IV. Environmental Impact Analysis

I. Noise

1. Introduction

This section of the Draft EIR analyzes potential noise and vibration impacts of the Project. Included in this section is a description of the existing noise environment within the Project Site area, an estimation of future noise and vibration levels at surrounding sensitive land uses associated with construction and operation of the Project, a description of the potential significant impacts, and the inclusion of mitigation measures to address identified potential significant impacts. Additionally, this section of the Draft EIR evaluates the Project's incremental contribution to potential cumulative noise and vibration impacts resulting from past, present, and probable future projects. This section summarizes the noise and vibration information analyses provided in the Noise Calculation Worksheets included in Appendix J of the Draft EIR.

It is noted that the 2018 Initial Study for the Project, included in Appendix A of this Draft EIR, concluded that the Project may result in potentially significant impacts associated with several environmental issues (including noise) and therefore would require further evaluation in an EIR. The Initial Study analyses were based on the questions contained in Appendix G of the CEQA Guidelines that were in effect at the time of preparation of the Initial Study, and therefore used by the City at the time the Project's NOP was distributed in August 2018. On December 28, 2018, the update approved to CEQA by the Governor's Office of Planning and Research and the California Natural Resources Agency was formally approved by the Office of Administrative Law. This update resulted in changes or additions to nearly 30 different sections of the State CEQA Guidelines, added two sections, and amended several appendices including Appendix G, which includes the Initial Study "checklist." This Draft EIR, including this section, incorporates the CEQA updates, as applicable, in the analysis of Project impacts (i.e., in this case, evaluating noise impacts per the current checklist questions for noise).

2. Environmental Setting

Due to the technical nature of noise and vibration impacts, a brief overview of basic noise principles and descriptors is provided below.

a. Noise and Vibration Basics

(1) Noise Principles and Descriptors

Sound can be described as the mechanical energy of a vibrating object transmitted by pressure waves through a liquid or gaseous medium (e.g., air). Noise is generally defined as undesirable (i.e., loud, unexpected, or annoying) sound. Acoustics is defined as the physics of sound and addresses its propagation and control.[1] In acoustics, the fundamental scientific model consists of a sound (or noise) source, a receiver, and the propagation path between the two. The loudness of the noise source and obstructions or atmospheric factors affecting the propagation path to the receiver determine the sound level and characteristics of the noise perceived by the receiver.

Sound, traveling in the form of waves from a source, exerts a sound pressure level (referred to as sound level) that is measured in decibels (dB), which is the standard unit of sound amplitude measurement and reflects the way people perceive changes in sound amplitude.[2] The dB scale is a logarithmic scale that describes the physical intensity of the pressure vibrations that make up any sound, with 0 dB corresponding roughly to the threshold of human hearing and 120 to 140 dB corresponding to the threshold of feeling pain. Pressure waves traveling through air exert a force registered by the human ear as sound.[3]

Sound pressure fluctuations can be measured in units of hertz (Hz), which correspond to the frequency of a particular sound. Typically, sound does not consist of a single frequency, but, rather, a broad band of frequencies varying in levels of magnitude. When all of the audible frequencies of a sound are measured, a sound spectrum is plotted consisting of a range of frequencies spanning 20 to 20,000 Hz. The sound pressure level, therefore, constitutes the additive force exerted by a sound corresponding to the sound frequency/sound power level spectrum.[4]

The typical human ear is not equally sensitive to the frequency range from 20 to 20,000 Hz. As a consequence, when assessing potential noise impacts, sound is

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[1] *California Department of Transportation, Technical Noise Supplement to the Traffic Noise Analysis Protocol, Section 2.2.1, September 2013.*

[2] *All sound levels measured in decibel (dB), as identified in the noise calculation worksheets included in Appendix J of this Draft EIR and in this section of the Draft EIR, are relative to $2x10^{-5}$ N/m^2.*

[3] *California Department of Transportation, Technical Noise Supplement to the Traffic Noise Analysis Protocol, Section 2.1.3, September 2013.*

[4] *California Department of Transportation, Technical Noise Supplement to the Traffic Noise Analysis Protocol, Section 2.1.3, September 2013.*

measured using an electronic filter that deemphasizes the frequencies below 1,000 Hz and above 5,000 Hz in a manner corresponding to the human ear's decreased sensitivity to these extremely low and extremely high frequencies. This method of frequency filtering or weighting is referred to as A-weighting, expressed in units of A-weighted decibels (dBA), which is typically applied to community noise measurements.[5] Some representative common outdoor and indoor noise sources and their corresponding A-weighted noise levels are shown in Figure IV.I-1 on page IV.I-4.

(2) Noise Exposure and Community Noise

Community noise exposure is typically measured over a period of time; a noise level is a measure of noise at a given instant in time. Community noise varies continuously over a period of time with respect to the sound sources contributing to the community noise environment. Community noise is primarily the product of many distant noise sources, which constitute a relatively stable background noise exposure, with many unidentifiable individual contributors. Single-event noise sources, such as aircraft flyovers, sirens, etc., may cause sudden changes in background noise level.[6] However, generally, background noise levels change gradually throughout the day, corresponding with the addition and subtraction of distant noise sources, such as changes in traffic volume.

These successive additions of sound to the community noise environment change the community noise level from moment to moment, requiring the noise exposure to be measured over periods of time to legitimately characterize a community noise environment and evaluate cumulative noise impacts. The following noise descriptors are used to characterize environmental noise levels over time.[7]

L_{eq}: The equivalent sound level over a specified period of time, typically, 1 hour (L_{eq}). The L_{eq} may also be referred to as the energy-average sound level.

L_{max}: The maximum, instantaneous noise level experienced during a given period of time.

L_{min}: The minimum, instantaneous noise level experienced during a given period of time.

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[5] *California Department of Transportation, Technical Noise Supplement to the Traffic Noise Analysis Protocol, Section 2.1.3, September 2013.*

[6] *California Department of Transportation, Technical Noise Supplement to the Traffic Noise Analysis Protocol, Section 2.2.1, September 2013.*

[7] *California Department of Transportation, Technical Noise Supplement to the Traffic Noise Analysis Protocol, September 2013, Section 2.2.2.*

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	110	Rock band
Jet lyover at 1,000 feet		
	100	
Gas lawnmower at 3 feet		
	90	
Diesel truck at 50 feet at 50 mph		Food blender at 3 feet
	80	Garbage disposal at 3 feet
Noisy urban area, daytime		
Gas lawnmower, 100 feet	70	Vacuum cleaner at 10 feet
Commercial area		Normal speech at 3 feet
Heavy traf ic at 300 feet	60	
		Large business of ice
Quiet urban daytime	50	Dishwasher in next room
Quiet urban nighttime	40	Theater, large conference room (background)
Quiet suburban nighttime		
	30	Library
Quiet rural nighttime		Bedroom at night, concert hall (background)
	20	
		Broadcast/recording studio
	10	
	0	

Figure IV.I-1

Decibel Scale and Common Noise Sources

Source: State of California, Department of Transportation (Caltrans), Technical Noise Supplement, 2009.

L_X: The noise level exceeded a percentage of a specified time period. For instance, L_{50} and L_{90} represent the noise levels that are exceeded 50 percent and 90 percent of the time, respectively.

L_{dn}: The average A-weighted noise level during a 24-hour day, obtained after an addition of 10 dBA to measured noise levels between the hours of 10:00 P.M. and 7:00 A.M. to account for nighttime noise sensitivity. The L_{dn} is also termed the day-night average noise level (DNL).

CNEL: The Community Noise Equivalent Level (CNEL) is the time average A-weighted noise level during a 24-hour day that includes an addition of 5 dBA to measured noise levels between the hours of 7:00 P.M. and 10:00 P.M. and an addition of 10 dBA to noise levels between the hours of 10:00 P.M. and 7:00 A.M. to account for noise sensitivity in the evening and nighttime, respectively.

(3) Effects of Noise on People

Noise is generally loud, unpleasant, unexpected, or undesired sound that is typically associated with human activity that is a nuisance or disruptive. The effects of noise on people can be placed into four general categories:

- Subjective effects (e.g., dissatisfaction, annoyance);
- Interference effects (e.g., communication, sleep, and learning interference);
- Physiological effects (e.g., startle response); and
- Physical effects (e.g., hearing loss).

Although exposure to high noise levels has been demonstrated to cause physical and physiological effects, the principal human responses to typical environmental noise exposure are related to subjective effects and interference with activities. Interference effects interrupt daily activities and include interference with human communication activities, such as normal conversations, watching television, telephone conversations, and interference with sleep.

The World Health Organization's Guidelines for Community Noise details the adverse health effects of high noise levels, which include hearing impairment, speech intelligibility, sleep disturbance, physiological functions (e.g. hypertension and cardiovascular effects), mental illness, performance of cognitive tasks, social and behavioral effects (e.g. feelings of helplessness, aggressive behavior), and annoyance.[8]

With regard to the subjective effects, the responses of individuals to similar noise events are diverse and influenced by many factors, including the type of noise, the perceived importance of the noise, the appropriateness of the noise to the setting, the duration of the noise, the time of day and the type of activity during which the noise occurs, and individual noise sensitivity. Overall, there is no completely satisfactory way to measure the subjective effects of noise, or the corresponding reactions of annoyance and dissatisfaction on people. A wide variation in individual thresholds of annoyance exists, and different tolerances to noise tend to develop based on an individual's past experiences with noise. Thus, an important way of predicting a human reaction to a new noise environment is the way it compares to the existing environment to which one has adapted (i.e., comparison to the ambient noise environment). In general, the more a new noise level exceeds the previously existing ambient noise level, the less acceptable the new noise level will be judged by those hearing it. With regard to increases in A-weighted noise level, the following relationships generally occur:[9]

- Except in carefully controlled laboratory experiments, a change of 1 dBA in ambient noise levels cannot be perceived;
- Outside of the laboratory, a change of 3 dBA in ambient noise levels is considered to be a barely perceivable difference;
- A change of 5 dBA in ambient noise levels is considered to be a readily perceivable difference; and
- A change of 10 dBA in ambient noise levels is subjectively heard as doubling of the perceived loudness.

These relationships between change in noise level and human hearing response occur in part because of the logarithmic nature of sound and the dB scale. Because the dBA scale is based on logarithms, two noise sources do not combine in a simple additive fashion, but, rather, logarithmically. Under the dBA scale, a doubling of sound energy corresponds to a 3 dBA increase. In other words, when two sources are each producing sound of the same loudness, the resulting sound level at a given distance would be approximately 3 dBA higher than one of the sources under the same conditions. For

[8] *World Health Organization Team, edited by Birgitta Berglund, Thomas Lindvall, and Dietrich H. Schwela, Guidelines for Community Noise, 1999.*

[9] *California Department of Transportation, Technical Noise Supplement to the Traffic Noise Analysis Protocol, September 2013, Section 2.2.1.*

example, if two identical noise sources produce noise levels of 50 dBA, the combined sound level would be 53 dBA, not 100 dBA. Under the dB scale, three sources of equal loudness together produce a sound level of approximately 5 dBA louder than one source, and 10 sources of equal loudness together produce a sound level of approximately 10 dBA louder than the single source.[10]

(4) Noise Attenuation

When noise propagates over a distance, the noise level reduces, or attenuates, with distance depending on the type of noise source and the propagation path. Noise from a localized source (i.e., point source) propagates uniformly outward in a spherical pattern, referred to as "spherical spreading." The rate of sound attenuation for a point source, such as a piece of mechanical or electrical equipment (e.g., air conditioner) or idling vehicle (e.g., bulldozer), is 6 dBA per doubling of distance from the noise source to the receptor over acoustically "hard" sites and 7.5 dBA per doubling of distance from the noise source to the receptor over acoustically "soft" sites.[11] Hard sites are those with a reflective surface between the source and the receiver, such as asphalt or concrete surfaces or smooth bodies of water. No excess ground attenuation is assumed for hard sites and the reduction in noise levels with distance (drop-off rate) is simply the geometric spreading of the noise from the source. Soft sites have an absorptive ground surface, such as soft dirt, grass, or scattered bushes and trees, which in addition to geometric spreading, provides an excess ground attenuation value of 1.5 dBA (per doubling distance).[12] For example, an outdoor condenser fan that generates a sound level of 60 dBA at a distance of 50 feet from a point source at an acoustically hard site would attenuate to 54 dBA at a distance of 100 feet from the point source and attenuate to 48 dBA at 200 feet from the point source.

Roadways and highways consist of several localized noise sources on a defined path, and, hence, are treated as "line" sources, which approximate the effect of several point sources.[13] Noise from a line source propagates over a cylindrical surface, often referred to as "cylindrical spreading."[14] Line sources (e.g., traffic noise from vehicles) attenuate at a rate between 3 dBA for hard sites and 4.5 dBA for soft sites for each

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[10] *California Department of Transportation, Technical Noise Supplement to the Traffic Noise Analysis Protocol, September 2013, Section 2.2.1.1.*

[11] *California Department of Transportation, Technical Noise Supplement to the Traffic Noise Analysis Protocol, September 2013, Sections 2.1.4.1 and 2.1.4.2.*

[12] *California Department of Transportation, Technical Noise Supplement to the Traffic Noise Analysis Protocol, September 2013, Sections 2.1.4.1 and 2.1.4.2.*

[13] *California Department of Transportation, Technical Noise Supplement to the Traffic Noise Analysis Protocol, September 2013, Section 2.1.4.1.*

[14] *California Department of Transportation, Technical Noise Supplement to the Traffic Noise Analysis Protocol, September 2013, Section 2.1.4.1.*

doubling of distance from the reference measurement.[15] Therefore, noise due to a line source attenuates less with distance than that of a point source with increased distance.

Structures (e.g., buildings and solid walls) and natural topography (e.g., hills and berms) that obstruct the line-of-sight between a noise source and a receptor further reduce the noise level if the receptor is located within the “shadow” of the obstruction, such as behind a sound wall. This type of sound attenuation is known as “barrier insertion loss.” If a receptor is located behind the wall but still has a view of the source (i.e., the line-of-sight is not fully blocked), barrier insertion loss would still occur but to a lesser extent. Additionally, a receptor located on the same side of the wall as a noise source may actually experience an increase in the perceived noise level as the wall can reflect noise back to the receptor, thereby compounding the noise. Noise barriers can provide noise level reductions ranging from approximately 5 dBA (where the barrier just breaks the line-of-sight between the source and receiver) to an upper range of 20 dBA with a larger barrier.[16] Additionally, structures with closed windows can further attenuate exterior noise by a minimum of 20 dBA to 30 dBA.[17]

Receptors located downwind from a noise source can be exposed to increased noise levels relative to calm conditions, whereas locations upwind can have lowered noise levels.[18] Atmospheric temperature inversion (i.e., increasing temperature with elevation) can increase sound levels at long distances. Other factors such as air temperature, humidity, and turbulence can, under the right conditions, also have substantial effects on noise levels.[19]

(5) Vibration Fundamentals

Vibration can be interpreted as energy transmitted in waves through the ground or man-made structures, which generally dissipate with distance from the vibration source. Vibration is an oscillatory motion through a solid medium in which the motion’s amplitude can be described in terms of displacement, velocity, or acceleration. Since energy is lost

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[15] *California Department of Transportation, Technical Noise Supplement to the Traffic Noise Analysis Protocol, September 2013, Section 2.1.4.1.*

[16] *California Department of Transportation, Technical Noise Supplement to the Traffic Noise Analysis Protocol, September 2013, Sections 2.1.4.24 and 5.1.1.*

[17] *California Department of Transportation, Technical Noise Supplement to the Traffic Noise Analysis Protocol, September 2013, Section 7.4.2, Table 7-1.*

[18] *California Department of Transportation, Technical Noise Supplement to the Traffic Noise Analysis Protocol, September 2013, Section 2.1.4.3.*

[19] *California Department of Transportation, Technical Noise Supplement to the Traffic Noise Analysis Protocol, September 2013, Section 2.1.4.3.*

during its transfer from one particle to another, vibration becomes less perceptible with increasing distance from the source.

As described in the Federal Transit Administration's (FTA) *Transit Noise and Vibration Impact Assessment Manual*, groundborne vibration can be a serious concern for nearby neighbors of a transit system route or maintenance facility, causing buildings to shake and rumbling sounds to be heard.[20] In contrast to airborne noise, groundborne vibration is not a common environmental problem, as it is unusual for vibration from sources such as rubber-tired buses and trucks to be perceptible, even in locations close to major roads. Some common sources of groundborne vibration are trains, heavy trucks traveling on rough roads, and certain construction activities, such as blasting, pile-driving, and operation of heavy earth-moving equipment.[21] Groundborne vibration generated by man-made activities (e.g., road traffic, construction operations) typically weakens with greater horizontal distance from the source of the vibration.

