IV. Environmental Impact Analysis
E. Noise

1. Introduction

This section of the Draft EIR analyzes the potential noise and vibration impacts that would result from the Project. Specifically, the analysis describes the existing noise environment in the vicinity of the Project Site and estimates future noise and vibration levels at surrounding sensitive land uses resulting from construction and operation of the Project, identifies the potential for significant impacts, and provides mitigation measures to address significant impacts. In addition, this section of the Draft EIR evaluates the potential cumulative noise and vibration impacts resulting from the Project together with related projects and other future growth. Noise calculation worksheets are included in Appendix E to this Draft EIR.

2. Environmental Setting

a. Noise and Vibration Fundamentals

(1) Noise

(a) Fundamentals of Sound and Environmental Noise

Noise is commonly defined as sound that is undesirable because it interferes with speech communication and hearing, causes sleep disturbance, or is otherwise annoying (unwanted sound). The decibel (dB) is a conventional unit for measuring the amplitude of sound as it accounts for the large variations in sound pressure amplitude and reflects the way people perceive changes in sound amplitude.[1] Human hearing is not equally sensitive to sound at all frequencies. Therefore, to approximate this human frequency-dependent response, the A-weighted filtering system is used to adjust measured sound levels (dBA). The term "A-weighted" refers to filtering the noise signal in a manner that corresponds to the way the human ear perceives sound. Examples of various sound levels in different environments are shown in Table IV.E-1 on page IV.E-2.

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[1] *All sound levels measured in decibel (dB), as identified in the noise calculation worksheets included in Appendix E to this Draft EIR and in this section of the Draft EIR, are relative to $2x10^{-5}$ N/m^2 (the reference unit for sound pressure measured in terms of newton per square meter, a common method for measuring sound pressure).*

Table IV.E-1
Typical Noise Levels

Common Outdoor Activities	Noise Levels (dBA)	Common Indoor Activities
	110	Rock Band
Jet Fly-Over at 1000 feet		
	100	
Gas Lawn Mower 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 Lawn Mower at 100 feet	**70**	Vacuum Cleaner at 10 feet
Commercial Area		Normal Speech at 3 feet
Heavy Traffic at 300 feet	**60**	
		Large Business Office
Quiet Urban Daytime	**50**	Dishwasher 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	

Source: Caltrans, Technical Noise Supplement (TeNS), Table 2-5, 2009.

People commonly judge the relative magnitude of sound sensation using subjective terms, such as “loudness” or “noisiness.” A change in sound level of 3 dB is considered “just perceptible,” a change in sound level of 5 dB is considered “clearly noticeable,” and a change (increase) of 10 dB is typically recognized as “twice as loud.”[2]

(b) Outdoor Sound Propagation

In an outdoor environment, sound energy attenuates through the air as a function of distance. Such attenuation is called “distance loss” or “geometric spreading” and is based on the type of source configuration (i.e., a point source or a line source). The rate of sound attenuation for a point source, such as a piece of mechanical or electrical equipment (e.g.,

[2] *Bies & Hansen, Engineering Noise Control, 1988, Table 2.1.*

air conditioner or bulldozer), is 6 dBA per doubling of distance from the noise source to the receptor over acoustically "hard" sites (e.g., asphalt and concrete surfaces) and 7.5 dBA per doubling of distance from the noise source to the receptor over acoustically "soft" sites (e.g., soft dirt, grass or scattered bushes and trees).[3] 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. The rate of sound attenuation for a line source, such as a constant flow of traffic on a roadway, is 3 dBA and 4.5 dBA per doubling of distance from the point source to the receptor for hard and soft sites, respectively.[4]

In addition, 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), some 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 reflects 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 more substantial barrier.[5] Additionally, structures with closed windows can further attenuate exterior noise by a minimum of 20 dBA to 30 dBA.[6]

(c) Environmental Noise Descriptors

Several rating scales have been developed to analyze the adverse effect of community noise on people. Since environmental noise fluctuates over time, these scales consider that the effect of noise is dependent upon the total acoustical energy content, as well as the time and duration of occurrence. The most frequently used noise descriptors, including those used by the City of Los Angeles (City), are summarized below.

- *Equivalent Sound Level (L_{eq}).* L_{eq} is a measurement of the acoustic energy content of noise averaged over a specified time period. Thus, the L_{eq} of a time-varying sound and that of a steady sound are the same if they deliver the same

[3] *Caltrans, Technical Noise Supplement (TeNS), 2009, Chapter 2.1.4.2*.

[4] *Caltrans, Technical Noise Supplement (TeNS), 2009, Chapter 2.1.4.2*.

[5] *Caltrans, Technical Noise Supplement (TeNS), 2009, Chapter 2.1.4.2*.

[6] *FHWA, Highway Traffic Noise Analysis and Abatement Policy and Guidance, 1995.*

amount of energy to the receptor's ear during exposure. L_{eq} for 1-hour periods, during the daytime or nighttime hours, and 24-hour periods are commonly used in environmental assessments. For evaluating community impacts, this rating scale does not vary regardless of whether the noise occurs during day or night.

- *Maximum Sound Level (L_{max}).* L_{max} represents the maximum sound level measured during a measurement period.

- *Community Noise Equivalent Level (CNEL)*. CNEL is the time average of all A-weighted sound levels for a 24-hour period with a 10-dBA adjustment (upward) added to the sound levels that occur between the hours of 10:00 P.M. and 7:00 A.M. (nighttime), and a 5-dBA adjustment (upward) added to the sound levels that occur between the hours of 7:00 P.M. and 10:00 P.M. (evening). These penalties attempt to account for increased human sensitivity to noise during the nighttime and evening periods, particularly where sleep is the most probable activity. CNEL has been adopted by the State of California to define the community noise environment for development of the community noise element of a general plan and is also used by the City for land use planning and to describe noise impacts in the *L.A. CEQA Thresholds Guide*.[7]

- *Day/Night Average Sound Level (L_{dn})*. L_{dn} is the time average of all A-weighted sound levels for a 24-hour period, similar to the CNEL. L_{dn} includes a 10 dBA adjustment (upward) added to the sound levels that occur between the hours of 10:00 P.M. and 7:00 A.M. (nighttime). Unlike CNEL, L_{dn} does not include the 5-dBA adjustment (upward) to the sound levels which occur between the hours of 7:00 P.M. and 10:00 P.M. (evening). L_{dn} is typically within 1 dBA of CNEL and the two measurements are often used interchangeably for the purposes of defining the community noise environment and measuring A-weighted sound levels for a 24-hour period.

