer will need to specify the project modifications that will be made to ensure criteria compliance.**

#### 12.3.2.2 Potential Noise and Vibration Impacts of the Proposed Alternative That Are Less Than Significant

**Impact Noise and Vibration 5: The implementation of the Proposed Alternative may result in an increased frequency of light-rail transit services through the Project Area, resulting in increased noise and vibration levels. This potential impact is considered to be less than significant.**

The implementation of the Proposed Alternative may result in land use changes in the Project Area that could provide impetus for changes to the frequency of light-rail transit services. However, no changes to light-rail transit service frequency are included in the Proposed Alternative.

The Metro is exempt from City of Los Angeles noise laws. Noise impacts from the Metro Gold Line are regulated by the FTA, and changes to the Gold Line would be required to meet the FTA Noise Impact Criteria. Therefore, this potential impact is considered to be less-than-significant.

**Mitigation Measure Noise and Vibration 5: None Required.**

**Impact Noise and Vibration 6: The implementation of the Proposed Alternative would contribute to small increases in traffic noise levels on Pasadena Avenue, North Broadway, and Main Street. This potential impact is considered to be less than significant.**

Traffic noise predictions have been made for the Project Area based on traffic flow volumes set forth in Chapter 4. Figure 12-3 shows the locations of the traffic noise predictions. Table 12-11 shows cumulative traffic noise levels with and without the Proposed Alternative at the identified sensitive receptors, and Table 12-12 shows the change in noise levels due to the Proposed Alternative, and the No Project Alternative.

Implementation of the Proposed Alternative would result in increases to traffic noise levels of 1 to 2dB adjacent to Pasadena Avenue, North Broadway, and Main Street. In most locations these traffic noise increases will also occur as a result of the No Project Alternative.

The City of Los Angeles CEQA Thresholds Guide (City of Los Angeles, 2006) defines an increase of existing noise levels of 3 decibels or more as a significant impact. Therefore, increases in road traffic noise that would result from implementation of the Proposed Alternative are less than significant.

**Table 12-11: Predicted Traffic Noise Levels**

Predicted Day-Night Noise Level (dBL <sub>dn</sub> )				
Receptor Prediction Location*	Roadway Segment(s)	Existing Conditions	Future 2035 with the No Project Alternative	Future 2035 with the Proposed Alternative
1	Pasadena Avenue between West Avenue 33 and West Avenue 34	71	72	72
2	North Broadway between Griffin Avenue and Sichel Street	76	76	77
3	North Main Street between Daly Street and Workman Street	75	76	76
4	Cypress Avenue between North Figueroa Street and Arroyo Seco Avenue	64	65	65
5	North Broadway at Pasadena Avenue	69	70	70
6	North Broadway between South Avenue 19 and South Avenue 20	76	76	77
7	North Main Street between Bloom Street and East Ann Street	73	75	75
8	North Main Street between Clover Street and Moulton Avenue	73	74	74
9	West College Street between Yale Street and North Hill Street	71	72	71

\*Locations are shown on Figure 12-3.

Source: Arup North America Ltd, 2011.



**Table 12-12: Change in Future Noise Levels in Comparison to 2035 No Project Alternative**

Change in Day-Night Noise Level (dBL <sub>dn</sub> ) in Comparison to Existing Conditions		
Receptor	Future 2035 with the No Project Alternative <sup>2</sup>	Future 2035 with the Proposed Alternative <sup>2</sup>
Prediction Location <sup>1</sup> 1	1	1
Prediction Location 2	0	1
Prediction Location 3	1	1
Prediction Location 4	1	1
Prediction Location 5	1	1
Prediction Location 6	0	1
Prediction Location 7	2	2
Prediction Location 8	1	1
Prediction Location 9	1	0