Several different methods are used to quantify vibration. The peak particle velocity (PPV) is defined as the maximum instantaneous peak of the vibration signal in inches per second (in/sec), and is most frequently used to describe vibration impacts to buildings.[22] The root mean square (RMS) amplitude is defined as the average of the squared amplitude of the signal and is most frequently used to describe the effect of vibration on the human body.[23] Decibel notation (VdB) is commonly used to express RMS vibration velocity amplitude. The relationship of PPV to RMS velocity is expressed in terms of the "crest factor," defined as the ratio of the PPV amplitude to the RMS amplitude. PPV is typically a factor of 1.7 to 6 times greater than RMS vibration velocity; FTA uses a crest factor of 4.[24] The decibel notation VdB acts to compress the range of numbers required to describe vibration. Typically, groundborne vibration generated by man-made activities attenuates rapidly with distance from the source of the vibration. Sensitive receptors for vibration include buildings where vibration would interfere with operations within the building or

[20] *Federal Transit Administration, Transit Noise and Vibration Impact Assessment Manual, September 2018, Section 7.*

[21] *Federal Transit Administration, Transit Noise and Vibration Impact Assessment Manual, September 2018, Section 7.*

[22] *Federal Transit Administration, Transit Noise and Vibration Impact Assessment Manual, September 2018, Section 5.1.*

[23] *Federal Transit Administration, Transit Noise and Vibration Impact Assessment Manual, September 2018, Section 5.1.*

[24] *Federal Transit Administration, Transit Noise and Vibration Impact Assessment Manual, September 2018, Section 5.1.*

cause damage (especially older masonry structures), locations where people sleep, and locations with vibration sensitive equipment.[25]

Groundborne noise specifically refers to the rumbling noise emanating from the motion of building room surfaces due to the vibration of floors and walls; it is perceptible only inside buildings.[26] The relationship between groundborne vibration and groundborne noise depends on the frequency of the vibration and the acoustical absorption characteristics of the receiving room. For typical buildings, groundborne vibration that causes low frequency noise (i.e., the vibration spectrum peak is less than 30 Hz) results in a groundborne noise level that is approximately 50 decibels lower than the velocity level. For groundborne vibration that causes mid-frequency noise (i.e., the vibration spectrum peak is between 30 and 60 Hz), the groundborne noise level will be approximately 35 to 37 decibels lower than the velocity level.[27] Therefore, for typical buildings, the groundborne noise decibel level is lower than the groundborne vibration velocity level at low frequencies.

b. Regulatory Framework

There are several plans, regulations, and programs that include policies, requirements, and guidelines regarding Noise at the federal, State, regional, and local levels. As described below, these plans, guidelines, and laws include the following:

- Noise Control Act of 1972
- Federal Transportation Administration Vibration Standards
- Occupational Safety and Health Act of 1970
- Office of Planning and Research Guidelines for Noise Compatible Land Use
- Caltrans Vibration/Groundborne Noise Standards
- Los Angeles County Airport Land Use Commission Comprehensive Land Use Plan
- City of Los Angeles Municipal Code

[25] *Federal Transit Administration, Transit Noise and Vibration Impact Assessment Manual, September 2018, Section 6.1, 6.2, and 6.3.*

[26] *Federal Transit Administration, Transit Noise and Vibration Impact Assessment Manual, September 2018, Section 5.4.*

[27] *Federal Transit Administration, Transit Noise and Vibration Impact Assessment Manual, September 2018, Table 6-3 and Table 6-14..*

- City of Los Angeles General Plan Noise Element

(1) Federal

(a) Noise Control Act of 1972

Under the authority of the Noise Control Act of 1972, the United States Environmental Protection Agency (USEPA) established noise emission criteria and testing methods published in Parts 201 through 205 of Title 40 of the Code of Federal Regulations (CFR) that apply to some transportation equipment (e.g., interstate rail carriers, medium trucks, and heavy trucks) and construction equipment. In 1974, USEPA issued guidance levels for the protection of public health and welfare in residential areas of an outdoor L_{dn} of 55 dBA and an indoor L_{dn} of 45 dBA.[28] These guidance levels are not standards or regulations and were developed without consideration of technical or economic feasibility. There are no federal noise standards that directly regulate environmental noise related to the construction or operation of the Project. Moreover, the federal noise standards are not reflective of urban environments that range by land use, density, proximity to commercial or industrial centers, etc. As such, for purposes of determining acceptable sound levels to determine and evaluate intrusive noise sources and increases, this document utilizes the City of Los Angeles Noise Regulations, discussed below.

(b) Federal Transit Administration Vibration Standards

There are no federal vibration standards or regulations adopted by any agency that are applicable to evaluating vibration impacts from land use development projects, such as the Project. However, the FTA has adopted vibration criteria for use in evaluating vibration impacts from construction activities.[29] The vibration damage criteria adopted by the FTA are shown in Table IV.I-1 on page IV.I-12.

The FTA has also adopted standards associated with human annoyance for determining the groundborne vibration and noise impacts from ground-borne noise on the following three off-site land-use categories: Vibration Category 1—High Sensitivity, Vibration Category 2—Residential, and Vibration Category 3—Institutional.[30] The FTA defines Category 1 as buildings where vibration would interfere with operations within the building, including vibration-sensitive research and manufacturing facilities, hospitals with

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[28] *U.S. Environmental Protection Agency, EPA Identifies Noise Levels Affecting Health and Welfare, April 2, 1974.*

[29] *Federal Transit Administration, Transit Noise and Vibration Impact Assessment Manual, September 2018, Table 7-5, p. 86.*

[30] *Federal Transit Administration, Transit Noise and Vibration Impact Assessment Manual, September 2018, Table 6-1, p. 124.*

Table IV.I-1
Construction Vibration Building Damage Criteria

Building Category	PPV (in/sec)
I. Reinforced-concrete, steel or timber (no plaster)	0.50
II. Engineered concrete and masonry (no plaster)	0.30
III. Non-engineered timber and masonry buildings	0.20
IV. Buildings extremely susceptible to vibration damage	0.12

Source: FTA, Transit Noise and Vibration Impact Assessment Manual, September 2018.

vibration-sensitive equipment, and university research operations. Vibration-sensitive equipment includes, but is not limited to, electron microscopes, high-resolution lithographic equipment, and normal optical microscopes. Category 2 refers to all residential land uses and any buildings where people sleep, such as hotels and hospitals. Category 3 refers to institutional land uses such as schools, churches, other institutions, and quiet offices that do not have vibration-sensitive equipment but that still potentially involve activities that could be disturbed by vibration. The vibration thresholds associated with human annoyance for these three land-use categories are shown in Table IV.I-2 on page IV.I-13. No thresholds have been adopted or recommended for commercial or office uses.

(c) Occupational Safety and Health Act of 1970

Under the Occupational Safety and Health Act of 1970 (29 United States Code [USC] Sections 1919 et seq.), the Occupational Safety and Health Administration (OSHA) has adopted regulations designed to protect workers against the effects of occupational noise exposure. These regulations list permissible noise level exposure as a function of the amount of time during which the worker is exposed. The regulations further specify a hearing conservation program that involves monitoring noise to which workers are exposed, ensuring that workers are made aware of overexposure to noise, and periodically testing the workers' hearing to detect any degradation.[31]

[31] *U.S. Department of Labor, Occupational Safety and Health Act, 1970.*

Table IV.I-2
Groundborne Vibration and Groundborne Impact Criteria for General Assessment—Human Annoyance

Land Use Category	Frequent Events[a]	Occasional Events[b]	Infrequent Events[c]
Category 1: Building where vibration would interfere with interior operations	65 VdB[d]	65 VdB[d]	65 VdB[d]
Category 2: Residences and buildings where people normally sleep	72 VdB	75 VdB	80 VdB
Category 3: Institutional land uses with primarily daytime uses	75 VdB	78 VdB	83 VdB

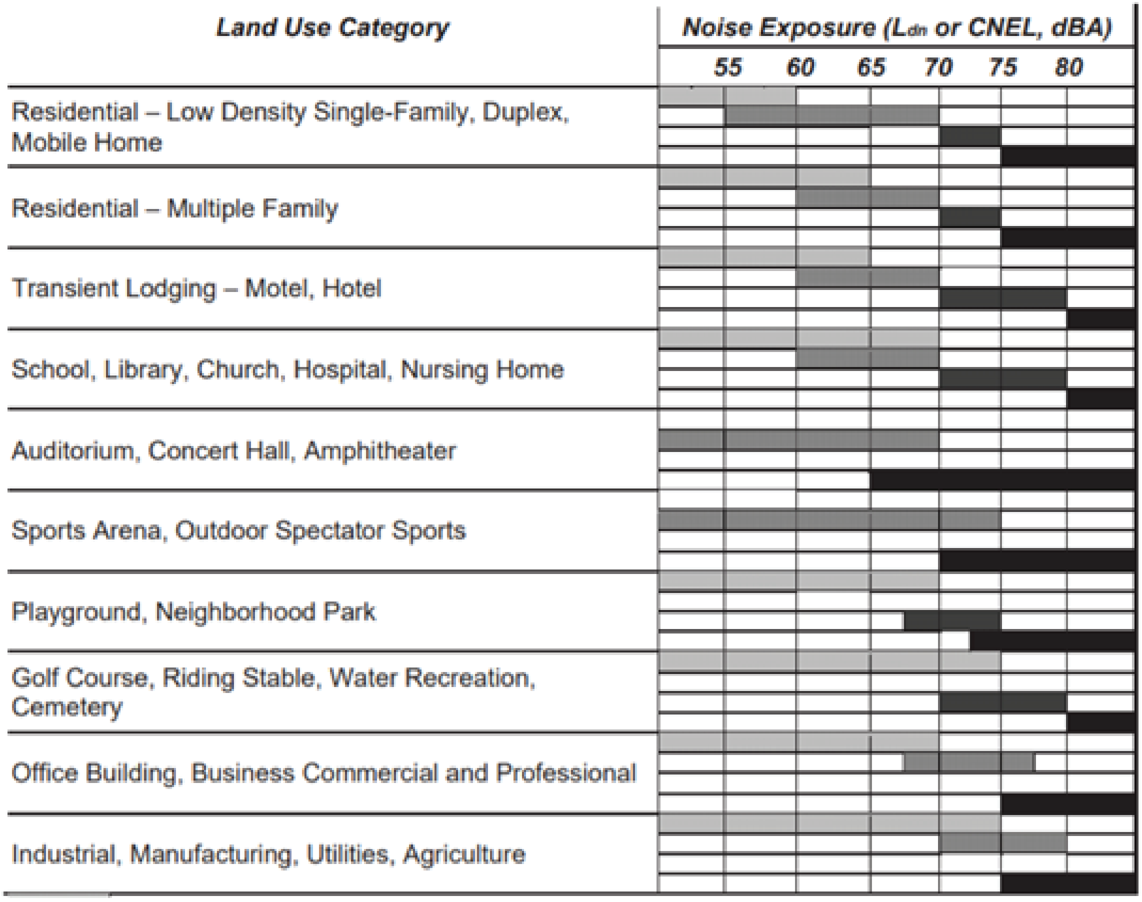
[a] *"Frequent Events" are defined as more than 70 vibration events of the same source per day.*
[b] *"Occasional Events" are defined as between 30 and 70 vibration events of the same source per day.*
[c] *"Infrequent Events" are defined as fewer than 30 vibration events of the same source per day.*
[d] *This criterion limit is based on the levels that are acceptable for most moderately sensitive equipment such as optical microscopes.*
Source: FTA, Transit Noise and Vibration Impact Assessment Manual, September 2018.

(2) State

(a) Office of Planning and Research Guidelines for Noise Compatible Land Use

The State of California has not adopted Statewide standards for environmental noise, but the Governor's Office of Planning and Research (OPR) has established guidelines for evaluating the compatibility of various land uses as a function of community noise exposure, as presented in Figure IV.I-2 on page IV.I-14.[32] The purpose of these guidelines is to maintain acceptable noise levels in a community setting for different land use types. Noise levels are divided into four general categories, which vary in range according to land use type: "normally acceptable," "conditionally acceptable," "normally unacceptable," and "clearly unacceptable." The City has developed its own compatibility guidelines in the Noise Element of the General Plan based in part on OPR Guidelines. California Government Code Section 65302 requires each county and city in the State to prepare and adopt a comprehensive long-range general plan for its physical development, with Section 65302(f) requiring a noise element to be included in the general plan. The noise element must: (1) identify and appraise noise problems in the community; (2) recognize Office of Noise Control guidelines; and (3) analyze and quantify current and projected noise levels.

[32] *State of California, Governor's Office of Planning and Research, General Plan 2017 Guidelines, July 31, 2017, p. 377.*



NORMALLY ACCEPTABLE: Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.

CONDITIONALLY ACCEPTABLE: New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design.

NORMALLY UNACCEPTABLE: New construction or development should be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirement must be made and needed noise insulation features included in the design.

CLEARLY UNACCEPTABLE: New construction or development should generally not be undertaken. Construction costs to make the indoor environmental acceptable would be prohibitive and the outdoor environment would not be usable.

Figure IV.I-2

Guidelines for Noise Compatible Land Use

Source: State of California, Governor's Office of Planning and Research, General Plan Guidelines, 2003.

The purpose of these guidelines is to maintain acceptable noise levels in a community setting for different land use types. Noise levels are divided into four general categories, which vary in range according to land use type: "normally acceptable," "conditionally acceptable," "normally unacceptable," and "clearly unacceptable." The City has developed its own compatibility guidelines in the Noise Element of the General Plan based in part on OPR Guidelines. California Government Code Section 65302 requires each county and city in the State to prepare and adopt a comprehensive long-range general plan for its physical development, with Section 65302(f) requiring a noise element to be included in the general plan. The noise element must identify and appraise noise problems in the community and analyze and quantify current and projected noise levels.

The State has also established noise insulation standards for new multi-family residential units, hotels, and motels. These requirements are collectively known as the California Noise Insulation Standards (Title 24 of the California Code of Regulations [CCR]). The noise insulation standards set forth an interior standard of 45 dBA CNEL in any habitable room. The standards require an acoustical analysis demonstrating how dwelling units have been designed to meet this interior standard where such units are proposed in areas subject to exterior noise levels greater than 60 dBA CNEL. Title 24 standards are typically enforced by local jurisdictions through the building permit application process.

(b) Caltrans Vibration/Groundborne Noise Standards

The State of California has not adopted Statewide standards or regulations for evaluating vibration or groundborne noise impacts from land use development projects, such as the Project. Although the State has not adopted any vibration standard, Caltrans in its 2013 *Transportation and Construction Vibration Guidance Manual* recommends the following vibration thresholds that are more practical than those provided by the FTA. The Caltrans vibration thresholds are shown in Table IV.I-3 on page IV.I-16.

(3) Regional

(a) Los Angeles County Airport Land Use Commission Comprehensive Land Use Plan

In Los Angeles County the Regional Planning Commission has the responsibility for acting as the Airport Land Use Commission (ALUC) and for coordinating the airport planning of public agencies within the county. The ALUC coordinates planning for the areas surrounding public use airports. The Comprehensive Land Use Plan provides for the orderly expansion of Los Angeles County's public use airports and the area surrounding them. It is intended to provide for the adoption of land use measures that will minimize the public's exposure to excessive noise and safety hazards. In formulating the Comprehensive Land Use Plan, the Los Angeles County ALUC has established provisions

Table IV.I-3
Guideline Vibration Damage Potential Threshold Criteria

Structure and Condition	Maximum PPV (inch/sec)	
	Transient Sources[a]	Continuous/Frequent Intermittent Sources[b]
Extremely Fragile Historic Buildings, Ruins, Ancient Monuments	0.12	0.08
Fragile Buildings	0.20	0.10
Historic and Some Old Buildings	0.50	0.25
Older Residential Structures	0.50	0.30
New Residential Structures	1.00	0.50
Modern Industrial/Commercial Buildings	2.00	0.50

[a] *Transient sources create a single, isolated vibration event, such as blasting or drop balls.*

[b] *Continuous/frequent intermittent sources include impact pile drivers, pogo-stick compactors, crack-and-seat equipment, vibratory pile drivers, and vibratory compaction equipment.*

Source: Caltrans, Transportation and Construction Vibration Guidance Manual, April 2020, Table 19.

for safety, noise insulation, and the regulation of building height within areas adjacent to each of the public airports in the County.

(4) Local

(a) Los Angeles Municipal Code

The City of Los Angeles Noise Regulations are provided in Chapter XI of the Los Angeles Municipal Code (LAMC). LAMC Section 111.02 provides procedures and criteria for the measurement of the sound level of “offending” noise sources. In accordance with the LAMC, a noise source that causes a noise level increase of 5 dBA over the existing average ambient noise level as measured at an adjacent property line creates a noise violation. This standard applies to radios, television sets, air conditioning, refrigeration, heating, pumping and filtering equipment, powered equipment intended for repetitive use in residential areas, and motor vehicles driven on-site.

To account for people’s increased tolerance for short-duration noise events, the Noise Regulations provide a 5-dBA allowance for a noise source that causes noise lasting more than 5 but less than 15 minutes in any 1-hour period, and an additional 5 dBA allowance (for a total of 10 dBA) for a noise source that causes noise lasting 5 minutes or less in any 1-hour period.[33]

The LAMC provides that in cases where the actual ambient conditions are not known, the City's presumed daytime (7:00 A.M. to 10:00 P.M.) and nighttime (10:00 P.M. to 7:00 A.M.) minimum ambient noise levels as defined in LAMC Section 111.03 should be used. The presumed ambient noise levels for these areas where the actual ambient conditions are not known as set forth in the LAMC Sections 111.03 are provided in Table IV.I-4 on page IV.I-18. For example, for residential-zoned areas, the presumed ambient noise level is 50 dBA during the daytime and 40 dBA during the nighttime.