(2) Ground-Borne Vibration

Vibration is commonly defined as an oscillatory motion through a solid medium in which the motion's amplitude can be described in terms of displacement, velocity, or acceleration. The peak particle velocity (PPV) or the root-mean square (RMS) velocity is usually used to describe vibration amplitudes. PPV is defined as the maximum instantaneous peak of the vibration signal and is typically used for evaluating potential building damage.[8] The RMS velocity is defined as the square-root of the average of the squared amplitude of the vibration signal and is typically more suitable for evaluating

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[7] *State of California, General Plan Guidelines, 2017.*

[8] *Vibration levels are described in the noise calculation worksheets included in Appendix E of this Draft EIR and in this section of the Draft EIR in terms peak particle velocity level in the unit of inches per second.*

human response to ground-borne vibration.[9] The RMS vibration velocity level can be presented in inch per second or in VdB (a decibel unit referenced to one micro-inch per second).[10] Ground-borne vibration generated by man-made activities (e.g., road traffic, construction operations) typically weakens with greater horizontal distance away from the source of the vibration.

b. Regulatory Framework

Various government agencies have established noise regulations and policies to protect citizens from potential hearing damage and other adverse effects associated with noise and ground-borne vibration. The City has adopted a number of regulations and policies, which are based in part on federal and state regulations and are intended to control, minimize, or mitigate environmental noise effects. There are no City-adopted regulations or policies that relate to ground-borne vibration; therefore, the ground-borne vibration standards and guidelines from the Federal Transit Administration (FTA) are used for this analysis. The regulations and policies that are relevant to Project construction and operation noise are discussed below.

(1) Federal

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 that apply to some transportation equipment (e.g., interstate rail carriers, medium trucks, and heavy trucks) and construction equipment. In 1974, the USEPA issued guidance levels for the protection of public health and welfare in residential land use areas[11] of an outdoor L_{dn} of 55 dBA and an indoor L_{dn} of 45 dBA. These guidance levels are not considered as 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.

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[9] *Federal Transit Administration (FTA), "Transit Noise and Vibration Impact Assessment," Section 5.1, September 2018.*

[10] *VdB (velocity level in decibel) = 20 x Log (V / V_{ref}), where V is the RMS velocity amplitude in micro-inch per second and V_{ref} is the reference velocity amplitude of $1x10^{-6}$ inch per second (1 micro-inch per second). All vibration levels described in decibel (VdB) in the noise calculation worksheets included in Appendix E of this Draft EIR and in this section of the Draft EIR are RMS and referenced to 1 micro-inch per second.*

[11] *United States Environmental Protection Agency, EPA Identifies Noise Levels Affecting Health and Welfare, April 1974.*

(2) State

The Governor's Office of Planning and Research (OPR) has established general plan noise compatibility guidelines for evaluating the compatibility of various land uses as a function of community noise exposure. The types of land uses addressed by the State and the acceptable noise categories for each land use are included in the *State of California General Plan Guidelines,* which is published and updated by the OPR. The level of acceptability of the noise environment is dependent upon the activity associated with the particular land use. For example, according to the State, an exterior noise environment up to 65 dBA CNEL is "normally acceptable" for single- and multi-family residential uses, without special noise insulation requirements. In addition, noise levels up to 75 dBA CNEL are "conditionally acceptable" with special noise insulation requirements, while noise levels at 75 dBA CNEL and above are "clearly unacceptable" for residential and hotel uses.[12] In addition, the 2019 California Building Standards Code requires that where the ambient noise environment exceeds 65 dBA CNEL, measures should be implemented to achieve an interior noise environment of a residential use (habitable room) not to exceed 45 dBA CNEL. The 2019 California Green Building Standards Code also requires that where the ambient noise environment exceeds 65 dBA CNEL or 65 dBA L_{eq}, measures should be implemented to achieve an interior noise environment of a non-residential use that would not exceed 50 dBA $L_{eq\ (1\text{-}hour)}$.

(3) City of Los Angeles Regulations and Policies

The Noise Element of the City of Los Angeles General Plan (General Plan) establishes CNEL guidelines for land use compatibility (refer to Table IV.E-2 on page IV.E-7) and includes a number of goals, objectives, and policies for land use planning purposes. The City also has regulations to control unnecessary, excessive, and annoying noise, as set forth in the Los Angeles Municipal Code (LAMC) Chapter XI, Noise Regulation. In addition, the *L.A. CEQA Thresholds Guide* provides thresholds for determining noise impacts of a project. These regulations and policies are described further below.

(a) Noise Element

The overall purpose of the General Plan's Noise Element (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. The following policies and objectives from the Noise Element are applicable to the Project:[13]

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[12] *State of California, Governor's Office of Planning and Research, General Plan Guidelines, July 2017, p. 374.*

[13] *Noise Element of the Los Angeles City General Plan, adopted February 3, 1999.*

Table IV.E-2
City of Los Angeles Guidelines for Noise Compatible Land Use

Land Use	Community Noise Exposure: Day-Night Average Exterior Sound Level (CNEL dB)						
	50	**55**	**60**	**65**	**70**	**75**	**80**
Residential Single-Family, Duplex, Mobile Home	A	C	C	C	N	U	U
Residential Multi-Family	A	A	C	C	N	U	U
Transient Lodging, Motel, Hotel	A	A	C	C	N	U	U
School, Library, Church, Hospital, Nursing Home	A	A	C	C	N	N	U
Auditoriums, Concert Hall, Amphitheater	C	C	C	C/N	U	U	U
Sports Arena, Outdoor Spectator Sports	C	C	C	C	C/U	U	U
Playgrounds, Neighborhood Park	A	A	A	A/N	N	N/U	U
Golf Course, Riding Stable, Water Recreation, Cemetery	A	A	A	A	N	A/N	U
Office Buildings, Business, Commercial, Professional	A	A	A	A/C	C	C/N	N
Agriculture, Industrial, Manufacturing, Utilities	A	A	A	A	A/C	C/N	N

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

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

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

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

Source: City of Los Angeles General Plan Noise Element, adopted February 1999, Exhibit I.

- Objective 2 (Non-airport): Reduce or eliminate non-airport related intrusive noise, especially relative to noise-sensitive uses.
- Policy 2.1: Enforce and/or implement applicable City, State, and federal regulations intended to mitigate proposed noise producing activities, reduce intrusive noise and alleviate noise that is deemed a public nuisance.
- Objective 3 (Land Use Development): Reduce or eliminate noise impacts associated with proposed development of land and changes in land use.
- Policy 3.1: Develop land use policies and programs that will reduce or eliminate potential and existing noise impacts.

The City's noise compatibility guidelines are provided in Table IV.E-2 on page IV.E-7.

(b) City of Los Angeles Noise Regulations (Chapter XI of the LAMC)

Chapter XI, Noise Regulation, of the LAMC (referred to herein as the Noise Regulations) establishes acceptable ambient sound levels to regulate intrusive noises (e.g., stationary mechanical equipment and vehicles other than those traveling on public streets) within specific land use zones and provides procedures and criteria for the measurement of the sound level of noise sources. These procedures recognize and account for differences in the perceived level of different types of noise and/or noise sources. In accordance with the Noise Regulations, a noise level increase from certain regulated noise sources of 5 dBA over the existing or presumed ambient noise level at an adjacent property line is considered a violation of the Noise Regulations. The 5-dBA increase above ambient is applicable to City-regulated noise sources (e.g., mechanical equipment), and is applicable any time of the day.[14]

The Noise Regulations state that the baseline ambient noise shall be the actual measured ambient noise level or the City's presumed ambient noise level, whichever is greater. The actual ambient noise level is the measured noise level averaged over a period of at least 15 minutes, $L_{eq(15\text{-minute})}$. The Noise Regulations indicate that in cases where the actual measured 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.) ambient noise levels defined in LAMC Section 111.03 should be used. The City's presumed ambient noise levels for specific land use zones, as set forth in LAMC Section 111.03, are provided in Table IV.E-3 on page IV.E-9.