Notes

1 Prediction locations are identified in Table 12-11 and on Figure 12-3.

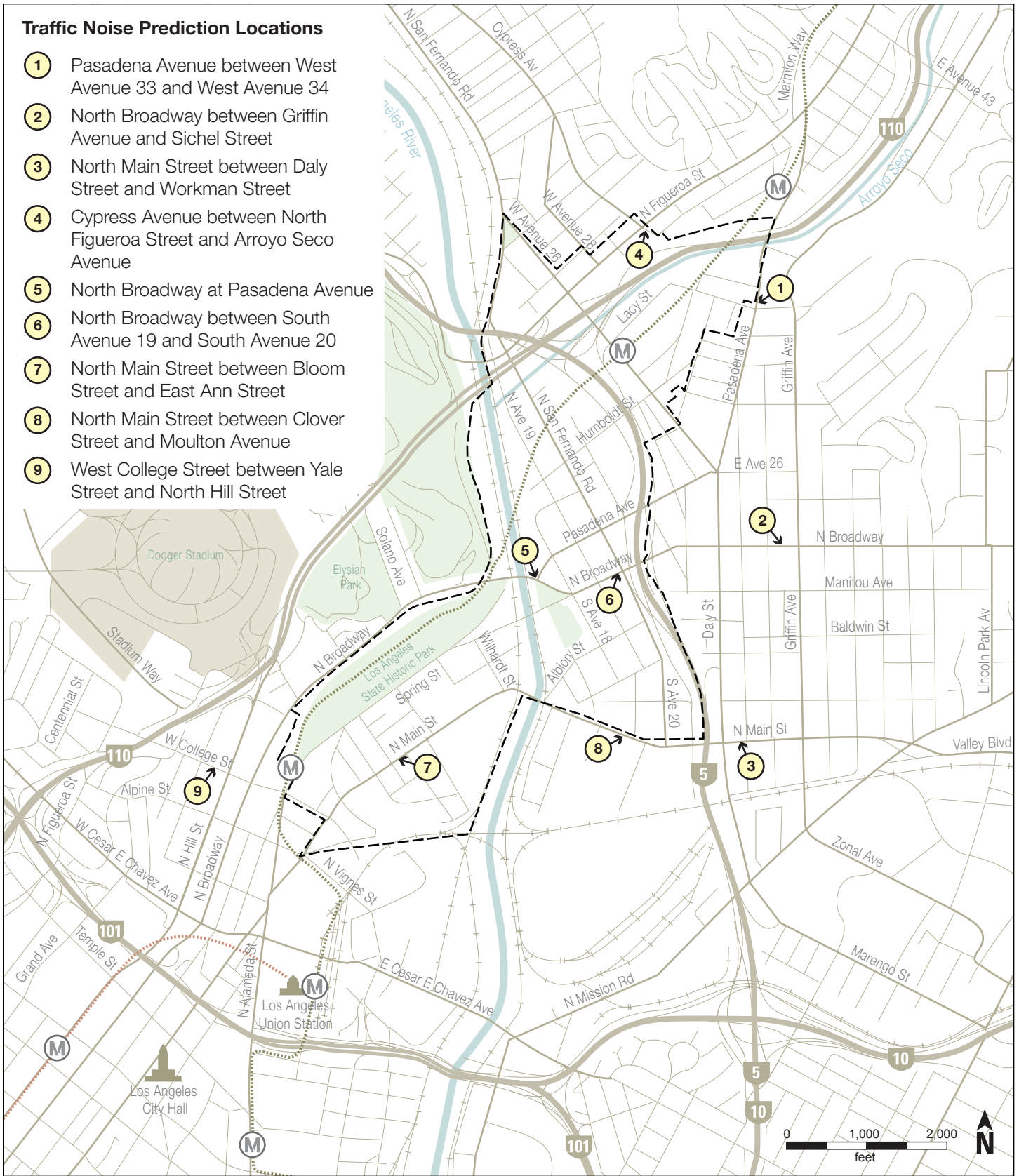
2 The change in noise level is calculated by subtracting the Existing Conditions traffic noise level from the future noise levels.

Source: Arup North America Ltd, 2011.

**Mitigation Measure Noise and Vibration 6: None Required.**

**Traffic Noise Prediction Locations**

- 1 Pasadena Avenue between West Avenue 33 and West Avenue 34
- 2 North Broadway between Griffin Avenue and Sichel Street
- 3 North Main Street between Daly Street and Workman Street
- 4 Cypress Avenue between North Figueroa Street and Arroyo Seco Avenue
- 5 North Broadway at Pasadena Avenue
- 6 North Broadway between South Avenue 19 and South Avenue 20
- 7 North Main Street between Bloom Street and East Ann Street
- 8 North Main Street between Clover Street and Moulton Avenue
- 9 West College Street between Yale Street and North Hill Street



**Legend**

- # Traffic Noise Prediction Location
- [---] Project Area Boundary
- (M) Metro Line and Station

**Source**

Arup, 2011.

**Figure 12-3  
Traffic Noise Prediction Locations**

Cornfield Arroyo Seco Specific Plan and  
Redevelopment Plan Draft EIR  
April 18, 2011

### 12.3.3 Potential Noise and Vibration Impacts of the No Project Alternative

The analysis of the No Project Alternative provided in this Draft EIR assumes no development would occur in the Project Area other than that currently allowed by the General Plan. Future land uses that would involve new sources of noise and vibration during construction or operation stages would require review by the Department of City Planning to ensure the new land uses comply with the City of Los Angeles and, as appropriate, State, and federal requirements.

#### 12.3.3.1 Potentially Significant Noise and Vibration Impacts of the No Project Alternative

None identified.

#### 12.3.3.2 Potential Noise and Vibration Impacts of the No Project Alternative That Are Less Than Significant

None identified.

### 12.4 References

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- City of Los Angeles. (1999). "Noise Element." *Los Angeles City General Plan*.
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Draft