LAMC Section 112.02 limits increases in noise levels from air conditioning, refrigeration, heating, pumping and filtering equipment. Such equipment may not be operated 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 5 dB.

LAMC Section 112.05 sets a maximum noise level for construction equipment of 75 dBA at a distance of 50 feet when operated within 500 feet of a residential zone. Compliance with this standard shall not apply where compliance therewith is technically infeasible.[34] LAMC Section 41.40 prohibits construction between the hours of 9:00 P.M. and 7:00 A.M. Monday through Friday, 6:00 P.M. and 8:00 A.M. on Saturday, and at any time on Sunday (i.e., construction is allowed Monday through Friday between 7:00 A.M. to 9:00 P.M.; and Saturdays and National Holidays between 8:00 A.M. to 6:00 P.M.). In general, the City's Department of Building and Safety enforces Noise Ordinance provisions relative to equipment, and the Los Angeles Police Department (LAPD) enforces provisions relative to noise generated by people.

LAMC Section 113.01 prohibits collecting or disposing of rubbish or garbage, operating any refuse disposal truck, or collecting, loading, picking up, transferring, unloading, dumping, discarding, or disposing of any rubbish or garbage, as such terms are defined in LAMC Section 66.00, within 200 feet of any residential building between the hours of 9:00 P.M. and 6:00 A.M. of the following day, unless a permit therefore has been duly obtained beforehand from the Board of Police Commissioners.

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[33] *Los Angeles Municipal Code, Chapter XI, Article I, Section 111.02-(b), accessed November 16, 2021.*

[34] *In accordance with the City's Noise Ordinances, "technically feasible" means that the established noise limitations can be complied with at a project site, with the use of mufflers, shields, sound barriers, and/or other noise reduction devices or techniques employed during the operation of equipment.*

Table IV.I-4
City of Los Angeles Presumed Ambient Noise Levels

Zone	Daytime (7:00 A.M. to 10:00 P.M.) dBA (L_{eq})	Nighttime (10:00 P.M. to 7:00 A.M.) dBA (L_{eq})
Residential (A1, A2, RA, RE, RS, RD, RW1, RW2, R1, R2, R3, R4, and R5)	50	40
Commercial (P, PB, CR, C1, C1.5, C2, C4, C5, and CM)	60	55
Manufacturing (M1, MR1, and MR2)	60	55
Heavy Manufacturing (M2 and M3)	65	65

Source: LAMC Section 111.03.

Section 91.1207.14.2 prohibits interior noise levels attributable to exterior sources from exceeding 45 dBA in any habitable room. The noise metric shall be either the day-night average sound level (L_{dn}) or the CNEL, consistent with the noise element of the local general plan.

(b) City of Los Angeles General Plan Noise Element

The Noise Element of the City's General Plan policies include the CNEL guidelines for land use compatibility as shown in Table IV.I-5 on page IV.I-19 and includes a number of goals, objectives, and policies for land use planning purposes. The overall purpose of the Noise Element is to guide policymakers in making land use determinations and in preparing noise ordinances that would limit exposure of citizens to excessive noise levels.[35] The following policies and objectives from the Noise Element apply to the Project.

Objective 2 (Non-Airport): Reduce or eliminate non-airport 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 impact 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.

35 *City of Los Angeles, General Plan Noise Element, Adopted February 3, 1999, pp. 1.1–2.4.*

Table IV.I-5
City of Los Angeles Guidelines for Noise Compatible Land Use

Land Use	Community Noise Exposure CNEL (dB)			
	Normally Acceptable	**Conditionally Acceptable**	**Normally Acceptable**	**Clearly Unacceptable**
Single-Family, Duplex, Mobile Homes	50 to 60	55 to 70	70 to 75	Above 70
Multi-Family Homes	50 to 65	60 to 70	70 to 75	Above 70
Schools, Libraries, Churches, Hospitals, Nursing Homes	50 to 70	60 to 70	70 to 80	Above 80
Transient Lodging—Motels, Hotels	50 to 65	60 to 70	70 to 80	Above 80
Auditoriums, Concert Halls, Amphitheaters	—	50 to 70	—	Above 65
Sports Arena, Outdoor Spectator Sports	—	50 to 75	—	Above 70
Playgrounds, Neighborhood Parks	50 to 70	—	67 to 75	Above 72
Golf Courses, Riding Stables, Water Recreation, Cemeteries	50 to 75	—	70 to 80	Above 80
Office Buildings, Business, Professional Commercial	50 to 70	67 to 77	Above 75	—
Industrial, Manufacturing, Utilities, Agriculture	50 to 75	70 to 80	Above 75	—

Normally Acceptable: *Specified land use is satisfactory, based upon assumption buildings involved are of normal conventional construction, without any special noise insulation requirements.*

Conditionally Acceptable: *New construction or development should be undertaken only after a detailed analysis of the noise-reduction requirements is made and needed noise insulation features included in design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning will normally suffice.*

Normally Unacceptable: *New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.*

Clearly Unacceptable: *New construction or development should generally not be undertaken.*

Source: City of Los Angeles, 2006; L.A. CEQA Thresholds Guide, 2006.

Exhibit I of the Noise Element also contains guidelines for noise compatible land uses.[36] Table IV.I-5 summarizes these guidelines, which are based on OPR guidelines from 1990.

c. Existing Conditions

As discussed in Section II, Project Description, of this Draft EIR, the Project Site is located in an industrial-zone (M3-1-RIO), with existing commercial/industrial surrounding the Project Site. The predominant source of noise in the vicinity of the Project Site is

[36] *City of Los Angeles, General Plan Noise Element, Adopted February 3, 1999, p. I-1.*

vehicular traffic on adjacent roadways, particularly along Santa Fe Avenue west of the Project Site, which have high volumes of traffic. Ambient noise sources in the vicinity of the Project Site include traffic, transit (nearby trains/rails), and trucks; commercial/industrial activities; construction noise from developing properties in the area; and other miscellaneous noise sources associated with typical urban activities.

(1) Noise-Sensitive Receptors

Some land uses are considered more sensitive to intrusive noise than others based on the types of activities typically involved at the receptor location. The *L.A. CEQA Thresholds Guide* states that noise-sensitive uses include residences, transient lodgings, schools, libraries, churches, hospitals, nursing homes, auditoriums, concert halls, amphitheaters, playgrounds, and parks.[37] These uses are generally considered more sensitive to noise than commercial and industrial land uses.

Currently, there is one noise-sensitive use within 500 feet of the Project Site (the Soho House), based on a review of surrounding land uses. Four noise receptor locations were selected to represent existing and future noise-sensitive uses within 500 feet of the Project Site, as indicated in Figure IV.I-3 on page IV.I-21. These locations represent areas with proposed uses that could qualify as noise-sensitive according to the definition of such uses in the *L.A. CEQA Thresholds Guide*. As discussed below, noise measurements were conducted at the four selected off-site locations around and adjacent to the Project Site to establish baseline noise conditions in the Project vicinity. The monitoring locations essentially surround the Project Site and thereby provide baseline measurements for uses in all directions. There are no noise-sensitive uses in the vicinity of the Project Site to the east. The nearest noise sensitive uses to the east are approximately 2,800 feet away and are shielded by intervening buildings. In addition, the monitoring locations provide an adequate basis to evaluate potential impacts at the monitoring locations and receptors beyond in the same direction. The noise measurement locations are shown in Figure IV.I-3 and described in Table IV.I-6 on page IV.I-22.

(2) Ambient Noise Levels

To establish baseline noise conditions, existing ambient noise levels were monitored at the four representative receptor locations (identified as R1 to R4) in the vicinity of the Project Site and one on-site receptor location (identified as P1). The baseline noise monitoring program was conducted on February 26, 2019, using a Quest Technologies

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[37] *City of Los Angeles, L.A. CEQA Thresholds Guide, p. I.1-3, 2006.*

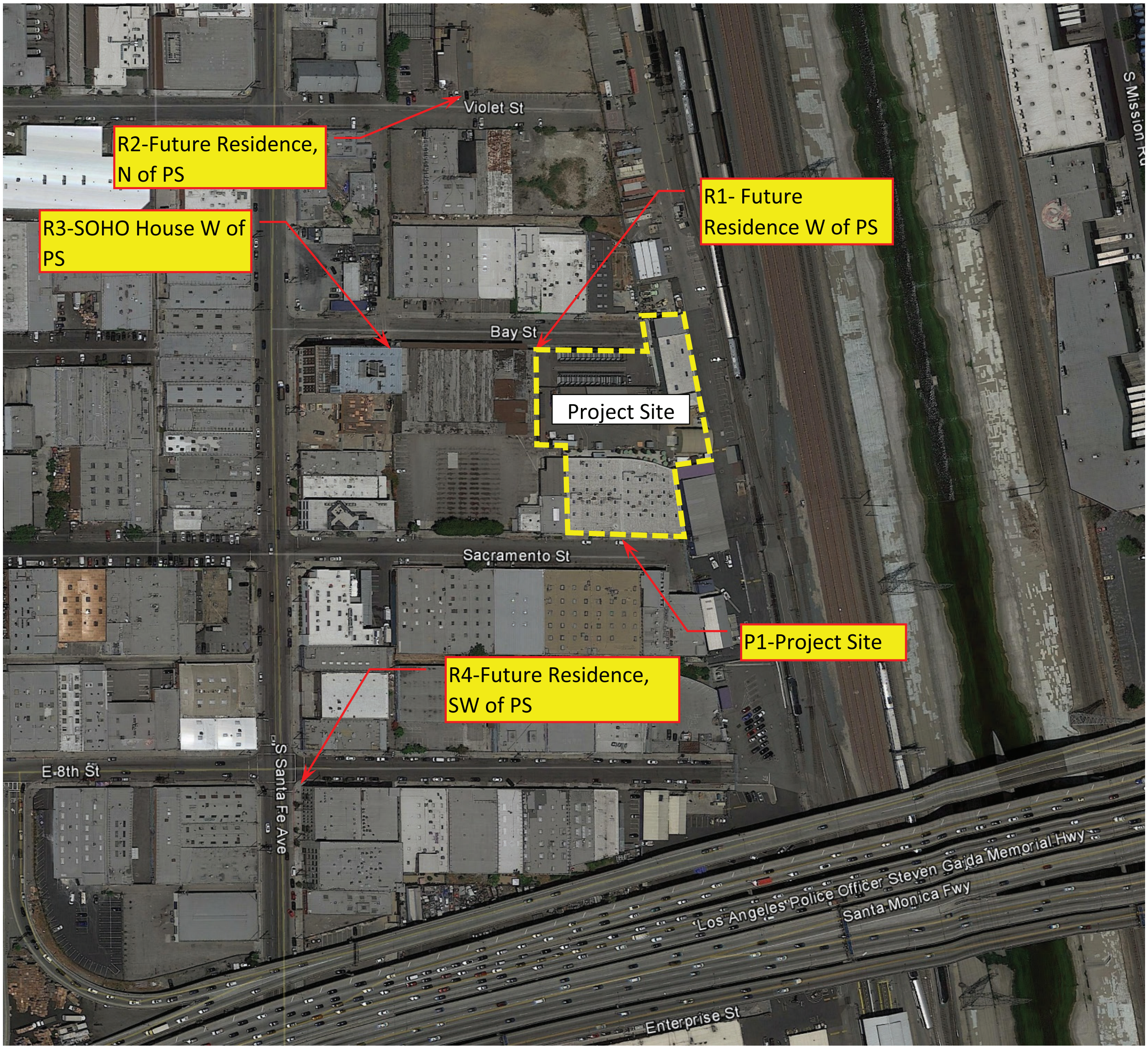

Figure IV.I-3

Noise Measurement Locations

Source: AES, November 16, 2021.

Table IV.I-6
Description of Noise Measurement Locations

Receptor Location	Land Use Description (Future)	Approximate Distance from Measurement Location to Nearest Project Site Boundary (feet)[a]	Existing Land Use/Zone
P1	Project Site southern property line	At the Project Site Property Line	Industrial (M3-1-RIO)
R1	Proposed mixed-use development at 2110 Bay Street (with residential uses) adjacent to the Project Site to the west	Adjacent to the Project Site	Industrial (M3-1-RIO)
R2	Proposed mixed-use development at 2143 Violet (with residential uses) on the north side of Violet Street, north of the Project Site.	365	Industrial (M3-1-RIO)
R3	Existing Soho House (hotel use) at the southeast corner of Santa Fe Avenue and Bay Street, west of the Project Site	250	Industrial (M3-1-RIO)
R4	Proposed mixed-use development at 1200 Santa Fe Avenue (with residential use) at the southeast corner of Santa Fe Avenue and 8th Street, southwest of the Project Site	500	Industrial (M3-1-RIO)

[a] *Distances are estimated using Google Earth and are direct (as the crow flies) rather than driving distances. (Map data ©Google 2019).*

Source: AES, Noise Calculation Worksheets, June 2022. See Appendix J of this Draft EIR.

Model 2900 Integrating/Logging Sound Level Meter.[38] City standards require ambient noise to be measured over a period of at least 15 minutes.[39] A 24-hour measurement was conducted at the on-site receptor location P1, from 11:00 A.M. on February 26 to 11:00 A.M. on February 27, 2019. Two 15-minute measurements were conducted at receptor locations R1 through R4 during daytime and nighttime hours. The daytime ambient noise levels were measured between 10:00 A.M. and 12:00 P.M., and the nighttime ambient noise levels were measured between 10:00 P.M. and 12:00 A.M. The daytime ambient noise measurements were taken midday (i.e., during a non-peak traffic hour) to provide a more conservative baseline, as ambient noise levels during a non-peak traffic hour (with a lower traffic volume) are generally lower than during a peak traffic hour

[38] *This sound meter meets and exceeds the minimum industry standard performance requirements for "Type 2" standard instruments as defined in the American National Standard Institute (ANSI) S1.4. It also meets the requirement specified in Section 111.01(l) of the LAMC that instruments be "Type S2A" standard instruments or better. The sound meter was calibrated and operated according to the manufacturer's written specifications.*

[39] *LAMC Section 111.01.*

(with a higher traffic volume). Table IV.I-7 on page IV.I-24 provides a summary of the ambient noise measurements conducted at the four off-site noise receptor locations and at the Project Site. Based on field observations, the ambient noise at the noted measurement locations is primarily dominated by local traffic and, to a lesser extent, helicopter flyovers, transit (nearby trains/rails) and other typical industrial noises. As indicated in Table IV.I-7, the existing daytime ambient noise levels at the off-site noise receptor locations ranged from 58.6 dBA (L_{eq}) at receptor location R1 to 76.1 dBA (L_{eq}) at receptor location R4. The measured nighttime ambient noise levels ranged from 53.6 dBA (L_{eq}) at receptor location R1 to 69.7 dBA (L_{eq}) at receptor location R4. The existing ambient noise levels (daytime and nighttime) at receptor locations P1, R1 and R2 are below the City's noise standard of 65 dBA (L_{eq}) for industrial zones, as presented above in Table IV.I-4 on page IV.I-18. However, the existing ambient noise levels at all off-site locations are above the City's presumed daytime and nighttime ambient noise levels of 50 dBA (L_{eq}) and 40 dBA (L_{eq}), respectively, for residential uses (i.e., the proposed future off-site residential uses).

In addition to the ambient noise measurements in the vicinity of the Project Site, the existing traffic noise on local roadways in the surrounding area was calculated to quantify the 24-hour CNEL noise levels using information provided by the Transportation Assessment prepared for the Project and included in Appendix M of this Draft EIR. Thirteen (13) roadway segments were selected for the existing off-site traffic noise analysis included in this section based on proximity to noise-sensitive uses along the roadway segments and potential increases in traffic volumes from the Project. Traffic noise levels were calculated using the Federal Highway Administration (FHWA) Traffic Noise Model (TNM) and traffic volume data from the Transportation Assessment prepared for the Project.[40] The TNM traffic noise prediction model calculates the hourly L_{eq} noise levels based on specific information including the hourly traffic volume, vehicle type mix, vehicle speed, and lateral distance between the noise receptor and the roadway. To calculate the 24-hour CNEL levels, the hourly L_{eq} levels were calculated for daytime hours (7:00 A.M. to 7:00 P.M.), evening hours (7:00 P.M. to 10:00 P.M.), and nighttime hours (10:00 P.M. to 7:00 A.M.).

The traffic noise prediction model calculates the 24-hour CNEL noise levels based on specific information, including Average Daily Traffic (ADT); percentages of day, evening, and nighttime traffic volumes relative to ADT; vehicle speed; and distance between the noise receptor and the roadway. Vehicle mix/distribution information used in the noise calculations is shown in Table IV.I-8 on page IV.I-25.