To account for people's increased tolerance for short-duration noise events, the Noise Regulations provide a 5-dBA allowance beyond the 5 dBA above ambient for noise sources occurring more than five minutes but less than 15 minutes in any 1-hour period (for a total of 10 dBA above the ambient), and an additional 5-dBA allowance (total of 15 dBA above the ambient) for noise sources occurring 5 minutes or less in any 1-hour period. These additional allowances for short-duration noise sources are applicable to noise sources occurring between the hours of 7:00 A.M. and 10:00 P.M. (daytime hours). Furthermore, the Noise Regulations provide a 5 dBA shall be added to the sound level measurement for steady high-pitched noise or repeated impulsive noises.[15,16]

[14] *Los Angeles Municipal Code, Chapter XI, Section 112.02.*

[15] *LAMC, Chapter XI, Article I, Section 111.02 (b).*

Table IV.E-3
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, School, Hospitals, Hotels	50	40
Commercial	60	55
Manufacturing (M1, MR1, and MR2)	60	55
Heavy Manufacturing (M2 and M3)	65	65

Source: LAMC Section 111.03.

The LAMC also provides noise regulations with respect to vehicle-related noise, including Section 114.02, which prohibits the operation of any motor driven vehicles upon any property within the City in a manner that would cause the noise level on the premises of any occupied residential property to exceed the ambient noise level by more than 5 dBA; Section 114.03, which prohibits loading and unloading operating between the hours of 10:00 P.M. and 7:00 A.M., which causes any impulsive sound, raucous or unnecessary noise within 200 feet of any residential building; and Section 114.06, which requires vehicle theft alarm systems shall be silenced within five minutes.

LAMC Section 112.01 prohibits the use or operation of a machine or device for the producing, reproducing or amplification of the human voice, music, or any other sound that causes the ambient noise level on the premises of any occupied property to be exceeded by more than 5 dBA.

In addition, the Noise Regulations (LAMC Section 112.05) set a maximum noise level from construction equipment (powered equipment or powered hand tools) operating between the hours of 7:00 A.M. and 10:00 P.M., in any residential zone of the City or within 500 feet thereof, of 75 dBA, measured at a distance of 50 feet from the source, unless compliance with this limitation is technically infeasible.[17] LAMC Section 41.40 prohibits construction noise that disturbs persons occupying sleeping quarters in any dwelling, hotel, or apartment or other place of residence between the hours of 9:00 P.M. and 7:00 A.M. Monday through Friday, before 8:00 A.M. and after 6:00 P.M. on Saturday or national

[16] *Impulsive sound as defined in the LAMC Section 111.01 (e) is sound of short duration, usually less than one second, with an abrupt onset and rapid decay. Examples of impulsive sound shall include, but are not limited to, explosion, musical bass drum beats, or the discharge of firearms.*

[17] *In accordance with the Noise Regulations, "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.*

holiday, and at any time on Sunday. Construction hours may be extended with approval from the Executive Director of the Board of Police Commissioners. In general, the City of Los Angeles Department of Building and Safety enforces Noise Regulations relative to noise generated by operation of equipment, and the Los Angeles Police Department enforces Noise Regulations relative to noise generated by people.

(4) Ground-Borne Vibration

The City currently does not have any adopted standards, guidelines, or thresholds relative to ground-borne vibration. As such, available guidelines from the FTA are utilized to assess impacts due to ground-borne vibration. As discussed above, in most circumstances common ground-induced vibrations related to roadway traffic and construction activities pose no threat to buildings or structures.[18,19]

The FTA published a technical manual titled, "Transit Noise and Vibration Impacts Assessment," which provides ground-borne vibration impact criteria with respect to building damage during construction activities.[20] As discussed above, building vibration damage is measured in PPV described in the unit of inches per second. Table IV.E-4 on page IV.E-11 provides the FTA vibration criteria applicable to construction activities. According to FTA guidelines, a vibration criterion of 0.20 PPV should be considered as the significant impact level for non-engineered timber and masonry buildings. Structures or buildings constructed of reinforced concrete, steel, or timber, have a vibration damage criterion of 0.50 PPV pursuant to the FTA guidelines.

In addition to the FTA Construction Vibration Impact Criteria for Building Damage, the FTA guidance manual also provides vibration criteria for human annoyance for various uses. These criteria were established primarily for rapid transit (rail) projects and, as indicated in Table IV.E-5 on page IV.E-11, are based on the frequency of vibration events. Specific criteria are provided for three land use categories: (1) Vibration Category 1—High Sensitivity; (2) Vibration Category 2—Residential; and (3) Vibration Category 3—Institutional.

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18 *FTA, "Transit Noise and Vibration Impact Assessment," Chapter 5.2, September 2018.*

19 *Caltrans, "Transportation Related Earthborne Vibrations," February 2002.*

20 *FTA, "Transit Noise and Vibration Impact Assessment," September 2018.*

Table IV.E-4
FTA Construction Vibration Impact Criteria for Building Damage

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: Federal Transit Administration, 2018.

Table IV.E-5
FTA Vibration Impact Criteria for Human Annoyance

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

[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: Federal Transit Administration, 2018.

c. Existing Conditions

As discussed in Section II, Project Description, of this Draft EIR, the Project Site is located in an urbanized area. The predominant source of noise in the vicinity of the Project Site is vehicular traffic on adjacent roadways. Other ambient noise sources in the vicinity of the Project Site include truck traffic, landscaping activities, surface parking lot 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 (hotels), schools, libraries, churches, hospitals, nursing homes, auditoriums, concert halls, amphitheaters, playgrounds, and parks.[21] Similarly, the Noise Element defines noise-sensitive land uses as single-family and multi-unit dwellings, long-term care facilities (including convalescent and retirement facilities), dormitories, motels, hotels, transient lodging, and other residential uses; houses of worship; hospitals; libraries; schools; auditoriums; concert halls; outdoor theaters; nature and wildlife preserves; and parks.[22] These uses are generally considered more sensitive to noise than commercial and industrial land uses.

Based on a review of the land uses in the vicinity of the Project Site, ten noise receptor locations (nine off-site and one on-site) were selected to represent noise-sensitive uses within 500 feet of the Project Site. These locations represent areas with land uses that could qualify as noise-sensitive uses according to the definition of such uses in the *L.A. CEQA Thresholds Guide* and the General Plan. As discussed below, noise measurements were conducted on-site and at nine off-site locations around and adjacent to the Project Site to establish baseline noise conditions in the vicinity of the Project Site. The monitoring locations essentially surround the Project Site and thereby provide representative baseline measurements for uses in all directions. 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.E-1 on page IV.E-13 and described in Table IV.E-6 on page IV.E-14.

(2) Ambient Noise Levels

To establish baseline noise conditions, existing ambient noise levels were monitored at nine off-site receptor locations (identified as R1 to R9) that are representative of sensitive uses in the vicinity of the Project Site and at one on-site location (identified as P1). The baseline noise monitoring program was conducted on July 15, 2019, using a Quest

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

[22] *Noise Element, City of Los Angeles General Plan, Chapter IV, p. 4-1.*

Figure IV.E-1
Noise Measurement Locations

Source: Acoustical Engineering Services, 2019; Google Earth Pro; Eyestone Environmental, 2019.

Table IV.E-6
Description of Noise Measurement Locations

Receptor Location	Description	Approximate Distance from Measurement Location to Nearest Project Site Boundary (feet)[a]	Nearest Noise-Sensitive Land Use(s)
R1	Residential use (8th and Grand Apartments) at the northeast corner of 8th Street and Grand Avenue, east of the Project Site	85	Residential
R2	Residential use (Atelier Apartments) at the southwest corner of 8th Street and Olive Street, southeast of the Project Site	275	Residential
R3	Hotel use (Stillwell Hotel) on Grand Avenue, south of the Project Site	425	Hotel
R4	Residential use (SP Lofts) on Grand Avenue, south of the Project Site	235	Residential
R5	Residential use (Sky Lofts) on the south side of 8th Street, south of the Project Site.	78	Residential
R6	Residential use (8th+Hope Apartments) at the southwest corner of 8th Street and Hope Street, southwest of the Project Site	110	Residential
R7	Residential use (Gas Co. Lofts Apartments) on 8th Street, west of the Project Site	265	Residential
R8	Religious use (Third Church of Christ) on Hope Street, north of the Project Site	150	Religious
R9	Hotel use (Sheraton Grand Hotel) on Hope Street, north of the Project Site	280	Hotel
P1	Project Site, southern boundary facing 8th Street	Project Site	Commercial Parking Garage and Parking Lot[b]

[a] *Distances are estimated using Google Earth.*

[b] *The commercial parking garage and parking lot are not considered noise-sensitive uses.*

Source: Acoustical Engineering Services (AES), 2021. See Appendix E to this Draft EIR.

Technologies Model 2900 Integrating/Logging Sound Level Meter.[23] Two 15-minute measurements were conducted at each of the off-site receptor locations (R1 to R9) during daytime and nighttime hours. The daytime ambient noise levels were measured between

[23] *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.*

10:00 A.M. and 1:00 P.M., and the nighttime ambient noise levels were measured between 10:00 P.M. and 1:00 A.M. A 24-hour measurement was conducted at the on-site receptor location (P1). The measurement periods represent the typical average ambient noise levels during the daytime and nighttime hours. As these average ambient noise levels are used as the base for comparison, the resulting analysis is more conservative (i.e., results in greater impacts) than use of other timeframes such as during peak traffic timeframes when noise levels are higher. The ambient noise measurements were measured in accordance with the City's standards, which require ambient noise to be measured over a period of at least 15 minutes.[24]

Table IV.E-7 on page IV.E-16 provides a summary of the ambient noise measurements conducted at the ten noise receptor locations. Based on field observations, the ambient noise at the measurement locations is dominated by local traffic and, to a lesser extent, helicopter flyovers and other typical urban noises. As indicated in Table IV.E-7, the existing daytime ambient noise levels at the off-site noise receptor locations ranged from 65.2 dBA (L_{eq}) at receptor location R8 to 71.9 dBA (L_{eq}) at receptor location R7. The measured nighttime ambient noise levels ranged from 62.5 dBA (L_{eq}) at receptor location R8 to 65.9 dBA (L_{eq}) at receptor location R1. Thus, 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 and hotel uses, as presented above in Table IV.E-3 on page IV.E-9.

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 as Appendix F of this Draft EIR. Twelve (12) 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. The TNM 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 during 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 TNM 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

[24] *LAMC Section 111.01.*

Table IV.E-7
Existing Ambient Noise Levels

Receptor Location	Noise-Sensitive Land Use	Measured Noise Levels, L_{eq} (dBA)		CNEL[b] (24-hour)
		Daytime Hours[a] (7:00 A.M.–10:00 P.M.)	Nighttime Hours[a] (10:00 P.M.–7:00 A.M.)	
R1	Residential	66.5	65.9	70.7
R2	Residential	65.8	65.4	70.2
R3	Hotel	66.0	62.9	68.4
R4	Residential	67.4	63.9	69.5
R5	Residential	67.3	63.8	69.4
R6	Residential	70.1	65.5	71.5
R7	Residential	71.9	65.6	72.4
R8	Religious	65.2	62.5	67.8
R9	Hotel	67.9	63.4	69.4
P1	Commercial Parking Garage and Parking Lot	71.0[c]	68.1[c]	75.4

[a] *The range of hours for the "Daytime Hours" and "Nighttime Hours" in the table heading are defined by the LAMC Section 111.03. For receptor locations R1 through R9, daytime ambient noise levels were measured between 10:00 A.M. and 1:00 P.M., and the nighttime ambient noise levels were measured between 10:00 P.M. and 1:00 A.M.*

[b] *Estimated based on short-term (15-minute) noise measurement based on FTA procedures (FTA Transit Noise and Vibration Impact Assessment Manual, Appendix E, Determining Existing Noise).*

[c] *Levels shown for P1 represent the average for the entire daytime and nighttime periods.*

Source: AES, 2021. See Appendix E to this Draft EIR.

mix/distribution information used in the noise calculations is shown in Table IV.E-8 on page IV.E-17.

Table IV.E-9 on page IV.E-18 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 68.9 dBA CNEL along 7th Street (between Hope Street and Grand Avenue) to 71.9 dBA CNEL along Flower Street (between 7th Street and 8th Street).

Currently, the existing traffic-related noise levels along the roadway segments of Hope Street (between 7th Street and 9th Street), Olive Street (between 7th Street and 8th Street), 7th Street (between Hope Street and Grand Avenue), and 9th Street (between Figueroa Street and Grand Avenue), fall within the conditionally acceptable noise levels for residential uses (i.e., between 60 and 70 dBA CNEL). The existing traffic noise levels along Flower Street (between 7th Street and 9th Street), Grand Avenue (between

Table IV.E-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, 2019. See Appendix E to this Draft EIR.

7th Street and 9th Street), Olive Street (between 8th Street and 9th Street), and 8th Street are between 70 dBA CNEL and 75 dBA CNEL, which are considered normally unacceptable for residential uses.