[40] *FHWA Traffic Noise Model, TNM Version 2.5, available at www.fhwa.dot.gov/environment/noise/traffic_noise_model/tnm_v25/, accessed November 16, 2021.*

Table IV.I-7
Existing Ambient Noise Levels

Receptor Location	Existing General Plan Land Use Designation	Measured Noise Levels, L_{eq} (dBA)		CNEL (24-hour)[a]
		Daytime Hours (7:00 A.M.–10:00 P.M.)	Nighttime Hours (10:00 P.M.–7:00 A.M.)	
P1	Industrial	60.9[b]	58.8[b]	65.8
R1	Industrial	58.6	53.6	59.8
R2	Industrial	59.9	57.7	62.9
R3	Industrial	66.4	55.5	65.2
R4	Industrial	76.1	69.7	76.5

[a] Estimated based on short-term (15-minute) noise measurement based on FTA procedures.
[b] Levels shown for P1 represent the average for the entire daytime and nighttime periods.
Source: AES, Noise Calculation Worksheets, June 2022. See Appendix J of this Draft EIR.

Table IV.I-9 on page IV.I-26 provides the calculated CNEL for the analyzed local roadway segments based on existing traffic volumes. As shown therein, the existing CNEL due to surface street traffic volumes ranges from 57.6 dBA CNEL along Violet Street (east of Santa Fe Avenue) to 70.9 dBA CNEL along Santa Fe Avenue (between 7th Street and Violet Street). Currently, the existing traffic-related noise levels along the roadway segment of Mateo Street (between 7th Street and 8th Street) and Santa Fe Street (between Sacramento Street and 8th Street), fall within the conditionally acceptable noise levels for commercial uses (i.e., between 67 and 77 dBA CNEL).[41] The existing traffic noise levels along analyzed roadway segments of Santa Fe Avenue (between 7th Street and Sacramento Street) are between 70 dBA CNEL and 75 dBA CNEL, which are considered normally unacceptable for residential uses (i.e., between 70 and 75 dBA CNEL). The existing traffic noise levels along Violet Street (between Wilson Street and east of Santa Fe Street), Bay Street (east of Santa Fe Street), and Sacramento Street (between Wilson Street and east of Santa Fe Avenue, adjacent to the Project Site) fall within normally acceptable for commercial uses (i.e., between 50 and 70 dBA CNEL).

(3) Existing Ground-Borne Vibration Levels

Based on field observations, the primary source of existing ground-borne vibration in the vicinity of the Project Site is vehicular travel (e.g., standard cars, refuse trucks, delivery trucks, construction trucks, school buses, and buses) on local roadways. According to the FTA technical study “Federal Transit Administration: Transit Noise and Vibration Impacts

[41] Note that the “normally acceptable” and “conditionally acceptable” categories overlap. To be conservative the “conditionally acceptable” category is used.

Table IV.I-8
Vehicle Mix for Traffic Noise Model

Vehicle Type	Percent of Average Daily Traffic (ADT)			Total Percent of ADT per Vehicle Type
	Daytime Hours (7 A.M.–7 P.M.)	Evening Hours (7 P.M.–10 P.M.)	Nighttime Hours (10 P.M.–7 A.M.)	
Automobile	77.6	9.7	9.7	97.0
Medium Truck[a]	1.6	0.2	0.2	2.0
Heavy Truck[b]	0.8	0.1	0.1	1.0
Total	80.0	10.0	10.0	100.0

[a] *Medium Truck—Trucks with 2 axles.*
[b] *Heavy Truck—Trucks with 3 or more axles.*
Source: AES, Noise Calculation Worksheets, June 2022. See Appendix J of this Draft EIR.

Assessments," typical road traffic-induced vibration levels are unlikely to be perceptible by people. Specifically, the FTA study reports that "[i]t is unusual for vibration from sources such as buses and trucks to be perceptible, even in locations close to major roads."[42] Trucks and buses typically generate ground-borne vibration velocity levels of around 63 VdB (at 50 feet distance), and these levels could reach 72 VdB when trucks and buses pass over bumps in the road. Other vibration sources include the existing active rails, approximately 150 feet east of the Project Site. Per the FTA, the ground-borne vibration velocity at 150 feet from trains range from approximately 63 VdB (for Rapid Transit or Light Rail Vehicles at 50 mph) to 74 VdB (for Locomotive Powered Passenger or Freight at 50 mph).[43] Per the FTA, 75 VdB is the dividing line between barely perceptible (with regard to ground vibration) and distinctly perceptible.[44] Therefore, existing ground vibration in the vicinity of the Project Site is generally below the perceptible level.

[42] *FTA, "Transit Noise and Vibration Impact Assessment," Page 112, September 2018.*

[43] *FTA, "Transit Noise and Vibration Impact Assessment," Figure 6-4, September 2018.*

[44] *FTA, "Transit Noise and Vibration Impact Assessment," Table 5-5, September 2018.*

Table IV.I-9
Existing Roadway Traffic Noise Levels

Roadway Segment	Adjacent Sensitive Land Use	Approximate Distance to Roadway Center Line (feet)	Calculated Traffic Noise Levels, CNEL (dBA)[a]	Noise-Sensitive Land Uses	Existing Noise Exposure Compatibility Category[b]
Mateo Street					
– Between 7th St. and Violet St.	Commercial	30	69.5	No	Conditionally Acceptable
– Between Violet St. and Sacramento St.	Commercial	30	69.5	No	Conditionally Acceptable
– Between Sacramento St. and 8th St.	Commercial	30	70.5	No	Conditionally Acceptable
Santa Fe Avenue					
– Between 7th St. and Violet St.	Residential	35	70.9	Yes	Normally Unacceptable
– Between Violet St. and Sacramento St.	Residential	35	70.8	Yes	Normally Unacceptable
– Between Sacramento St. and 8th St.	Commercial	35	70.8	No	Conditionally Acceptable
Violet Street					
– Between Wilson St. and Mateo St.	Commercial	30	60.2	No	Normally Acceptable
– Between Mateo St. and Santa Fe St.	Commercial	30	61.3	No	Normally Acceptable
– East of Santa Fe St.	Commercial	30	57.6	No	Normally Acceptable
Bay Street					
– East of Santa Fe Ave.	Industrial	30	58.2	No	Normally Acceptable
Sacramento Street					
– Between Wilson St. and Mateo St.	Commercial	30	64.2	No	Normally Acceptable
– Between Mateo St. and Santa Fe St.	Commercial	30	59.7	No	Normally Acceptable
– East of Santa Fe St.	Commercial	30	59.9	No	Normally Acceptable

[a] *Detailed calculation worksheets are included in Appendix J of this Draft EIR.*

[b] *Noise compatibility is based on the most stringent land use, per City's land use compatibility as provided in Table IV.I-5 on page IV.I-19.*

Source: AES, Noise Calculation Worksheets, June 2022. See Appendix J of this Draft EIR.

3. Project Impacts

a. Thresholds of Significance

In accordance with the State CEQA Guidelines Appendix G (Appendix G), the Project would have a significant impact related to noise if it would result in the:

Threshold (a): ***Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies; or***

Threshold (b): ***Generation of excessive groundborne vibration or noise levels; or***

Threshold (c): ***For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?***

For this analysis, the Appendix G Thresholds provided above are relied upon. The analysis utilizes factors and considerations identified in the City's 2006 *L.A. CEQA Thresholds Guide*, as appropriate, to assist in answering the Appendix G Threshold questions.

The *L.A. CEQA Thresholds Guide* identifies the following criteria to evaluate impacts related to noise:

(1) Construction Noise

A project would normally have a significant impact on noise levels from construction if:

- Construction activities lasting more than one day would exceed existing ambient exterior sound levels by 10 dBA (hourly L_{eq}) or more at a noise-sensitive use;
- Construction activities lasting more than 10 days in a three-month period would exceed existing ambient exterior noise levels by 5 dBA (hourly L_{eq}) or more at a noise-sensitive use; or
- Construction activities of any duration would exceed the ambient noise level by 5 dBA (hourly L_{eq}) at a noise-sensitive use between the hours of 9:00 P.M. and 7:00 A.M. Monday through Friday, before 8:00 A.M. or after 6:00 P.M. on Saturday, or at any time on Sunday.

As discussed in Section II, Project Description, of this Draft EIR, construction of the Project is anticipated to be completed in 2025. Therefore, since construction activities would occur over a period longer than 10 days for all phases, the corresponding significance criteria used in the construction noise analysis presented in this section of the Draft EIR is an increase in the ambient exterior noise levels by 5 dBA (hourly L_{eq}) or more at a noise-sensitive use.

(2) Operational Noise

A project would normally have a significant impact on noise levels from operation if:

- The project causes the ambient noise levels measured at the property line of affected noise-sensitive uses to increase by 3 dBA in CNEL to or within the "normally unacceptable" or "clearly unacceptable" category (see Table IV.H 2 on page IV.H-7 for a description of these categories); or
- The project causes the ambient noise levels measured at the property line of affected noise-sensitive uses to increase by 5 dBA in CNEL or greater; or
- Project-related operational on-site (i.e., non-roadway) noise sources, such as outdoor building mechanical/electrical equipment, outdoor activities, loading, trash compactor, or parking facilities, increase the ambient noise level (hourly L_{eq}) at noise-sensitive uses by 5 dBA.

The significance criteria used in the noise analysis for on-site operations presented below is an increase in the ambient noise level of 5 dBA (hourly L_{eq}) at the noise-sensitive uses, in accordance with the LAMC. The LAMC does not apply to off-site traffic (i.e., vehicle traveling on public roadways). Therefore, based on the *L.A. CEQA Thresholds Guide*, the significance criteria for off-site traffic noise associated with Project operations is an increase in the ambient noise level by 3 dBA or 5 dBA in CNEL (depending on the existing ambient noise levels and the land use category) at noise-sensitive uses. In addition, the significance for composite noise levels (on-site and off-site sources) is also based on the *L.A. CEQA Thresholds Guide*, which is an increase in the ambient noise level of 3 dBA or 5 dBA in CNEL (depending on the current ambient noise levels and the land use category) for the Project's composite noise (both project-related on-site and off-site sources) at noise-sensitive uses.

(3) Airport Noise

A project would normally have a significant impact on noise levels from airport noise if:

- Noise levels at a noise-sensitive use attributable to airport operations exceed 65 dB CNEL and the project increases ambient noise levels by 1.5 dB CNEL or greater.

(4) FTA Ground-Borne Vibration Standards and Guidelines

The City of Los Angeles currently does not have significance criteria to assess vibration impacts during construction. Thus, guidelines set forth in the FTA's *Transit Noise and Vibration Assessment*, dated September 2018, are used to evaluate potential impacts related to construction vibration for both potential building damage and human annoyance. The FTA guidelines regarding construction vibration are the most current guidelines and are commonly used in evaluating vibration impacts.

Based on this FTA guidance, impacts relative to ground-borne vibration associated with potential building damage would be considered significant if any of the following future events were to occur:

- Project construction activities cause ground-borne vibration levels to exceed 0.5 PPV at the nearest off-site reinforced-concrete, steel, or timber building.
- Project construction activities cause ground-borne vibration levels to exceed 0.3 PPV at the nearest off-site engineered concrete and masonry building.
- Project construction activities cause ground-borne vibration levels to exceed 0.2 PPV at the nearest off-site non-engineered timber and masonry building.
- Project construction activities cause ground-borne vibration levels to exceed 0.12 PPV at buildings extremely susceptible to vibration damage, such as historic buildings.

Based on FTA guidance, construction vibration impacts associated with human annoyance would be significant if the following were to occur (applicable to frequent events; 70 or more vibration events per day):

- Project construction activities cause ground-borne vibration levels to exceed 72 VdB at off-site sensitive uses, including residential/hotel uses.

b. Methodology

(1) On-Site Construction Activities

Construction noise impacts due to on-site construction activities associated with the Project were evaluated by calculating the construction-related noise levels at representative sensitive receptor locations and comparing these estimated construction-related noise levels associated with construction of the Project to the existing ambient noise levels (i.e., noise levels without construction noise from the Project). Construction noise associated with the Project was analyzed based on the Project's potential construction equipment inventory, construction durations, and construction schedule. The construction noise model for the Project is based on construction equipment noise levels as published by the FHWA's "Roadway Construction Noise Model (FHWA 2006)."[45] The ambient noise levels at surrounding sensitive receptor locations were based on field measurement data (see Table IV.I-7 on page IV.I-24). The construction noise levels were then calculated for the Project sensitive receptor locations based on the standard point source noise-distance attenuation factor of 6.0 dBA for each doubling of distance (as described above in Subsection 2.a(4), Noise Attenuation). Additional noise attenuation was assigned to receptor locations where the acoustical line-of-sight to the Project Site was interrupted by the presence of intervening structures.

(2) Off-Site Construction Haul Trucks

Off-site construction noise impacts from haul trucks associated with the Project were analyzed using the FHWA's TNM Version 2.5 computer noise model. The TNM is the current Caltrans standard computer noise model for traffic noise studies. The model allows for the input of roadway, noise receivers, and sound barriers, if applicable. The construction-related off-site truck volumes were obtained from the Transportation Assessment prepared for the Project, which is included in Appendix M of this Draft EIR. The TNM noise model calculates the hourly L_{eq} noise levels generated by construction-related haul trucks. Noise impacts were determined by comparing the Project's predicted noise level plus ambient noise with that of the existing ambient noise levels along the Project's anticipated haul route(s).

(3) On-Site Stationary Noise Sources (Operation)

On-site stationary point-source noise impacts were evaluated by: (1) identifying the noise levels that would be generated by the Project's stationary noise sources, such as rooftop mechanical equipment, outdoor activities (e.g., use of the outdoor paseo), parking facilities, and trash compactor; (2) calculating the noise level from each noise source at surrounding sensitive receptor property line locations; and (3) comparing such noise levels to ambient noise levels to determine significance. The on-site stationary noise sources

[45] The reference noise levels for construction equipment from the FHWA are based on more recent measurements of newer construction equipment (published in 2006), rather than the noise levels from the Environmental Protection Agency report referenced in the L.A. CEQA Thresholds Guide (published in 1971).

were calculated using the SoundPLAN (version 8.0) computer noise prediction model.[46] SoundPLAN is a 3-dimensional acoustic ray tracing program for outdoor noise propagation prediction developed by the German company, SoundPLAN GmbH. SoundPLAN is widely used by acoustical engineers as a noise modeling tool for environmental noise analysis.

(4) Off-Site Roadway Noise (Operation)

As discussed in Subsection 2.c, Existing Conditions, above, off-site roadway noise was analyzed using the FHWA TNM model and traffic data from the Project's Transportation Assessment, included as Appendix M of this Draft EIR. Roadway noise conditions without the Project were calculated and compared to noise levels that would occur with implementation of the Project to determine Project-related noise impacts for operational off-site roadway noise.

(5) Construction Vibration

Ground-borne vibration impacts due to the Project's construction activities were evaluated by identifying potential vibration sources (i.e., construction equipment), estimating the vibration levels at the potentially affected receptor, and comparing the Project's activities to the applicable vibration significance thresholds, as described below.

(6) Operational Vibration

The primary source of ground vibration related to operation of the Project would include vehicle circulation within the proposed subterranean parking garage and off-site vehicular trips. However, as discussed above, vehicular-induced vibration is unlikely to be perceptible by people. The Project would also include typical commercial-grade stationary mechanical equipment, such as air-handling units (mounted at the roof level), that would include vibration-attenuation mounts to reduce the vibration transmission.

c. Project Design Features

The following project design features are proposed with regard to noise and vibration:

Project Design Feature NOI-PDF-1: Power construction equipment (including combustion engines), fixed or mobile, shall be equipped with state-of-the-art noise shielding and muffling devices (consistent with manufacturers' standards). All equipment shall be properly

[46] *SoundPLAN GmbH, SoundPLAN version 8.0, 2017*

maintained to assure that no additional noise, due to worn or improperly maintained parts, would be generated.

Project Design Feature NOI-PDF-2: Project construction shall not include the use of driven (impact) pile systems.

Project Design Feature NOI-PDF-3: All outdoor mounted mechanical equipment shall be enclosed or screened from off-site noise-sensitive receptors. This project design feature does not apply to at-grade transformers per LADWP access requirements.

Project Design Feature NOI-PDF-4: Outdoor amplified sound systems, if any, shall be designed so as not to exceed the maximum noise level of 65 dBA ($L_{eq\text{-}1hr}$) at a distance of 25 feet from the face of the amplified speaker sound systems at the outdoor terrace, paseo and forum at Level 1 and 85 dBA ($L_{eq\text{-}1hr}$) at a distance of 25 feet at the Penthouse Terraces.[47] A qualified sound system/acoustic consultant shall provide written documentation that the design of the system complies with these maximum noise levels.

Project Design Feature NOI-PDF-5: All loading docks shall be screened from off-site noise-sensitive receptors.

d. Analysis of Project Impacts

Threshold (a): Would the Project result in generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?