(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 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."[25] 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. Per the FTA, 75 VdB is the dividing line between barely perceptible (with regards to ground vibration) and distinctly perceptible.[26] Therefore, existing ground vibration in the vicinity of the Project Site is generally below the perceptible level. However, ground vibration associated with heavy trucks traveling on road surfaces with irregularities, such as speed bumps and potholes, could reach the perceptible threshold.

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

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

Table IV.E-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]
Flower Street					
Between 7th St. and 8th St.	Commercial	40	71.9	No	Conditionally Acceptable
Between 8th St. and 9th St.	Residential	40	71.7	Yes	Normally Unacceptable
Hope Street					
Between 7th St. and 8th St.	Hotel, Residential, Religious	35	69.3	Yes	Conditionally Acceptable
Between 8th St. and 9th St.	Residential	35	69.3	Yes	Conditionally Acceptable
Grand Avenue					
Between 7th St. and 8th St.	Residential	35	70.7	Yes	Normally Unacceptable
Between 8th St. and 9th St.	Residential, Hotel	35	71.1	Yes	Normally Unacceptable
Olive Street					
Between 7th St. and 8th St.	Residential	35	69.6	Yes	Conditionally Acceptable
Between 8th St. and 9th St.	Residential	35	70.2	Yes	Normally Unacceptable
7th Street					
Between Hope St. and Grand Ave.	Residential	40	68.9	Yes	Conditionally Acceptable
8th Street					
Between Hope St. and Grand Ave.	Residential	35	70.8	Yes	Normally Unacceptable
9th Street					
Between Figueroa St. and Hope St.	Residential	40	69.4	Yes	Conditionally Acceptable
Between Hope St. and Grand Ave.	Residential, Park, School	35	69.9	Yes	Conditionally Acceptable

[a] *Detailed calculation worksheets are included in Appendix E to 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.E-2 on page IV.E-7.*

Source: AES, 2021.

3. Project Impacts

a. Thresholds of Significance

In accordance with the State CEQA Guidelines 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;

Threshold (b): Generation of excessive groundborne vibration or groundborne 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, expose people residing or working in the project area to excessive noise levels.

For this analysis, the Appendix G Thresholds listed 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 noise impacts:

(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 take approximately 36 months and 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.E-2 on page IV.E-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 based on LAMC Section 112.01(c), Section 112.02(a), Section 112.04(b), and Section 114.02(a).3.

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., vehicles 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 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 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 currently does not have significance criteria to assess vibration impacts during construction. Thus, FTA guidelines set forth in 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 Project construction activities cause ground-borne vibration levels to exceed 72 VdB at off-site sensitive uses, including residential and hotel uses (applicable to frequent events; 70 or more vibration events per day).

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 used construction equipment noise levels published by the FHWA's "Roadway Construction Noise Model (FHWA 2006)."[27] The ambient noise levels at surrounding sensitive receptor locations were based on field measurement data (see Table IV.E-7 on page IV.E-16). The construction noise levels were then calculated for 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(1)(b), Outdoor Sound Propagation). Additional noise attenuation was assigned to receptor locations where the 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. 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 G to this Draft EIR. The TNM calculates the hourly L_{eq} noise levels generated by construction-related haul trucks. Noise impacts were determined by comparing the predicted noise level plus ambient 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 spaces), parking

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[27] *The reference noise levels for construction equipment from the FHWA are based on 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).*

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 were calculated using the SoundPLAN (version 8.1) computer noise prediction model.[28] 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 and traffic data from the Project's Transportation Assessment, included as Appendix G of this Draft EIR. Roadway noise levels were calculated for various roadway segments, based on the intersection traffic volumes. Roadway noise conditions without the Project were 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. Vibration levels were calculated based on the FTA published standard vibration velocities for various construction equipment operations. In addition, vibration impacts were evaluated based on maximum peak vibration levels generated by each type of construction equipment, per FTA guidance.

(6) Operational Vibration

The primary source of 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-condenser units (mounted at the roof level), that would include vibration-attenuation mounts to reduce the vibration transmission. The Project does not include land uses that would generate high levels of vibration. In addition, ground-borne vibration attenuates rapidly as a function of distance from the vibration source. A more specific discussion of operational vibration impacts is provided below.

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[28] *SoundPLAN GmbH, SoundPLAN version 8.0, 2017.*

c. Project Design Features

The following project design features are applicable to the Project with regard to noise and vibration:

Project Design Feature NOI-PDF-1: Power construction equipment (including combustion engines), fixed or mobile, will be equipped with state-of-the-art noise shielding and muffling devices (consistent with manufacturers' standards). All equipment will be properly maintained to assure that no additional noise, due to worn or improperly maintained parts, would be generated.

Project Design Feature NOI-PDF-2: All outdoor mounted mechanical equipment will be screened from off-site noise-sensitive receptors. The equipment screen will be impermeable (i.e., solid material with minimum weight of 2 pounds per square feet) and break the line-of-sight from the equipment to the off-site noise-sensitive receptors.

Project Design Feature NOI-PDF-3: Project construction will not include the use of driven (impact) pile systems.

Project Design Feature NOI-PDF-4: Outdoor amplified sound systems, if any, will be designed so as not to exceed the maximum noise level of 80 dBA ($L_{eq\text{-}1hr}$) at a distance of 25 feet from the amplified speaker sound systems.[29] A qualified noise consultant will provide written documentation that the design of the system complies with this maximum noise levels.

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 the site clearance and demolition of the existing parking structure and parking lot, followed by grading and excavation for the subterranean parking and the utilities to service the Project. Building foundations would

[29] *The specified noise level limit was established to ensure the noise levels from the amplified sound system at the nearest noise sensitive receptor would not increase the ambient noise level by more than 5 dBA, per LAMC Section 112.01.*

then be constructed, followed by building construction, paving/concrete installation, and landscape installation. It is estimated that approximately 89,750 cubic yards of soil would be hauled from the Project Site during the excavation phase. Construction delivery/haul trucks would travel on approved truck routes between the Project Site and the Harbor/Pasadena Freeway (SR-110). Trucks leaving the Project Site would travel west on 8th Street, and north on the SR-110. Trucks coming to the Project Site would travel south on the SR-110, exit at the James M. Wood Boulevard/9th Street off-ramp, travel east on 9th Street, north on Olive Street, and west on 8th Street to the Project Site.

(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, utilities, 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.

As provided in Project Design Feature NOI-PDF-1 above, construction equipment would have proper noise muffling devices per the manufacturer's standards. 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.E-10 on page IV.E-26. 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 operates 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

Table IV.E-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	20	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, 2006.

construction phase.[30] These noise levels are typically associated with multiple pieces of equipment operating on part power, simultaneously.

Table IV.E-11 on page IV.E-27 provides the estimated construction noise levels for various construction phases at the nine noise-sensitive receptor locations (R1 to R9). 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.

[30] *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.E-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))	Significance Criteria (L_{eq} (dBA))[a]	Maximum Noise Exceedance Above the Criteria (L_{eq} (dBA))	Sig. Impact Without Mitigation?
		Demo	Grading/ Excavation	Building Foundation	Building Construction	Paving/ Landscape				
R1	85	82.2	78.3	79.1	79.7	80.8	66.5	71.5	10.7	Yes
R2	275	72.9	69.5	69.8	70.8	71.4	65.8	70.8	2.1	Yes
R3	425	69.3	66.0	66.3	67.6	67.8	66.0	71.0	0.0	No
R4	235	74.2	70.8	71.2	72.2	72.7	67.4	72.4	1.8	Yes
R5	78	83.0	79.1	79.9	80.5	81.6	67.3	72.3	10.7	Yes
R6	110	80.3	76.6	77.2	77.9	78.9	70.1	75.1	5.2	Yes
R7	265	73.2	69.8	70.2	71.3	71.7	71.9	76.9	0.0	No
R8[b]	150	62.8	59.3	59.8	60.6	61.4	65.2	70.2	0.0	No
R9	280	72.8	69.4	69.8	70.8	71.3	67.9	72.9	0.0	No

[a] *Significance criteria are equivalent to the measured daytime ambient noise levels (see Table IV.E-7 on page IV.E-16) 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] *Estimated noise levels at receptor location R8 include sound attenuation provided by the existing 8-story parking structure located between the Project Site and the receptor location.*

Source: AES, 2021. See Appendix E to this Draft EIR.

These assumptions represent the 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 combined, the corresponding significance criteria used in the construction noise analysis is when the construction-related noise exceeds the ambient L_{eq} noise level of 5 dBA at a noise-sensitive use. As indicated in Table IV.E-11 on page IV.E-27, the estimated noise levels during all stages of Project construction combined would exceed the significance criteria at off-site receptor locations, R1, R2, R4, R5 and R6. The estimated noise levels at off-site receptor locations, R3, R7, R8 and R9 would below the significance criteria. The estimated construction-related noise would exceed the significance threshold by a range of 1.8 dBA at the uses represented by receptor location R4 to up to 10.7 dBA at the uses represented by receptor locations R1 and R5, without implementation of mitigation. **Therefore, temporary noise impacts associated with the Project's on-site construction would be significant prior to implementation of mitigation measures.**

(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 from the delivery/concrete/haul trucks.

The peak period of construction with the highest number of noise generating construction trucks would occur during the building foundation phase. During this phase, there would be a maximum of 300 daily trips which include 150 construction trucks coming to and leaving the Project Site (equal to 300 total trips) per day. In addition, there would be a total of 100 worker trips (50 coming to and 50 leaving from the Project Site) on a daily basis during the building foundation phase.

Table IV.E-12 on page IV.E-29 provides the estimated number of construction-related truck trips, including haul/concrete/material delivery trucks and worker vehicles, and the estimated noise levels along the anticipated truck route(s). As indicated in Table IV.E-12, the hourly noise levels generated by construction trucks during all stages of Project construction would be consistent with the existing daytime ambient noise levels along the anticipated truck routes, including: 8th Street, James M. Wood Boulevard/

Table IV.E-12
Off-Site Construction Truck Noise Levels

Construction Phase	Estimated Number of Construction Truck/Worker Trips per Day[b]	Estimated Number of Construction Truck/Worker Trips per Hour[c]	Estimated Truck Noise Levels Plus Ambient Along the Project Truck Routes,[a] (L_{eq} (dBA)) (Project/Project + Ambient)				
				8th Street	James M. Wood Blvd./ 9th Street		Olive Street
Demolition	58/40	4/16		60.0/68.0	60.7/67.4		60.0/67.5
Grading/Excavation	220/60	19/24		66.3/69.8	67.0/69.7		66.3/69.5
Building Foundation	300/100	19/40		66.4/69.9	67.2/69.8		66.4/69.6
Building Construction	20/550	2/220		63.9/68.9	64.7/68.6		63.9/68.5
Paving/Landscape	10/40	1/16		55.6/67.6	56.3/66.8		55.6/67.0
Existing Ambient Noise Levels Along the Project Haul Routes, L_{eq} (dBA)[d]				67.3	66.4		66.7
Significance Criteria, L_{eq} (dBA)[e]				72.3	71.4		71.7
Maximum Exceedance Over Significance Criteria, L_{eq} (dBA)				0.0	0.0		0.0
Significant Impact?				No	No		No

[a] *Noise levels include Project-related truck trips plus ambient.*

[b] *Trip numbers represent roundtrips (i.e., including both incoming and outgoing trips).*

[c] *Trip numbers represent one-way trips. For construction trucks, the number of hourly trips is based on an hourly average, assuming a uniform distribution of trips over an 8-hour work day and divided by two, as incoming and departing trucks would be on different roadways (due to one-way streets). Haul truck hourly trips are conservatively distributed over an assumed 6-hour hauling day. For worker vehicles, the number of hourly trips is based on 40 percent of the worker trips that would arrive in one hour to represent a conservative analysis.*

[d] *Ambient noise levels along the truck routes are based on measurements at nearby receptor locations (i.e., R5 along 8th Street). Ambient noise levels along James M. Wood Boulevard/9th Street and Olive Street are based on measured ambient at receptor R5, adjusted for the existing traffic volumes along the roadway segments.*

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

Source: AES, 2021. See Appendix E to this Draft EIR.

9th Street, and Olive Street (between the Project Site and the nearest freeway on-ramps) and therefore would be below significance criteria of 5-dBA increase over the ambient noise level. **Therefore, temporary noise impacts from off-site construction traffic would be less than significant.**

(iii) Summary of Construction Noise Impacts

As discussed above, temporary noise impacts associated with the Project's on-site construction would be significant. **Therefore, prior to implementation of mitigation measures, Project construction would result in the generation of a substantial temporary increase in ambient noise levels in the vicinity of the Project, mainly at R1, R2, R4, R5 and R6, in excess of significance criteria established by the City.**

(b) Operational Noise

This section provides a discussion of potential operational noise impacts on nearby noise-sensitive receptors. 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 open spaces, 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 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 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-2, all outdoor mounted mechanical equipment would be screened from off-site noise-sensitive receptors. Table IV.E-13 on page IV.E-31 presents the estimated noise levels at the off-site receptor locations from operation of the Project mechanical equipment.