(1) Impact Analysis

(a) Construction Noise

Construction of the Project would commence with demolition of the existing buildings and surface parking areas, followed by grading and excavation for the subterranean parking. Building foundations would then be constructed, followed by building construction, paving/concrete installation, and landscape installation. It is estimated that approximately 140,000 cubic yards of debris (e.g., concrete and asphalt surfaces) and soil would be hauled from the Project Site during the demolition and grading phase. Construction delivery/haul trucks would travel on approved truck routes between the Project Site and the I-10 Freeway. The truck route from the Project Site is anticipated to be Bay Street or Sacramento Street, Santa Fe Avenue, Porter Street, and then E/B Santa Monica (I-10)

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[47] *The sound limits are provided to ensure the amplified sound system would not exceed the significance criteria at any off-site noise-sensitive receptor locations.*

Freeway. The truck route to the Project Site is anticipated to be W/B I-10 Freeway, 8th Street, Santa Fe Avenue, and then either Sacramento Street or Bay Street.

(i) On-Site Construction Noise

Noise impacts from Project-related construction activities occurring within or adjacent to the Project Site would be a function of the noise generated by construction equipment, the location of the equipment, the timing and duration of the noise-generating construction activities, and the relative distance to noise-sensitive receptors. Construction activities for the Project would generally include demolition, site grading and excavation for the subterranean parking garage, and building construction. Each stage of construction would involve the use of various types of construction equipment and would, therefore, have its own distinct noise characteristics. Demolition generally involves the use of backhoes, front-end loaders, and heavy-duty trucks. Grading and excavation typically requires the use of earth-moving equipment, such as excavators, front-end loaders, and heavy-duty trucks. Building construction typically involves the use of cranes, forklifts, concrete trucks, pumps, and delivery trucks. Noise from construction equipment would generate both steady-state and episodic noise that could be heard within and adjacent to the Project Site.

Individual pieces of construction equipment anticipated to be used during construction of the Project could produce maximum noise levels (L_{max}) of 74 dBA to 90 dBA at a reference distance of 50 feet from the noise source, as shown in Table IV.I-10 on page IV.I-34. These maximum noise levels would occur when equipment is operating under full power conditions (i.e., the equipment engine at maximum speed). However, equipment used on construction sites often operate under less than full power conditions, or partial power. To more accurately characterize construction-period noise levels, the average (hourly L_{eq}) noise level associated with each construction phase is calculated based on the quantity, type, and usage factors for each type of equipment that would be used during each construction phase.[48] These noise levels are typically associated with multiple pieces of equipment operating simultaneously at partial power.

Table IV.I-11 on page IV.I-35 provides the estimated construction noise levels for various construction phases at the off-site noise-sensitive receptors. To present a conservative impact analysis, the estimated noise levels were calculated for a scenario in which all pieces of construction equipment were assumed to operate simultaneously and be located at the construction area nearest to the affected receptors.

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[48] *Pursuant to the FHWA Roadway Construction Noise Model User's Guide, 2006, the usage factor is the percentage of time during a construction noise operation that a piece of construction is operating at full power.*

Table IV.I-10
Construction Equipment Noise Levels

Equipment	Estimated Usage Factor[a] (%)	Typical Noise Level at 50 feet from Equipment, dBA (L_{max})
Air Compressor	40	78
Asphalt Concrete Grinder	20	90
Cement and Mortar Mixer	50	80
Concrete Mixer Truck	40	79
Concrete Saw	20	90
Crane	16	81
Drill Rig	20	84
Forklift	10	75
Generator	50	81
Grader	40	85
Dump/Haul Truck	40	76
Excavator	40	81
Paver	50	77
Pump	50	81
Roller	20	80
Rubber Tired Loader	40	79
Tractor/Loader/Backhoe	40	80
Delivery Truck	40	74
Welders	40	74

[a] *Usage factor represents the percentage of time the equipment would be operating at full speed.*
Source: FHWA Roadway Construction Noise Model User's Guide, January 2006.

These assumptions represent a worst-case noise scenario because construction activities would typically be spread out throughout the Project Site, and, thus, some equipment would be farther away from the affected receptors. In addition, the noise modeling assumes that construction noise is constant, when, in fact, construction activities and associated noise levels are periodic and fluctuate based on the construction activities.

As discussed above, since construction activities would occur over a period longer than 10 days for all phases, the corresponding significance criteria used in the construction noise analysis is when construction-related noise exceeds the ambient L_{eq} noise level by 5 dBA at a noise-sensitive use. As presented in Table IV.I-11 on page IV.I-35, construction activities would generate the highest noise during the demolition phase, as it is anticipated to have the highest noise generating construction equipment in the construction area compared to the Project's other construction stages.

Table IV.I-11
Construction Noise Impacts

Off-Site Receptor Location	Approximate Distance from Receptor to Project Construction Area (feet)	Estimated Construction Noise Levels by Construction Phases, (L_{eq} (dBA))								Existing Daytime Ambient Noise Levels (L_{eq} (dBA))	Signifi-cance Criteria (L_{eq} (dBA))[a]	Maximum Noise Exceedance Above the Criteria (L_{eq} (dBA))	Signifi-cant Impact?
		Demo.	Grading	Foundation	Basement	Building	Façade	Interior	Paving				
R1	10	97.3	95.4	91.7	97.1	97.2	89.0	92.0	97.3	58.6	63.6	33.7	Yes[b]
R2	365	65.7	63.5	62.2	62.9	64.6	58.6	61.4	63.9	59.9	64.9	0.8	Yes[b]
R3	250	63.7	61.5	60.1	61.1	62.6	56.8	59.5	62.0	66.4	71.4	0.0	No
R4	500	58.1	55.9	54.6	55.3	57.1	50.9	53.7	56.2	76.1	81.1	0.0	No

[a] *Significance criteria are equivalent to the measured daytime ambient noise levels (see Table IV.I-7 on page IV.I-24) plus 5 dBA, per the L.A. CEQA Thresholds Guide for construction activities lasting longer than 10 days in a three-month period. If the estimated construction noise levels exceed those significance criteria, a construction-related noise impact is identified.*

[b] *Significant impact if the proposed mixed-use developments at receptor locations R1 and R2 are built and occupied prior to or during Project construction. Noise impact would be less than significant for the existing use (i.e., industrial and surface parking).*

Source: AES, Noise Calculation Worksheets, June 2022. See Appendix J of this Draft EIR.

Therefore, potential noise impacts would be highest during the demolition phase. As indicated in Table IV.I-11 on page IV.I-35, the estimated noise levels during all stages of Project construction would exceed the significance criteria at off-site receptor locations R1, by up to 33.7 dBA. The estimated noise levels during the demolition phase would exceed the significance criteria at off-site receptor location R2, by up to 0.8 dBA. However, the noise impact identified at receptor locations R1 and R2 assumes the proposed mixed-use developments (which include multi-family residential uses) at those locations will be completed and occupied prior to or during Project construction. In the event the proposed mixed-use developments are not built and occupied before or during Project construction, the noise impacts identified at receptor locations R1 and R2 would be less than significant, based on the current land use category (i.e., industrial and surface parking). **Therefore, it is concluded that temporary noise impacts associated with the Project's on-site construction activities would be significant without mitigation measures if the mixed-use developments proposed at receptor locations R1 and R2 are completed and occupied prior to or during project construction.**

(ii) Off-Site Construction Noise

In addition to on-site construction noise sources, other noise sources may include materials delivery, concrete mixing, and haul trucks (construction trucks), as well as construction worker vehicles accessing the Project Site during construction. Typically, construction trucks generate higher noise levels than construction worker vehicles. The major noise sources associated with off-site construction trucks would be associated with delivery/haul trucks. As described above, construction delivery/haul trucks would travel between the Project Site and the I-10 Freeway via Bay Street, Sacramento Street, and Santa Fe Avenue. There are no sensitive uses along Sacramento Street between the Project Site and Santa Fe Avenue. Therefore, noise impacts are evaluated along Bay Street and Santa Fe Avenue.

The peak period of construction with the highest number of construction trucks would occur during the site grading phase.[49] During this phase, there would be a maximum of 130 trucks (125 haul trucks and 5 delivery trucks) coming to and leaving the Project Site (equal to 260 total trips) per day. In addition, there would be a total of 25 worker trips to and from the Project Site on a daily basis during the grading/excavation phase. There would also be construction haul/delivery truck trips (up to 240 truck trips per day when including concrete trucks) during other construction phases of the Project, but such trips would be less than the 260 truck trips under the grading phase.

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[49] *See construction assumptions in Appendix J of this Draft EIR.*

Table IV.I-12 on page IV.I-38 provides the estimated number of construction-related trips, including haul/delivery trucks and worker vehicles, and the estimated noise levels along the anticipated haul route(s). As indicated in Table IV.I-12, the noise levels generated by construction traffic during all stages of Project construction would be below the existing daytime ambient noise levels along Santa Fe Avenue. However, the estimated construction traffic noise level along Bay Street (between the Project Site and Santa Fe Avenue) would result in a maximum 6.5 dBA increase over the existing ambient, which would exceed the applicable 5-dBA significance criteria. **Therefore, temporary noise impacts from off-site construction traffic would be significant without mitigation measures.**

(iii) Summary of Construction Noise Impacts

As discussed above, temporary noise impacts associated with the Project's on-site construction would be significant at the sensitive uses represented by two of the off-site receptor locations if the mixed-use developments proposed at those locations are completed and occupied prior to or during project construction. In addition, the temporary noise impacts from off-site construction traffic would be significant along Bay Street (east of Santa Fe Avenue). **Therefore, without mitigation measures, Project construction would result in the generation of a substantial temporary increase in ambient noise levels in excess of standards established by the City. Therefore, the Project's construction noise impacts would be significant prior to mitigation.**

(b) Operational Noise

This section provides a discussion of potential operational noise impacts on nearby noise-sensitive receptors represented by receptors R1 through R4. Specific operational noise sources addressed herein include: (a) on-site stationary noise sources, including outdoor mechanical equipment (e.g., heating, ventilation, and air conditioning [HVAC] equipment), activities within the proposed outdoor spaces (e.g., outdoor patios/paseo and terraces), parking facilities, loading dock, and trash compactor; and (b) off-site mobile (roadway traffic) noise sources.

(i) On-Site Stationary Noise Sources

Mechanical Equipment

As part of the Project, new mechanical equipment (e.g., air ventilation equipment) would be located at the building roof level and within the building structure (e.g., garage exhaust fans). Although operation of this equipment would generate noise, Project-related outdoor mechanical equipment would be designed so as not to increase the existing ambient noise levels by 5 dBA in accordance with the City's Noise Regulations. Specifically, the Project would comply with LAMC Section 112.02, which prohibits noise

Table IV.I-12
Off-Site Construction Noise Levels

Construction Phase	Estimated Number of Construction Truck/Worker Trips per Day	Estimated Number of Construction Truck/Worker Trips per Hour[a]	Estimated Haul Truck Noise Levels Along the Project Haul Routes (L_{eq} (dBA)) (Project/Project + Ambient)	
			Bay Street	Santa Fe Avenue
Demolition	30/25	5/10	60.6/62.7	59.8/76.2
Grading	260/25	44/10	69.8/70.1	68.9/76.9
Foundation (concrete pour)	160/125	20/50	66.7/67.3	65.9/76.5
Basement to Podium	240/250	30/100	68.6/69.0	67.8/76.7
Building Construction	80/400	10/160	65.6/66.4	64.8/76.4
Architectural Façade	120/350	15/140	66.5/67.2	65.7/76.5
Building Interior	120/300	15/120	66.3/67.0	65.5/76.5
Finish Sitework/Paving/ Landscaping	40/100	5/40	61.6/63.4	60.7/76.2
Existing Daytime Ambient Noise Levels Along the Project Haul Routes, L_{eq} (dBA)[b]			58.6	76.1
Significance Criteria, L_{eq} (dBA)[c]			63.6	81.1
Maximum Exceedance over Significance Criteria, L_{eq} (dBA)			6.5	0.0
Significant Impact?			Yes	No

[a] *For construction trucks, the number of hourly trips is based on an hourly average, assuming a uniform distribution of trips over an 8-hour workday. Haul truck hourly trips are based on 6-hour hauling per day. For worker vehicles, the number of hourly trips is based on 40% of the worker trips that would arrive in one hour to represent a conservative analysis.*

[b] *Ambient noise levels along the haul routes are based on measurements at nearby receptor locations (i.e., receptor location R1 along Bay Street and R4 along Santa Fe Avenue).*

[c] *Significance criteria are equivalent to the measured daytime ambient noise levels plus 5 dBA.*

Source: AES, Noise Calculation Worksheets, June 2022. See Appendix J of this Draft EIR.

from air conditioning, refrigeration, heating, pumping, and filtering equipment from exceeding the ambient noise levels on the premises of other occupied properties by more than 5 dBA. In addition, as provided above in Project Design Feature NOI-PDF-3, all outdoor mounted mechanical equipment would be enclosed or screened from off-site noise-sensitive receptors. Table IV.I-13 on page IV.I-39 presents the estimated noise levels at the off-site receptor locations from operation of the Project's mechanical equipment. As indicated in Table IV.I-13, the estimated noise levels from mechanical equipment would range from 38.3 dBA (L_{eq}) at receptor location R2 to 49.5 dBA (L_{eq}) at receptor location R1, which would be below the existing ambient noise levels. As such, the

Table IV.I-13
Estimated Noise Levels from Mechanical Equipment

Receptor Location	Existing Ambient Noise Levels, dBA (L_{eq})	Estimated Noise Levels from Mechanical Equipment, dBA (L_{eq})	Ambient + Project Noise Levels, dBA (L_{eq})	Significance Criteria, dBA (L_{eq})[a]	Exceedance over Significance Criteria	Significant Impact?
R1	53.6	49.5	55.0	58.6	0.0	No
R2	57.7	38.3	57.7	62.7	0.0	No
R3	55.5	39.5	55.6	60.5	0.0	No
R4	69.7	39.6	69.7	74.7	0.0	No

[a] *Significance criteria are equivalent to the measured daytime or nighttime ambient noise levels, whichever is lower (see Table IV.I-7 on page IV.I-24) plus 5 dBA, per the City of Los Angeles Noise Regulations. If the estimated noise levels exceed those significance criteria, a noise impact is identified.*

Source: AES, Noise Calculation Worksheets, June 2022. See Appendix J of this Draft EIR.

estimated noise levels at all off-site receptor locations would be below the significance criteria of 5 dBA (L_{eq}) above ambient noise levels (based on the lowest measured ambient noise level). **Therefore, noise impacts from mechanical equipment would be less than significant.**

Outdoor Spaces

As discussed in Section II, Project Description, of this Draft EIR, the Project would include outdoor terrace, paseo and forum at Level 1 (ground level) and terraces at the Penthouse level. Noise sources associated with outdoor uses typically include people gathering and conversing. For this operational noise analysis, raised voice levels of 65 dBA for a male and 62 dBA for a female were assumed for people gathering at the outdoor spaces.[50] In addition, it was assumed that up to 50 percent of the people (half of which would be male and the other half female) would be talking at the same time. In addition, the typical hours of operation for use of the outdoor areas would be from 6:00 A.M. to 2:00 A.M., as set forth in Section 3, Project Description, of this Draft EIR, which limits activity in the Project's outdoor activity areas to these times.

An additional potential noise source associated with outdoor uses would be the use of an outdoor amplified sound system (e.g., music or other sounds broadcast through an outdoor mounted speaker system). As set forth in Project Design Feature NOI-PDF-4, any

[50] *Cyril M. Harris, Handbook of Acoustical Measurements and Noise Control, Third Edition, 1991, Table 16.1.*

amplified sound system used in outdoor areas would be designed so as not to exceed the maximum noise levels of 65 to 85 dBA L_{eq}, as indicated in Table IV.I-14 on page IV.I-41, thereby ensuring that the amplified sound system would not exceed the significance criteria at any off-site noise-sensitive receptor location. Table IV.I-14 presents the anticipated number of people at each of the outdoor spaces and the Project's maximum amplified sound levels.

Table IV.I-15 on page IV.I-41 presents the estimated noise levels at the off-site sensitive receptors resulting from the use of outdoor areas. The estimated noise levels were calculated with the assumption that all of the outdoor spaces would be fully occupied and operating concurrently to represent a worst-case noise analysis. As presented in Table IV.I-15, the estimated noise levels from the outdoor spaces would range from 42.7 dBA (L_{eq}) at receptor location R4 to 51.7 dBA (L_{eq}) at receptor location R1, which would be below the significance criteria of 5 dBA (L_{eq}) above ambient noise levels (based on the lowest measured ambient noise level). **As such, noise impacts from the use of the outdoor areas would be less than significant.**

Parking Facilities

As discussed in Section II, Project Description, of this Draft EIR, parking would be provided within four subterranean levels and a ground floor parking level (with 12 parking spaces). Sources of noise within the parking garage would primarily include vehicular movements and engine noise, doors opening and closing, and intermittent car alarms. Noise levels within the parking garage would fluctuate with the amount of automobile and human activity. Since the subterranean parking levels would be fully enclosed on all sides, noise generated within the subterranean parking garage would be effectively shielded from off-site sensitive receptor locations. Table IV.I-16 on page IV.I-42 presents the estimated noise levels at the off-site receptor locations from parking operations (mainly noise from vehicles using the ground floor parking).