As indicated in Table IV.E-13, the estimated noise levels from the mechanical equipment would range from 39.2 dBA (L_{eq}) at the uses represented by receptor location R4 to 46.8 dBA (L_{eq}) at the uses represented by receptor location R6, which would be below the existing ambient noise levels. As such, the estimated ambient noise levels at all

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

Receptor Location	Existing Ambient Noise Levels, dBA (L_{eq})	Estimated Noise Levels from Mechanical Equipment,[b] dBA (L_{eq})	Ambient + Project Noise Levels, dBA (L_{eq})	Significance Criteria, dBA (L_{eq})[a]	Exceedance over Significance Criteria	Significant Impact?
R1	65.9	42.3	65.9	70.9	0.0	No
R2	65.4	46.1	65.5	70.4	0.0	No
R3	62.9	39.6	62.9	67.9	0.0	No
R4	63.9	39.2	63.9	68.9	0.0	No
R5	63.8	43.2	63.8	68.8	0.0	No
R6	65.5	46.8	65.6	70.5	0.0	No
R7	65.6	40.7	65.6	70.6	0.0	No
R8	62.5	44.6	62.6	67.5	0.0	No
R9	63.4	44.0	63.4	68.4	0.0	No

[a] *Significance criteria are equivalent to the measured daytime or nighttime ambient noise levels, whichever is lower (see Table IV.E-7 on page IV.E-16) 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.*

[b] *Estimated noise levels from rooftop equipment and parking garage exhaust fans.*

Source: AES, 2021. See Appendix E to this Draft EIR.

off-site receptor locations with the addition of the Project's mechanical equipment would be below the significance criteria of 5 dBA (L_{eq}) above ambient noise levels (based on the lowest measured ambient). **Therefore, compliance with the City's code requirements would ensure that operation of the Project's mechanical equipment would not exceed the City's threshold of significance and that impacts would be less than significant.**

Outdoor Spaces

As discussed in Section II, Project Description, of this Draft EIR, the Project would include various common and private open space within the Project Site. The common outdoor open space areas would include: a dog run/pet amenity area on Level 3, a pool, cabanas, sun deck area, gym, spa, yoga and fitness area, juice bar, barbeque and dining areas, seating, event lawn, fire on Level 10; common outdoor open space featuring a coffee and snack bar, seating, and co-working spaces on Level 21, and common outdoor open space including a spa, fire pit and seating, dining areas, bar, and lounges on Level 35. Noise sources associated with outdoor uses typically include noise from people gathering and conversing. For this operational noise analysis, reference noise levels of 65 dBA for a male and 62 dBA for a female speaking in a raised voice were used for analyzing

potential noise impacts from people gathering at the outdoor spaces.[31] In order to analyze a typical noise scenario, 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. Noise levels associated with the dog run area were calculated based on measured noise level from an existing dog park, which generated approximately 58.4 dBA (L_{eq}) at a distance of 25 feet.[32] In addition, the hours of operation for use of the outdoor areas were assumed to be from 6:00 A.M. to 12:00 A.M.

An additional potential noise source associated with outdoor uses would be the use of an outdoor sound system (e.g., music or other sounds broadcast through an outdoor mounted speaker system) at the outdoor open spaces. As set forth in Project Design Feature NOI-PDF-4, the amplified sound system used in outdoor areas would be designed so as not to exceed the maximum noise levels of 80 dBA L_{eq} at a distance of 25 feet from the amplified speaker sound system, thereby ensuring that the amplified sound system would not exceed the significance criteria (i.e., an increase of 5 dBA L_{eq}) at any off-site noise-sensitive receptor location. Table IV.E-14 on page IV.E-33 presents the anticipated number of people and amplified sound system levels at each of the outdoor spaces.

Table IV.E-15 on page IV.E-34 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.E-15, the estimated noise levels from the outdoor spaces would range from 45.8 dBA (L_{eq}) at the uses represented by receptor location R3 to 65.1 dBA (L_{eq}) at the uses represented by receptor location R5. The estimated ambient noise levels with the addition of the noise levels generated by the Project's outdoor spaces would be below the significance criteria of 5 dBA (L_{eq}) above ambient noise levels (based on the lowest measured ambient noise level) at all off-site receptor locations. **As such, noise impacts from the use of the outdoor spaces would be less than significant.**

Parking Facilities

As discussed in Section II, Project Description, of this Draft EIR, the Project would provide 636 vehicular parking spaces. These parking spaces would be located within

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

[32] *City of San Diego, Noise Technical Report Beyer Community Park, April 2019. The measured noise levels provided in the referenced report are from an existing dog park with 5 to 11 dogs present in each of the small and large dog areas. The measured noise level is appropriate for the Project as the Project also includes areas for dogs.. In addition, the reference noise level was adjusted up by 3.8 dBA to account for the maximum 19 dogs for the Project.*

Table IV.E-14
Outdoor Use Analysis Assumptions

Outdoor Space	Approximate Common Outdoor Area, square feet	Estimated Total Number of People[a]	Amplified Sound System Levels, dBA (L_{eq})
Level 1 (ground)	—	94[b]	—
Level 3 (Dog Run/Pet Amenity Area)	934[c]	62	—
Level 10	11,709	781	80 dBA at 25 feet
Level 21	7,553	504	80 dBA at 25 feet
Level 35	4,691	313	80 dBA at 25 feet

[a] *Based on 15 square feet per person, per the Building Code maximum allowance.*

[b] *Per Section II, Project Description, of this Draft EIR up to 94 outdoor seats would be provided on the ground floor.*

[c] *The dog run/pet amenity area included in the nose analysis is not counted toward the open space requirements. This area would accommodate up to approximately 19 dogs during peak use.*

Source: Gensler, 2020; AES, 2021.

11 parking levels (eight above-ground levels and three below grade levels). 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 levels would be effectively shielded from off-site sensitive receptor locations. The above grade parking levels would be visually screened with a solid wall along the north and east sides. Along the west and south sides, the Project would provide a partial height opaque guardrail with parking stalls set back from the building perimeter by at least six feet to obscure any visibility of the cars from the street. The analysis conservatively includes booster (exhaust) fans on these levels (garage exhaust fans are evaluated as part of the building mechanical equipment above). Table IV.E-16 on page IV.E-35 presents the estimated noise levels from the above-grade parking levels at the off-site receptor locations, which ranged from 27.3 dBA (L_{eq}) at the uses represented by receptor location R3 to 46.2 dBA (L_{eq}) at the uses represented by receptor location R5. As indicated in Table IV.E-16, the estimated ambient noise levels with the addition of the noise levels generated by the Project parking facilities 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.**

Table IV.E-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	65.9	52.3	66.1	70.9	0.0	No
R2	65.4	49.3	65.5	70.4	0.0	No
R3	62.9	45.8	63.0	67.9	0.0	No
R4	63.9	48.6	64.0	68.9	0.0	No
R5	63.8	65.1	67.5	68.8	0.0	No
R6	65.5	64.0	67.8	70.5	0.0	No
R7	65.6	60.1	66.7	70.6	0.0	No
R8	62.5	48.7	62.7	67.5	0.0	No
R9	63.4	58.0	64.5	68.4	0.0	No

[a] *Significance criteria are equivalent to the measured daytime or nighttime ambient noise levels, whichever is lower (see Table IV.E-7 on page IV.E-16) 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, 2021. See Appendix E to this Draft EIR.