As indicated in Table IV.I-16, the estimated noise levels from parking operations would range from 10.7 dBA (L_{eq}) at receptor location R4 to 31.4 dBA (L_{eq}) at receptor location R1, which would be well below the significance criteria of 5 dBA (L_{eq}) above the ambient noise levels (based on the lowest measured ambient). **Therefore, noise impacts from the parking facilities would be less than significant.**

Loading Dock and Trash Collection Areas

The Project loading dock and trash compactor would be located within the ground floor parking level, with access from Sacramento Street and Bay Street. Noise sources associated with the loading dock and trash collection area would include delivery/trash collection trucks and operation of the trash compactor. Based on measured noise levels

Table IV.I-14
Outdoor Use Analysis Assumptions

Outdoor Space	Estimated Total Number of People[a]	Amplified Sound System Levels, dBA (L_{eq})
Level 1—Outdoor Terrace/Paseo	452	65 dBA at 25 feet
Level 1—Outdoor Forum	291	65 dBA at 25 feet
Penthouse – Terrace	363	85 dBA at 25 feet

[a] *Based on maximum 15 square feet per person, per Building Code.*
Source: AES, June 2022. Based on information from Shimoda Design Group.

Table IV.I-15
Estimated Noise Levels from Outdoor Uses

Receptor Location	Existing Ambient Noise Levels (dBA (L_{eq}))	Estimated Noise Levels from Outdoor Uses (dBA (L_{eq}))	Ambient + Project Noise Levels (dBA (L_{eq}))	Significance Criteria[a]	Exceedance over Significance Criteria	Significant Impact?
R1	53.6	51.7	55.8	58.6	0.0	No
R2	57.7	48.9	58.3	62.7	0.0	No
R3	55.5	45.9	55.5	60.5	0.0	No
R4	69.7	42.7	69.7	74.7	0.0	No

[a] *Significance criteria are equivalent to the measured daytime or nighttime ambient noise levels, whichever is lower (see Table IV.I-7 on page IV.I-24) plus 5 dBA, per the City of Los Angeles Noise Regulations. If the estimated noise levels exceed those significance criteria, a noise impact is identified.*
Source: AES, Noise Calculation Worksheets, June 2022. See Appendix J of this Draft EIR.

from typical loading dock facilities and trash compactors, delivery/trash collection trucks and trash compactors could generate noise levels of approximately 71 dBA (L_{eq}) and 66 dBA (L_{eq}), respectively, at a distance of 50 feet.[51] As provided above in Project Design Feature NOI-PDF-5, all loading docks would be screened from off-site noise-sensitive receptors. The loading dock and trash compactor would be effectively shielded from the off-site sensitive receptors. Table IV.I-17 on page IV.I-42 presents the estimated noise levels at the off-site receptor locations from operation of the loading dock and trash compactor. As indicated therein, the estimated noise from the loading dock and trash compactor would be below the significance criteria of 5 dBA (L_{eq}) above ambient noise levels. **Therefore, noise impacts from loading dock and trash compactor operations would be less than significant.**

[51] *RK Engineering Group, Inc., Wal-Mart/Sam's Club Reference Noise Level Study, 2003.*

Table IV.I-16
Estimated Noise Levels from Parking Facilities

Receptor Location	Existing Ambient Noise Levels, dBA (L_{eq})	Estimated Noise Levels from Parking Facilities, dBA (L_{eq})	Ambient + Project Noise Levels, dBA (L_{eq})	Significance Criteria[a]	Exceedance over Significance Criteria	Significant Impact?
R1	53.6	31.4	53.6	58.6	0.0	No
R2	57.7	12.5	57.7	62.7	0.0	No
R3	55.5	15.2	55.5	60.5	0.0	No
R4	69.7	10.7	69.7	74.7	0.0	No

[a] *Significance criteria are equivalent to the measured daytime or nighttime ambient noise levels, whichever is lower (see Table IV.I-7 on page IV.I-24) plus 5 dBA, per the City of Los Angeles Noise Regulations. If the estimated noise levels exceed those significance criteria, a noise impact is identified.*

Source: AES, Noise Calculation Worksheets, June 2022. See Appendix J of this Draft EIR.

Table IV.I-17
Estimated Noise Levels from Loading Dock and Trash Compactor

Receptor Location	Existing Daytime Ambient Noise Levels (dBA (L_{eq}))	Estimated Noise Levels from Loading Dock and Trash Compactor (dBA (L_{eq}))	Ambient + Project Noise Levels (dBA (L_{eq}))	Significance Criteria[a]	Exceedance over Significance Criteria	Significant Impact?
R1	58.6	51.2	59.3	63.6	0.0	No
R2	59.9	34.5	59.9	64.9	0.0	No
R3	66.4	36.8	66.4	71.4	0.0	No
R4	76.1	33.7	76.1	81.1	0.0	No

[a] *Significance criteria are equivalent to the measured daytime ambient noise levels (see Table IV.I-7 on page IV.I-24) plus 5 dBA, per the City of Los Angeles Noise Regulations. If the estimated noise levels exceed those significance criteria, a noise impact is identified.*

Source: AES, Noise Calculation Worksheets, June 2022. See Appendix J of this Draft EIR.

(ii) Off-Site Mobile Noise Sources

Future Plus Project

Future roadway noise levels were calculated along 13 roadway segments in the vicinity of the Project Site. The roadway noise levels were calculated using the traffic data provided in the Transportation Assessment prepared for the Project, which is included in Appendix M to this Draft EIR. As discussed in the Transportation Assessment, the Project is expected to generate a net increase of 2,119 daily trips. As such, Project-related traffic would increase the existing traffic volumes along the roadway segments in the study area when compared with Future without Project conditions. This increase in roadway traffic was analyzed to determine if any traffic-related noise impacts would result from operation of the Project. Table IV.I-18 on page IV.I-44 provides a summary of the roadway noise impact analysis. The CNEL levels were conservatively calculated in front of the roadways and do not account for the presence of any physical sound barriers or intervening structures. As shown in Table IV.I-18, the Project's greatest noise increase of 1.8 dBA (CNEL) would occur along Sacramento Street east of Santa Fe Avenue. The estimated 1.8 dBA noise level increase would be below the applicable 5 dBA significance threshold (as the estimated noise level is less than 70 dBA CNEL). At other analyzed roadway segments, the increase in traffic-related noise levels would be 1.1 dBA or less, which would be well below the relevant 3 dBA and 5 dBA CNEL significance criteria. **Therefore, traffic noise impacts under Future Plus Project conditions would be less than significant.**

Existing Plus Project

The analysis of traffic noise impacts provided above was based on the incremental increase in traffic noise levels attributable to the Project as compared to Future Without Project conditions. An additional analysis was performed to determine the potential noise impacts based on the increase in noise levels due to Project-related traffic compared with the existing baseline traffic noise conditions.

As shown in Table IV.I-19 on page IV.I-45, when compared with existing conditions, the Project would result in a maximum increase of up to 4.4 dBA (CNEL) in traffic-related noise levels along the roadway segment of Sacramento Street (east of Santa Fe Avenue). At other analyzed roadway segments, the increase in traffic-related noise levels would be 1.1 dBA or less. The estimated increase in traffic noise levels along Sacramento Street as compared to existing conditions would be below the relevant 5 dBA CNEL significance criteria. The estimated increase in traffic-related noise levels at all other analyzed roadway segments would be well below the relevant CNEL significance criteria. **Therefore, traffic noise impacts under Existing Plus Project conditions would be less than significant.**

(iii) Composite Noise Level Impacts from Project Operations

In addition to considering the potential noise impacts to neighboring noise-sensitive receptors from each specific on-site and off-site noise source (e.g., mechanical equipment, outdoor areas, parking facilities, loading dock and trash compactor, and off-site traffic), an evaluation of potential composite noise level increases (i.e., noise levels from all on-site noise sources combined) at the analyzed sensitive receptor locations was also performed. This evaluation of composite noise levels from all on-site project noise sources, evaluated using the CNEL noise metric, was conducted to determine the contributions at the noise-sensitive receptor locations in the vicinity of the Project Site.

Table IV.I-18
Roadway Traffic Noise Impacts—Future Plus Project

Roadway Segment	Adjacent Land Use	Calculated Traffic Noise Levels[a] (CNEL (dBA))		Increase in Noise Levels due to Project (CNEL (dBA))	Significant Impact?
		Future Without Project	Future Plus Project		
Mateo Street					
– Between 7th St. and Violet St.	Commercial	70.7	70.8	0.1	No
– Between Violet St. and Sacramento St.	Commercial	70.8	70.8	0.0	No
– Between Sacramento St. and 8th St.	Commercial	71.5	71.6	0.1	No
Santa Fe Avenue					
– Between 7th St. and Violet St.	Residential	73.3	73.5	0.2	No
– Between Violet St. and Sacramento St.	Residential	73.4	73.6	0.2	No
– Between Sacramento St. and 8th St.	Commercial	73.5	73.7	0.2	No
Violet Street					
– Between Wilson St. and Mateo St.	Commercial	60.2	60.2	0.0	No
– Between Mateo St. and Santa Fe St.	Commercial	61.3	61.9	0.6	No
– East of Santa Fe St.	Commercial	68.1	68.1	0.0	No
Bay Street					
– East of Santa Fe Ave.	Industrial	61.9	62.3	0.4	No
Sacramento Street					
– Between Wilson St. and Mateo St.	Commercial	64.2	64.2	0.0	No
– Between Mateo St. and Santa Fe St.	Commercial	59.7	60.8	1.1	No
– East of Santa Fe St.	Commercial	65.2	67.0	1.8	No

[a] *Detailed calculation worksheets are included in Appendix J of this Draft EIR.*

Source: AES, Noise Calculation Worksheets, June 2022. See Appendix J of this Draft EIR. Based on traffic data from The Mobility Group.

Table IV.I-19
Roadway Traffic Noise Impacts—Existing Plus Project

Roadway Segment	Adjacent Land Use	Calculated Traffic Noise Levels[a] (CNEL (dBA))		Increase in Noise Levels due to Project (CNEL (dBA))	Significant Impact?
		Existing Without Project	Existing Plus Project		
Mateo Street					
– Between 7th St. and Violet St.	Commercial	69.5	69.6	0.1	No
– Between Violet St. and Sacramento St.	Commercial	69.5	69.5	0.0	No
– Between Sacramento St. and 8th St.	Commercial	70.5	70.6	0.1	No
Santa Fe Avenue					
– Between 7th St. and Violet St.	Residential	70.9	71.1	0.2	No
– Between Violet St. and Sacramento St.	Residential	70.8	71.1	0.3	No
– Between Sacramento St. and 8th St.	Commercial	70.8	71.0	0.2	No
Violet Street					
– Between Wilson St. and Mateo St.	Commercial	60.2	60.2	0.0	No
– Between Mateo St. and Santa Fe St.	Commercial	61.3	61.8	0.5	No
– East of Santa Fe St.	Commercial	57.6	57.6	0.0	No
Bay Street					
– East of Santa Fe Ave.	Industrial	58.2	58.8	0.6	No
Sacramento Street					
– Between Wilson St. and Mateo St.	Commercial	64.2	64.2	0.0	No
– Between Mateo St. and Santa Fe St.	Commercial	59.7	60.8	1.1	No
– East of Santa Fe St.	Commercial	59.9	64.3	4.4	No

[a] *Detailed calculation worksheets are included in Appendix J of this Draft EIR.*

Source: AES, Noise Calculation Worksheets, June 2022. See Appendix J of this Draft EIR. Based on traffic data from The Mobility Group.

Table IV.I-20 on page IV.I-47 presents the estimated composite noise levels in terms of CNEL at the off-site sensitive receptor locations from all Project-related noise sources. As indicated therein, the Project would result in an increase in composite noise levels ranging from 0.1 dBA at receptor location R4 to 2.9 dBA at receptor location R1. At receptor location R4, the composite noise level from Project operations would fall below the 3-dBA significance criteria (applicable because the composite noise level would be within the clearly unacceptable (i.e., greater than 75 CNEL) land use category); and at receptor locations R1 through R3, the Project's composite noise levels would fall below the 5-dBA significance criteria (applicable because the composite noise levels would be within the conditionally acceptable (i.e., 60 to 70 CNEL) land use category). **As such, composite noise impacts due to Project operations would be less than significant.**

In summary, Project operations would not result in the generation of a substantial permanent increase in ambient noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies. Therefore, the Project's operational noise impacts would be less than significant.

Table IV.I-20
Composite Noise Impacts

Receptor Location	Existing Ambient Noise Levels (CNEL (dBA))	Calculated Project-Related Noise Sources (CNEL (dBA))					Project Composite Noise Levels (CNEL (dBA))	Ambient plus Project Noise Levels (CNEL (dBA))	Increase in Noise Levels due to Project (CNEL (dBA))	Significance Criteria[a] (CNEL (dBA))	Significant Impact?
		Traffic	Mechanical	Parking	Loading/ Trash Compactor	Outdoor Spaces					
R1	59.8	49.9	54.8	38.1	48.4	56.3	59.5	62.7	2.9	64.8	No[b]
R2	62.9	47.0	43.6	19.2	31.7	53.5	54.7	63.5	0.6	67.9	No
R3	65.2	49.9	44.8	21.9	34.0	50.5	53.8	65.5	0.3	70.2	No
R4	76.5	59.3	44.9	17.4	30.9	47.3	59.8	76.6	0.1	79.5	No

[a] *Significance criteria are equivalent to the existing ambient plus 3 dBA if the estimated noise levels (ambient plus Project) fall within the "normally unacceptable" or "clearly unacceptable" land use categories or ambient plus 5 dBA if the estimated noise levels fall within the "normally acceptable" or "conditionally acceptable" land use categories, per the City of Los Angeles Noise Element. If the estimated noise levels exceed those significance criteria, a noise impact is identified.*

Source: AES, Noise Analysis Worksheets, June 2022. See Appendix J of this Draft EIR.

(2) Mitigation Measures

As analyzed above, construction of the Project would have the potential to result in significant noise impacts at two off-site sensitive receptor locations (receptors R1 and R2) from on-site construction activities, but only if these two projects are completed and occupied prior to or during Project construction. Therefore, the following mitigation measure is provided to reduce construction-related noise impacts:

Mitigation Measure NOI-MM-1: A temporary and impermeable sound barrier shall be erected at the locations listed below. At plan check, building plans shall include documentation prepared by a noise consultant verifying compliance with this measure.

- Along the western property line of the Project Site between the construction areas and proposed mixed-use development at 2110 Bay Street on the west side of the Project Site (receptor location R1, located adjacent to the Project Site to the west). The temporary sound barrier shall be minimum 16 feet high and designed to provide a minimum 15-dBA noise reduction at the ground level of receptor location R1. In the event the 2110 Bay Street project is not completed and occupied prior to or during Project construction, this mitigation measure shall not be required.
- Along the northeastern property line of the Project Site between the construction areas and proposed mixed-use development at 2143 Violet Street, north of the Project Site (receptor location R2, located on the north side of Violet Street, north of the Project Site). The temporary sound barrier shall be minimum 8 feet high and designed to provide a minimum 5-dBA noise reduction at receptor location R2. In the event the 2143 Violet Street project is not completed and occupied prior to or during the demolition phase of Project construction, this mitigation measure shall not be required.

(3) Level of Significance After Mitigation

(a) On-Site Construction Noise

Implementation of Mitigation Measure NOI-MM-1 provided above would reduce the Project's construction noise levels to the extent feasible. Specifically, implementation of Mitigation Measure NOI-MM-1 (installation of temporary sound barrier) would reduce the noise generated by on-site construction activities at the off-site sensitive uses by a minimum of 5 dBA (i.e., from 65.7 dBA to 60.7 dBA) at the proposed mixed-use development at 2143 Violet Street north of the Project Site (receptor location R2) and by 15 dBA (i.e., from 97.3 dBA to 82.3 dBA) at the proposed mixed-use development at 2110 Bay

Street adjacent to the Project Site to the west (receptor location R1).[52] However, the estimated construction-related noise levels would still exceed the significance thresholds at receptor location R1 of 63.6 dBA. In addition, the temporary noise barrier would not be effective in reducing the construction noise levels at the upper levels at receptor location R2 (which is a 36-story building). There are no other feasible mitigation measures that could be implemented to reduce the temporary noise impacts from on-site construction at receptor locations R1 and R2. Therefore, construction noise impacts associated with on-site noise sources would remain significant and unavoidable. However, it is important to note that this impact would only occur if the 2143 Violet Street and the 2110 Bay Street projects are completed and occupied prior to or during Project construction. If the 2143 Violet Street and the 2110 Bay Street projects are not completed and occupied prior to or during Project construction, the Project's construction-related noise impacts at receptor locations R1 and R2 would not occur, and mitigation would not be necessary.

(b) Off-Site Construction Noise

Noise levels from off-site construction would exceed the ambient noise levels along the haul route Bay Street (east of Santa Fe Avenue) by 5 dBA (i.e., from 2.8 dBA during the building construction phase to a maximum of 6.5 dBA during the grading/excavation phase). There are no feasible mitigation measures that could be implemented to reduce this short-term impact. Conventional mitigation measures, such as providing temporary noise barrier walls to reduce the offsite construction truck traffic noise impacts, would not be feasible as the barriers would obstruct the access and visibility to the properties along the anticipated haul routes. As such, Project-level noise impacts from off-site construction would be significant and unavoidable.

(c) Operational Noise

Project-level impacts with regard to operational noise would be less than significant.

Threshold (b): Would the Project result in the generation of excessive ground-borne vibration or ground-borne noise levels?

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[52] The Project construction noise levels at receptor locations R1 and R2 would vary depending on the construction phase (i.e., demolition, grading, building construction, etc.). The pre- and post-mitigation Project construction noise levels identified here are during the demolition phase which is the construction phase that would generate the highest noise levels (i.e., worst-case condition).

(1) Impact Analysis

(a) *Construction*

Construction activities can generate varying degrees of ground vibration, depending on the construction procedures and the type of construction equipment used. The operation of construction equipment generates vibrations that spread through the ground and diminish in amplitude with distance from the source. The effect on buildings located in the vicinity of the construction site often varies, depending on soil type, ground strata, and construction characteristics of the receptor buildings. The results from vibration can range from no perceptible effects at the lowest vibration levels to low rumbling sounds and perceptible vibration at moderate levels. However, ground-borne vibrations from construction activities rarely reach levels that damage structures.

(i) Building Damage Impacts from On-Site Construction

With regard to potential building damage, the Project would generate ground-borne construction vibration during building demolition and site excavation/grading activities when heavy construction equipment, such as large bulldozers, drill rigs, and loaded trucks, would be used. The FTA has published standard vibration velocities for various construction equipment operations. Table IV.I-21 on page IV.I-51 provides the estimated vibration levels (in terms of inch per second PPV) at the nearest off-site structures to the Project Site. It is noted that since impact pile driving methods would not be used during construction of the Project, in accordance with Project Design Feature NOI-PDF-2 provided above, impact pile driving vibration is not included in the on-site construction vibration analysis. Installation of piles for shoring and foundation would utilize drilling methods to minimize vibration generation.

As discussed in Section IV.B, Cultural Resources, of the Draft EIR, there are no historic structures adjacent to the Project Site. Therefore, the assessment of construction vibration provided below for potential building damage due to on-site construction compares the estimated vibration levels generated during construction of the Project to the 0.2-PPV significance criteria for non-engineered timber and masonry building (applicable to the single-story commercial/industrial buildings to the north, south, east and west of the Project Site).

As indicated in Table IV.I-21, the estimated vibration velocity levels from on-site construction equipment would be below the building damage significant criteria for the existing off-site buildings surrounding the Project Site, with the exception of the two single-story industrial buildings adjacent to the Project to the west and east. The estimated vibration levels from construction equipment would exceed the 0.2 PPV building damage

Table IV.I-21
On-Site Construction Vibration Impacts—Building Damage

Off-Site Building[a]	Estimated Vibration Velocity Levels at the Outside of and Adjacent to the Nearest Off-Site Structures from the Project Construction Equipment (inch/second (PPV))[b]					Significance Criteria[c] (PPV)	Sig. Impact?
	Large Bulldozer	Caisson Drilling	Loaded Trucks	Jack-hammer	Small Bulldozer		
FTA Reference Vibration Levels at 25 feet	0.089	0.089	0.076	0.035	0.003	—	—
Single-Story Industrial Building to the North	0.037	0.037	0.032	0.015	0.001	0.2	No
Single-Story Industrial Building to the South	0.032	0.032	0.027	0.012	0.001	0.2	No
Single-Story Industrial Building to the West	0.523	0.523	0.446	0.206	0.018	0.2	Yes
Single-Story Industrial Building to the East	0.523	0.523	0.446	0.206	0.018	0.2	Yes

[a] *Represents off-site buildings located nearest to the Project Site to the north, south, east and west.*

[b] *Vibration level calculated based on FTA reference vibration level at 25-foot distance.*

[c] *FTA criteria for non-engineered timber and masonry buildings.*

Source: FTA, Transit Noise and Vibration Impact Assessment Manual, September 2018; AES, Noise Calculation Worksheets, June 2022. See Appendix J of this Draft EIR.

significance criteria at these latter two buildings. **Therefore, on-site vibration impacts during construction of the Project would be significant without implementation of mitigation measures.**

(ii) Human Annoyance Impacts from On-Site Construction

Table IV.I-22 on page IV.I-52 provides the estimated vibration levels at the off-site sensitive uses due to construction equipment operations and compares the estimated vibration levels to the specified significance criteria for human annoyance. Per FTA guidance, the significance criteria for human annoyance is 72 VdB for sensitive uses, including residential and hotel uses, assuming there are a minimum of 70 vibration events occurring during a typical construction day. As indicated in Table IV.I-22, the estimated ground-borne vibration levels from construction equipment would be below the significance criteria for human annoyance at off-site sensitive receptor locations R2 through R4. The estimated ground-borne vibration levels at receptor location R1 would be up to 99 VdB and would exceed the 72 VdB significance criteria during the demolition and grading/excavation phases when large construction equipment (e.g., large bulldozer, caisson drilling and loaded trucks) would operate within 80 feet of the sensitive receptor. However, the

Table IV.I-22
On-Site Construction Vibration Impacts—Human Annoyance

Off-Site Receptor Location	Estimated Vibration Velocity Levels at the Off-Site Sensitive Uses Due to On-Site Construction Equipment Operation[a] (VdB)					Significance Criteria (VdB)	Sig. Impact?
	Large Bulldozer	Caisson Drilling	Loaded Trucks	Jack-hammer	Small Bulldozer		
FTA Reference Vibration Levels at 25 feet	87	87	86	79	58	—	—
R1	99	99	98	91	70	72	Yes[b]
R2	52	52	51	44	23	72	No
R3	57	57	56	49	28	72	No
R4	48	48	47	40	19	72	No

[a] *Vibration levels calculated based on FTA reference vibration level at a 25-foot distance.*

[b] *Significant impact if the proposed mixed-use development (which includes residential uses) at receptor location R1 is built and occupied prior to or during Project construction. Vibration impact would be less than significant for the existing industrial use.*

Source: FTA, Transit Noise and Vibration Impact Assessment Manual, September 2018; AES, Noise Calculation Worksheets, June 2022. See Appendix J of this Draft EIR.

vibration impact identified at receptor location R1 assumes the proposed mixed-use development (which includes multi-family residential uses) will be completed and occupied prior to or during Project construction. In the event the proposed mixed-use development is not built and occupied by or during Project construction, the vibration impact identified at receptor location R1 would be less than significant. **Accordingly, on-site vibration impacts during construction of the Project, pursuant to the significance criteria for human annoyance, would be considered significant without mitigation measures if the proposed mixed-use project is completed and occupied prior to or during Project construction.**

(iii) Building Damage and Human Annoyance Impacts from Off-Site Construction Activities

As described above, construction delivery/haul trucks would travel between the Project Site and I-10 Freeway via Santa Fe Avenue, Sacramento Street, and Bay Street. Heavy-duty construction trucks would generate ground-borne vibration as they travel along the Project's anticipated haul route(s). Thus, an analysis of potential vibration impacts using the building damage and human annoyance criteria for ground-borne vibration along the anticipated local haul routes was conducted. The construction vibration analysis for potential building damage due to off-site construction activities conservatively compares the estimated vibration levels generated from haul truck activities to the 0.12-PPV significance criteria for buildings extremely susceptible to vibration damage.

Regarding building damage, based on FTA data, the vibration generated by a typical heavy-duty truck would be approximately 63 VdB (0.00566 PPV) at a distance of 50 feet from the truck.[53] According to the FTA "[i]t is unusual for vibration from sources such as buses and trucks to be perceptible, even in locations close to major roads." Nonetheless, there are existing buildings along the Project's anticipated haul route that are situated approximately 20 feet from the right-of-way and would be exposed to ground-borne vibration levels of approximately 0.022 PPV, as provided in the noise calculation worksheets included in Appendix J to this Draft EIR. This estimated vibration generated by construction trucks traveling along the anticipated haul route would be well below the most stringent building damage criteria of 0.12 PPV for buildings extremely susceptible to vibration. **Therefore, vibration impacts (pursuant to the significance criteria for building damage) from off-site construction activities (i.e., construction trucks traveling on public roadways) would be less than significant**.

As discussed above, per FTA guidance, the significance criteria for human annoyance is 72 VdB for sensitive uses, including residential and hotel uses. It should be noted that buses and trucks rarely create vibration that exceeds 70 VdB at 50 feet from the receptor unless there are bumps or potholes in the road.[54] Currently, there are no vibration-sensitive uses along the anticipated haul routes. To provide a conservative analysis, the estimated vibration levels generated by construction trucks traveling along the anticipated haul route were assumed to be within 22 feet of sensitive uses (i.e., proposed residential use at receptor location R1 and the hotel use at receptor location R3) along Bay Street. As indicated in the noise calculation worksheets included in Appendix J to this Draft EIR, the temporary vibration levels could reach approximately 74 VdB periodically as trucks pass sensitive receptors along the anticipated haul route. Therefore, the proposed residential/hotel uses along Bay Street (between the Project Site and I-10 Freeway), would be exposed to ground-borne vibration of up to 74 VdB, which would exceed the 72-VdB significance threshold. **Therefore, potential vibration impacts with respect to human annoyance that would result from temporary and intermittent off-site vibration from construction trucks traveling along the anticipated haul route would be significant without mitigation measures.**

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[53] *FTA, Transit Noise and Vibration Impact Assessment Manual, Figure 5-4, September 2018.*

[54] *FTA, Transit Noise and Vibration Impact Assessment Manual, Page 113, September 2018.*

(iv) Summary of Construction Vibration Impacts

As discussed above, the estimated vibration levels from on-site construction equipment would exceed the building damage significance criteria of 0.2 PPV for the off-site buildings adjacent to the Project Site to the east and west, and such vibration impacts would be significant without implementation of mitigation measures. In addition, vibration impacts from on-site construction activities would be significant at receptor location R1 pursuant to the significance criteria for human annoyance.

Relative to off-site construction activities (i.e., construction trucks traveling along the anticipated haul route), vibration impacts associated with temporary and intermittent vibration would be less than significant with respect to building damage but significant with respect to human annoyance.

As such, the Project would result in the generation of excessive ground-borne vibration levels from on-site construction activities with respect to building damage and human annoyance and from off-site construction activities with respect to human annoyance.

(b) Operational Vibration Impacts

As described above, sources of vibration related to operation of the Project would include vehicle circulation, delivery trucks, and building mechanical equipment. As also discussed above, vehicular-induced vibration, including vehicle circulation within the subterranean parking area, would not generate perceptible vibration levels at off-site sensitive uses. Building mechanical equipment installed as part of the Project would include typical commercial-grade stationary mechanical equipment, such as air-condenser units (mounted at the roof level), that would include vibration-attenuation mounts to reduce vibration transmission so vibration would not be perceptible at the off-site sensitive receptors. **Therefore, operation of the Project would not increase the existing ambient vibration levels in the immediate vicinity of the Project Site and would not result in the generation of excessive ground-borne vibration levels. As such, vibration impacts associated with operation of the Project would be less than significant.**

(2) Mitigation Measures

As discussed above, Project vibration levels generated from on- and off-site construction activities would result in significant impacts with respect to both building damage and human annoyance. Therefore, the following mitigation measure is provided to reduce construction-related vibration impacts for building damage:

Mitigation Measure NOI-MM-2: Prior to start of construction, the Applicant shall retain the services of a structural engineer or qualified professional to visit the existing single-story commercial/industrial buildings adjacent to the Project Site to the east and west to inspect and document the apparent physical condition of the buildings' readily-visible features.

Prior to construction, the Applicant shall retain the services of a qualified acoustical engineer to review proposed construction equipment and develop and implement a vibration monitoring program capable of documenting the construction-related ground vibration levels at the off-site nearby/adjacent buildings during demolition and grading/excavation phases. In the event that consent is not provided from the adjacent property owners, the vibration monitoring shall be made at the Project Site property line. The vibration monitoring at the Project property line would provide a conservative reading, as it would be closer to the construction equipment. The vibration monitoring system shall continuously measure and store the peak particle velocity (PPV) in inch/second. The system shall also be programmed for two preset velocity levels: a warning level of 0.16 PPV and a regulatory level of 0.20 PPV. The system shall also provide real-time alert when the vibration levels exceed the warning level.

In the event the warning level (0.16 PPV) is triggered, the contractor shall identify the source of vibration generation and provide feasible steps to reduce the vibration level, including but not limited to halting/staggering concurrent activities and utilizing lower vibratory techniques.

In the event the regulatory level (0.20 PPV) is triggered, the contractor shall halt construction activities in the vicinity of the building and visually inspect the building for any damage. Results of the inspection must be logged. The contractor shall identify the source of vibration generation and provide feasible steps to reduce the vibration level. Construction activities may then restart.

As analyzed above, vibration impacts from on-site construction activities would be significant pursuant to the significance criteria for human annoyance. Mitigation measures considered to reduce vibration impacts from on-site construction activities with respect to human annoyance included the installation of a wave barrier, which is typically a trench or a thin wall made of sheet piles installed in the ground (essentially a subterranean sound barrier to reduce noise). However, wave barriers must be very deep and long to be effective, are cost prohibitive for temporary applications such as construction, and therefore are considered infeasible.[55] In addition, constructing a wave barrier to reduce the Project's

[55] *Caltrans, Transportation and Construction-Induced Vibration Guidance Manual, June 2004.*

construction-related vibration impacts would, in and of itself, generate ground-borne vibration from the excavation equipment. Furthermore, it would not be feasible to install a wave barrier along the public roadways for the off-site construction vibration impacts. As such, there are no feasible mitigation measures to reduce the potential vibration human annoyance impacts. While these impacts are temporary and would cease when construction is complete, impacts would remain significant and unavoidable throughout the duration of Project construction activities.

(3) Level of Significance After Mitigation

With implementation of Mitigation Measure NOI-MM-2, potential building damage impacts to the adjacent buildings to the east and west would be reduced to less than significant levels. Vibration impacts associated with off-site haul trucks would be less than significant without mitigation with regard to building damage.

As described above, there are no feasible mitigation measures that could be implemented to reduce the temporary vibration impacts from on-site and off-site construction associated with human annoyance to a less-than-significant level. **Vibration impacts from on- and off-site construction activities with respect to human annoyance would remain significant and unavoidable.** However, it is important to note that vibration impacts from on-site construction activities would only occur if the 2110 Bay Street project (receptor location R1) is completed and occupied prior to or during Project construction. If the 2110 Bay Street project is not completed and occupied prior to or during Project construction, the Project's on-site construction-related vibration impacts at receptor location R1 would not occur. **In addition, operational vibration would be less than significant without mitigation.**

Threshold (c): For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the Project expose people residing or working in the Project area to excessive noise levels?

As discussed in Section VI, Other CEQA Considerations, and in the Initial Study (included in Appendix A of this Draft EIR), the Project Site would not expose people residing or working in the project area to excessive airport-related noise levels. The nearest airport is the Bob Hope Airport located approximately 7 miles north of the Project Site. Since the Project would not be located within an airport land use plan, within two miles of a public airport or public use airport, or within the vicinity of a private airstrip, impacts with regard to airport-related noise would not occur and would be insignificant and unlikely to occur. Thus, the Project would have a less than significant impact with respect to Threshold (c). **No impacts from excessive airport-related noise levels would occur and no further analysis is required.**

e. Cumulative Impacts

(1) Impact Analysis

The Project, together with the related projects and future growth, could contribute to cumulative noise impacts. The potential for cumulative noise impacts to occur is specific to the distance between each related project and their stationary noise sources, as well as the cumulative traffic that these projects would add to the surrounding roadway network.

(a) Construction Noise

(i) On-Site Construction Noise

As indicated in Section III, Environmental Setting, of this Draft EIR, 72 related projects have been identified in the vicinity of the Project Site. Noise from construction of development projects is typically localized and has the potential to affect noise-sensitive uses within 500 feet from the construction site, based on the *L.A. CEQA Thresholds Guide* screening criteria. Thus, noise from construction activities for two projects within 1,000 feet of each other can contribute to a cumulative noise impact for receptors located midway between the two construction sites. While the majority of the related projects are located a substantial distance (greater than 1,000 feet) from the Project Site, the following seven related projects are within 1,000 feet of the Project Site:

- Related Project No. 5 is an office/retail development located at 2030 7th Street, approximately 640 feet northwest of the Project Site. However, construction for this related project is completed. Therefore, Related Project No. 5 would not contribute to cumulative construction-related noise impacts.

- Related Project No. 9 is an office/retail development located at 2130 Violet Street, approximately 165 feet north of the Project Site. The nearest noise-sensitive receptor to the Project Site and Related Project No. 9 is the Soho House (receptor location R3). In addition, there are future noise-sensitive receptors within 500 feet of Project Site and the Related Project No. 9, including: the mixed-use development adjacent to the Project Site (receptor location R1) and the mixed-use development at 2143 Violet Street (receptor location R2). There are multiple buildings located between Related Project No. 9 and receptors locations R1 and R3. Therefore, Related Project No. 9 would not contribute to the cumulative construction noise impacts at receptor locations R1 and R3. However, as analyzed above in Subsection 3.c.(2)(a)(i) (see Table IV.I-11 on page IV.I-35), the estimated Project-related construction noise levels at receptor location R2 would exceed the significance criteria by 0.8 dBA. Since Related Project No. 9 is across from receptor location R2, concurrent construction of the Project and Related Project No. 9 would contribute to the cumulative construction-related noise impacts. However, Related Project No. 9 has been under construction for several months and is likely to be completed before Project construction is commenced. Therefore, cumulative construction noise impacts would only occur if (a) completion of Related Project No. 9 is delayed, and (b) the proposed mixed-use development at receptor location R2 is built and occupied prior to concurrent construction of Related Project No. 9 and the Project.

- Related Project No. 39 is a mixed-use development adjacent to the Project Site to the west, at 2110 Bay Street. The nearest noise-sensitive receptor to the Project Site and Related Project No. 39 is the Soho House (receptor location R3). As analyzed above in Subsection 3.c.(2)(a)(i) (see Table IV.I-11 on page IV.I-35), the estimated Project-related construction noise levels at receptor location R3 would be 7.7 dBA below the significance criteria. Therefore, the Project would not contribute to cumulative construction-related noise impacts at receptor location R3 in the event of concurrent construction with Related Project No. 39.

- Related Project No. 49 is a mixed-use development located at 1200 Santa Fe Avenue, approximately 500 feet southwest of the Project Site. Currently, there are no noise-sensitive receptors located within 500 feet of the Project Site and Related Project No. 49. The nearest future noise-sensitive receptor within 500 feet of Related Project No. 49 is the proposed mixed-use development at 2110 Bay Street (receptor location R1). Based on distance attenuation and multiple intervening buildings between Related Project No. 49 and the Project sites, which would provide noise reduction from the construction activities between the two projects. Therefore, Related Project No. 49 would not contribute to cumulative construction-related noise impacts in the event of concurrent construction with the Project.

- Related Project No. 54 is a mixed-use development (Soho House) located at 1000 Santa Fe Avenue, approximately 250 feet west of the Project Site. However, construction of Related Project No. 54 has been completed, and the development is now operational. Therefore, Related Project No. 54 would not contribute to cumulative construction-related noise impacts.

- Related Project No. 64 is a mixed-use development located at 1024 Mateo Street, approximately 890 feet west of the Project Site. The nearest noise-sensitive receptors located between the Project and Related Project No. 64 are the proposed mixed-use development at 2110 Bay Street (receptor location R1) and the Soho House (receptor location R3). Distance attenuation and multiple intervening buildings between Related Project No. 64 and the future noise-sensitive receptors would provide noise reduction from the construction activities associated with Related Project No. 64. Therefore, Related Project No. 64 would not contribute to cumulative construction-related noise impacts in the event of concurrent construction with the Project.

- Related Project No. 65 is a mixed-use development located at 2143 Violet Street, approximately 500 feet northwest of the Project Site. The nearest noise-sensitive receptor to the Project Site and Related Project No. 65 are the Soho House (receptor location R3) and the future the mixed-use development adjacent to the Project Site (receptor location R1). There are multiple buildings located between Related Project No. 65 and receptors R1 and R3. Therefore, the Project would not contribute to cumulative construction noise impacts at receptor locations R1 and R3 in the event of concurrent construction with Related Project No. 65.

Construction-related noise levels from the related projects would be intermittent and temporary, and it is anticipated that, as with the Project, the related projects would comply with the construction hours and other relevant provisions set forth in the LAMC. Noise associated with cumulative construction activities would be reduced to the degree reasonably and technically feasible through proposed mitigation measures for each individual related project and compliance with locally adopted and enforced noise ordinances. Based on the above, there potentially would be cumulative noise impacts at the nearby sensitive uses (e.g., residential use) located in proximity to the Project Site and related projects, in the event of concurrent construction activities with Related Project No. 9. **As such, cumulative noise impacts from on-site construction would be significant. However, cumulative construction noise impacts would only occur if the proposed mixed-use development at receptor location R2 is built and occupied prior to or during concurrent construction of Related Project No. 9 and the Project.**

(ii) Off-Site Construction Noise

In addition to the cumulative impacts of on-site construction activities, off-site construction haul trucks would have a potential to result in cumulative impacts if the trucks for the related projects and the Project were to utilize the same haul route. As analyzed above, the Project-related construction trucks would result in significant impacts along Bay Street, based on the assumption that the proposed noise-sensitive uses along Bay Street (i.e., receptors R1 and R3) would be built and occupied prior to the Project construction. Any additional truck trips would have the potential to increase the traffic noise and contribute to the cumulative noise impacts. Therefore, cumulative noise due to construction truck traffic from the Project and other related projects would increase the ambient noise levels along the haul route (i.e., Bay Street) by 5 dBA. **As such, cumulative noise impacts from off-site construction would be significant if the Project is constructed concurrently with one or more of the related projects and the related project(s) use the same routes for construction traffic.**

(iii) Summary of Cumulative Construction Noise Impacts

As discussed above, on-site and off-site construction activities from the Project and related projects have the potential to result in the exposure of persons to or generation of noise levels in excess of standards established by the City or result in a substantial temporary or periodic increase in ambient noise levels in the vicinity of the Project Site above levels existing without the Project and related projects. **Therefore, cumulative noise impacts from on-site and off-site construction activities would be significant.**

(b) Operational Noise

The Project Site and surrounding area have been developed with uses that have previously generated, and will continue to generate, noise from a number of community noise sources, including mechanical equipment (e.g., HVAC systems), outdoor activity areas, and vehicle travel. Similar to the Project, each of the related projects that have been identified in the vicinity of the Project Site would also generate stationary-source and mobile-source noise due to ongoing day-to-day operations. All related projects are of a residential, retail, commercial, or institutional nature, and these uses are not typically associated with excessive exterior noise levels. However, each project would produce traffic volumes that are capable of generating roadway noise impacts. The potential cumulative noise impacts associated with on-site and off-site noise sources are addressed below.

(i) On-Site Stationary Noise Sources

Due to provisions set forth in the LAMC that limit stationary source noise from items, such as roof-top mechanical equipment, noise levels would be less than significant at the property line for each related project. In addition, as discussed above, noise impacts associated with operations within the Project Site would be less than significant. **Therefore, based on the distance of the related projects from the Project Site and the operational noise levels associated with the Project, as well as LAMC requirements that regulate mechanical equipment noise, cumulative stationary source noise impacts associated with operation of the Project and the related projects would be less than significant**.

(ii) Off-Site Mobile Noise Sources

The Project and related projects in the area would produce traffic volumes (off-site mobile sources) that would generate roadway noise. Cumulative noise impacts due to off-site traffic were analyzed by comparing the projected increase in traffic noise levels from Existing (Future Without Project) conditions to Future Plus Project conditions to the applicable significance criteria. Future Plus Project conditions include traffic volumes from future ambient growth, related projects, and the Project. The calculated traffic noise levels under Existing and Future Plus Project conditions are presented in Table IV.I-23 on page IV.I-61. As shown therein, cumulative traffic volumes would result in an increase ranging from 0.6 dBA (CNEL) along the roadway segment of Violet Street (between Mateo Street and Santa Fe Avenue), to up to 10.5 dBA (CNEL) along the roadway segment of Violet Street (east of Santa Fe Avenue). The estimated noise levels along Violet Street and

Table IV.I-23
Cumulative Roadway Traffic Noise Impacts

Roadway Segment	Adjacent Land Use	Calculated Traffic Noise Levels[a] (CNEL (dBA))		Increase in Noise Levels due to Cumulative + Project (CNEL (dBA))	Significant Impact?
		Existing Conditions	Future Cumulative Plus Project		
Mateo Street					
– Between 7th St. and Violet St.	Commercial	69.5	70.8	1.3	No
– Between Violet St. and Sacramento St.	Commercial	69.5	70.8	1.3	No
– Between Sacramento St. and 8th St.	Commercial	70.5	71.6	1.1	No
Santa Fe Avenue					
– Between 7th St. and Violet St.	Residential	70.9	73.5	2.6	No
– Between Violet St. and Sacramento St.	Residential	70.8	73.6	2.8	No
– Between Sacramento St. and 8th St.	Commercial	70.8	73.7	2.9	No
Violet Street					
– Between Wilson St. and Mateo St.	Commercial	60.2	60.2	0.0	No
– Between Mateo St. and Santa Fe St.	Commercial	61.3	61.9	0.6	No
– East of Santa Fe St.	Commercial	57.6	68.1	10.5	Yes
Bay Street					
– East of Santa Fe Ave.	Industrial	58.2	62.3	4.1	No
Sacramento Street					
– Between Wilson St. and Mateo St.	Commercial	64.2	64.2	0.0	No
– Between Mateo St. and Santa Fe St.	Commercial	59.7	60.8	1.1	No
– East of Santa Fe St.	Commercial	59.9	67.0	7.1	Yes

[a] *Detailed calculation worksheets are included in Appendix J of this Draft EIR.*

Source: AES, Nose Calculation Worksheets, June 2022. See Appendix J of this Draft EIR. Based on traffic data from The Mobility Group.

Sacramento Street (east of Santa Fe Avenue) would exceed the 5-dBA (CNEL) significance threshold. **Therefore, cumulative noise impacts due to off-site mobile noise sources associated with the Project, future growth, and the related projects would be significant.**

(iii) Summary of Cumulative Operational Noise Impacts

As discussed above, the Project and related projects would result in the exposure of persons to or generation of noise levels in excess of standards established by the City or in a substantial permanent increase in ambient noise levels in the vicinity of the Project Site above levels existing without the Project and the related projects. **Cumulative operational noise impacts from on-site sources would be less than significant. However, cumulative operational noise impacts from off-site sources would be significant.**

(c) Construction Vibration

(i) On-Site Construction Vibration

As previously discussed, ground-borne vibration decreases rapidly with distance. Potential vibration impacts due to construction activities are generally limited to buildings/structures that are located in proximity to the construction site (i.e., within 15 feet as related to building damage and 80 feet as related to human annoyance at residential uses). The nearest related project to the Project Site is Related Project No. 39, located adjacent to the Project Site to the west. The nearest sensitive building to the Project and Related Project No. 39 construction sites would be the single-story commercial buildings located on the north side of Bay Street. As analyzed above, the estimated vibration level at the single-story commercial buildings to the north resulting from Project construction (0.037 inch/second PPV) would be well below the significance criteria of 0.2 inch/second PPV. Therefore, based on the above, the Project would not contribute to a cumulative construction vibration impact with respect to building damage associated with ground-borne vibration from on-site sources.

As analyzed above, potential vibration impacts associated with Project-related on-site construction activities would be significant with respect to human annoyance at the future mixed-use development at 2110 Bay Street (receptor location R1), which is also Related Project No. 39. Therefore, concurrent construction of the Project and Related Project No. 39 would not result in a cumulative impact at receptor location R1 since this related project and receptor represent the same location. Other related projects are located more than 165 feet from the Project Site. Therefore, due to the rapid attenuation characteristics of ground-borne vibration, there is no potential for a cumulative construction vibration impact with respect to both building damage and human annoyance associated with ground-borne vibration from on-site sources.

(ii) Off-Site Construction Vibration

As previously discussed, based on FTA data, the vibration generated by a typical heavy truck would be approximately 63 VdB (0.00566 PPV) at a distance of 50 feet from the truck.[56] In addition, according to the FTA "[i]t is unusual for vibration from sources such as buses and trucks to be perceptible, even in locations close to major roads." As discussed above, there are existing buildings that are approximately 20 feet from the right-of-way of the anticipated haul route(s) for the Project (i.e., Bay Street, Sacramento Street and Santa Fe Avenue). These buildings are anticipated to be exposed to ground-borne vibration levels of approximately 0.022 PPV. Trucks from the related projects are expected to generate similar ground-borne vibration levels. Therefore, the vibration levels generated from off-site construction trucks associated with the Project and other related projects along the anticipated haul route(s) would be below the most stringent building damage significance criteria of 0.12 PPV for buildings extremely susceptible to vibration. Therefore, potential cumulative vibration impacts with respect to building damage from off-site construction would be less than significant.

As discussed above, potential vibration impacts associated with temporary and intermittent vibration from project-related construction trucks traveling along the anticipated haul route (i.e., Bay Street) would be significant with respect to human annoyance. As related projects would be anticipated to use similar trucks as the Project, it is anticipated that construction trucks would generate similar vibration levels along the anticipated haul route(s). As analyzed above, the Project-related construction trucks would result in significant impacts at sensitive used along the anticipated haul route(s). **Therefore, to the extent that other related projects use the same haul route as the Project and at the same time, potential cumulative human annoyance impacts associated with temporary and intermittent vibration from haul trucks traveling along the designated haul routes would be significant.**

(iii) Summary of Cumulative Construction Vibration Impacts

As discussed above, due to the rapid attenuation characteristics of ground-borne vibration and given the distance of the nearest related project to the Project Site, there is no potential for a cumulative construction vibration impact with respect to building damage associated with ground-borne vibration from on-site sources. In addition, potential cumulative vibration impacts with respect to building damage from off-site construction would be less than significant. **Therefore, on-site and off-site construction activities associated with the Project and related projects would not generate excessive ground-borne vibration levels with respect to building damage.**

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[56] *FTA, Transit Noise and Vibration Impact Assessment Manual, Figure 5-4, September 2018.*

As discussed above, potential vibration impacts associated with temporary and intermittent vibration from Project-related construction trucks traveling along the anticipated haul route would be significant with respect to human annoyance. As the related projects would be anticipated to use similar trucks as the Project, it is expected that construction trucks from the related projects would generate similar vibration levels along the anticipated haul routes. **Therefore, cumulative vibration impacts associated with off-site construction activities would be significant with respect to human annoyance.**

(d) Operational Vibration

Vibration levels from project operation are generally limited to building mechanical equipment and vehicle circulations and would be limited to immediate vicinity of the project sites. As analyzed above, the Project operation would not increase in the existing vibration in the immediate vicinity of the Project Site. **Therefore, based on the distance of the related projects from the Project Site and the operational vibration levels associated with the Project, cumulative vibration impacts associated with operation of the Project and related projects would be less than significant**.

(2) Mitigation Measures

(a) Construction Noise

As evaluated above, there would potentially be cumulative noise impacts at the nearby sensitive use (e.g., residential use) located in proximity to the Project Site and Related Project No. 9, in the event of concurrent on-site construction activities. Noise associated with cumulative construction activities would be reduced to the degree reasonably and technically feasible through proposed mitigation measures (e.g., providing temporary noise barriers) for each individual related project. However, even with these mitigation measures cumulative noise impacts would continue to occur and there are no other physical mitigation measures that would be feasible. As such, cumulative on-site noise impacts from on-site construction would remain significant. However, cumulative construction noise impacts would only occur if the proposed mixed-use development at receptor location R2 is built and occupied prior to or during concurrent construction of Related Project No. 9 and the Project.

As analyzed above, cumulative noise impacts associated with off-site construction trucks from the Project and other related projects could occur. Conventional mitigation measures, such as providing temporary noise barrier walls to reduce the off-site construction truck traffic noise impacts, would not be feasible as the barriers would obstruct the access and visibility to the properties along the anticipated haul routes. As such, there are no other feasible mitigation measures to reduce the temporary significant noise impacts associated with the cumulative off-site construction trucks.

(b) Operational Noise

As discussed above, operation of the Project would not result in a significant noise impact during operation. However, as analyzed above, cumulative noise impacts associated with off-site traffic would occur along Violet Street (east of Santa Fe Avenue) and Sacramento Street (east of Santa Fe Avenue). Conventional mitigation measures, such as providing noise barrier walls to reduce the off-site traffic noise impacts, would not be feasible as the barriers would obstruct the access and visibility to the properties along the impacted roadway segments. There are no other feasible mitigation measures to reduce the significant noise impacts associated with the cumulative off-site traffic.

(c) Construction Vibration

Cumulative vibration impacts with respect to building damage associated with on-site and off-site construction activities would be less than significant. However, vibration levels from construction trucks would exceed the significance criteria for human annoyance at vibration sensitive receptors along the anticipated haul route (i.e., Bay Street). There are no feasible mitigation measures to reduce the potential vibration human annoyance impacts. Even though impacts would be temporary, intermittent, and limited to daytime hours when haul trucks are traveling within 24 feet of a sensitive receptor, cumulative vibration impacts from off-site construction with respect to human annoyance would remain significant and unavoidable.

(d) Operational Vibration

Cumulative vibration impacts associated with operation of the Project and related projects would be less than significant. Therefore, no mitigation measures are required.

(3) Level of Significance After Mitigation

(a) Construction Noise

Cumulative construction noise impacts associated with on-site noise sources would remain significant and unavoidable. However, cumulative construction noise impacts would only occur if (a) completion of Related Project No. 9 is delayed, and (b) the proposed mixed-use development at receptor location R2 is built and occupied prior to or during concurrent construction of Related Project No. 9 and the Project.

(b) Operational Noise

Cumulative operational noise associated with off-site traffic would be significant and unavoidable.

(c) Construction Vibration

Cumulative vibration impacts associated with respect to building damage from on-site and off-site construction activities would be less than significant. However, cumulative vibration impacts associated with human annoyance from construction trucks would be significant and unavoidable.

(d) Operational Vibration

Cumulative impacts with regard to operational vibration would be less than significant without mitigation.