Loading Dock and Trash Collection Areas

The Project loading docks and trash compactors would be located at the north side of the building at the ground level. The loading area would be mostly shielded from the off-site sensitive receptor locations by the existing parking garage structure to the north and the Project building. In addition, the trash compactor would be located inside an enclosed room, and would be shielded thus minimizing ambient noise. 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 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.[33] The trash compactors would be effectively shielded to the off-site sensitive receptors as they are located inside an enclosed room within the building. Table IV.E-17 on page IV.E-36 presents the estimated noise levels at the off-site receptor locations from operation of the loading dock and trash compactor. As indicated in Table IV.E-17, the estimated noise from the loading dock and trash compactor range from 24.8 dBA (L_{eq}) at the uses represented by receptor location R7 to 54.7 dBA (L_{eq}) at the uses represented by receptor location R1. The estimated ambient noise levels with the

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

Table IV.E-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	65.9	39.6	65.9	70.9	0.0	No
R2	65.4	34.8	65.4	70.4	0.0	No
R3	62.9	27.3	62.9	67.9	0.0	No
R4	63.9	38.9	63.9	68.9	0.0	No
R5	63.8	46.2	63.9	68.8	0.0	No
R6	65.5	43.7	65.5	70.5	0.0	No
R7	65.6	44.4	65.6	70.6	0.0	No
R8	62.5	39.4	62.5	67.5	0.0	No
R9	63.4	37.9	63.4	68.4	0.0	No

[a] *Significance criteria are equivalent to the measured daytime or nighttime ambient noise levels, whichever is lower (see Table IV.E-7 on page IV.E-16) 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, 2021. See Appendix E to this Draft EIR.

addition of the noise levels generated by 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.**

(ii) Off-Site Mobile Noise Sources

Future Plus Project

Future roadway noise levels were calculated along 12 roadway segments in the vicinity of the Project Site. The roadway noise levels were calculated using the traffic data provided by The Mobility Group and included in Appendix G to this Draft EIR. As discussed in the Transportation Assessment, the Project is expected to generate a net increase of 1,500 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.E-18 on page IV.E-37 provides a summary of the roadway noise impact analysis. The calculated CNEL levels are conservative as the noise levels experienced along the roadways are used and do not account for the presence of any physical sound barriers or intervening structures. As shown in Table IV.E-18, the Project would result in a maximum

Table IV.E-17
Estimated Noise Levels from Loading Dock and Trash Compactors

Receptor Location	Existing 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	66.5	54.7	67.8	71.5	0.0	No
R2	65.8	46.9	65.9	70.8	0.0	No
R3	66.0	27.4	66.0	71.0	0.0	No
R4	67.4	47.5	67.4	72.4	0.0	No
R5	67.3	50.5	67.4	72.3	0.0	No
R6	70.1	43.5	70.1	75.1	0.0	No
R7	71.9	24.8	71.9	76.9	0.0	No
R8	65.2	30.2	65.2	70.2	0.0	No
R9	67.9	43.5	67.9	72.9	0.0	No

[a] *Significance criteria for loading and trash compactor areas are equivalent to the measured daytime noise level (see Table IV.E-7 on page IV.E-16) plus 5 dBA, per the City of Los Angeles Noise Regulations. (The loading and trash compactor areas would only operate during the daytime hours). If the estimated noise levels exceed those significance criteria, a noise impact is identified. Nevertheless, the estimated noise levels from the loading dock and trash compactor operation would also be below the nighttime ambient noise levels.*

Source: AES, 2021. See Appendix E to this Draft EIR.

of up to 0.2 dBA (CNEL) increase in traffic noise along the roadway segments of Hope Street (between 7th Street and 8th Street). At other analyzed roadway segments, the increase in traffic-related noise levels would be 0.1 dBA or lower. The increase in traffic noise levels would be well below both the 5 dBA CNEL (applicable to noise levels less than 70 dBA CNEL) and the 3-dBA CNEL (applicable to noise levels 70 dBA CNEL or higher) 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.

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

Roadway Segment	Adjacent Land Use	Calculated Traffic Noise Levels (CNEL (dBA))		Increase in Noise Levels due to Project (CNEL (dBA))	Significant Impact?[a]
		Future Without Project	Future Plus Project		
Flower Street					
Between 7th St. and 8th St.	Commercial	72.4	72.4	0.0	No
Between 8th St. and 9th St.	Residential	72.1	72.1	0.0	No
Hope Street					
Between 7th St. and 8th St.	Hotel, Residential, Religious	69.4	69.6	0.2	No
Between 8th St. and 9th St.	Residential	70.1	70.1	0.0	No
Grand Avenue					
Between 7th St. and 8th St.	Residential	71.3	71.3	0.0	No
Between 8th St. and 9th St.	Residential, Hotel	71.7	71.7	0.0	No
Olive Street					
Between 7th St. and 8th St.	Residential	70.4	70.4	0.0	No
Between 8th St. and 9th St.	Residential	71.0	71.0	0.0	No
7th Street					
Between Hope St. and Grand Ave.	Residential	69.3	69.4	0.1	No
8th Street					
Between Hope St. and Grand Ave.	Residential	71.4	71.5	0.1	No
9th Street					
Between Figueroa St. and Hope St.	Residential	70.7	70.7	0.0	No
Between Hope St. and Grand Ave.	Residential, Park, School	70.8	70.8	0.0	No

[a] *Significant impact is identified if the increase is 3 dBA and the estimated noise levels fall within the "normally unacceptable" or "clearly unacceptable" land use categories or the increase is 5 dBA and the estimated noise levels fall within the "normally acceptable" or "conditionally acceptable" land use categories, per the City of Los Angeles Noise Element.*

Source: AES, 2021. See Appendix E to this Draft EIR.

As shown in Table IV.E-19 on page IV.E-39, when compared with existing conditions, the Project would result in a maximum increase of up to 0.2 dBA (CNEL) in traffic-related noise levels along the roadway segments of Hope Street (between 7th Street and 8th Street) and Grand Avenue (between 7th Street and 8th Street). At other analyzed roadway segments, the increase in traffic-related noise levels would be 0.1 dBA or lower. The estimated increase in traffic noise levels as compared to existing conditions would be well below the relevant 3 dBA 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 [including people and amplified sound], parking facilities, loading/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-related 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.E-20 on page IV.E-40 presents the estimated composite noise levels in terms of CNEL at the off-site sensitive receptor locations from the Project-related noise sources. As indicated in Table IV.E-20, the Project would result in an increase in composite noise levels ranging from 0.2 dBA at the uses represented by receptor locations R2 and R3 to 2.6 dBA at the uses represented by receptor location R5. The composite noise level from Project operation at the off-site receptor location R2 would be below the 3-dBA significance criteria as the Ambient Plus Project Composite noise level falls within the normally unacceptable (70 to 75 CNEL) range for the residential, motel, and hotel land use categories. In addition, the composite noise levels from Project operation at the off-site receptor locations R3, R4, and R8 would be below the 5-dBA significance criteria as the Ambient Plus Project Composite noise levels fall within the conditionally acceptable (60 to 70 CNEL) range for the residential, motel, and hotel land use categories. **As such, composite noise level impacts due to Project operations would be less than significant.**

Based on the above, Project operations would not result in the generation of a substantial permanent increase in ambient noise levels in the vicinity of the Project in excess of standards established in the City's general plan or noise ordinance, or applicable standards of other agencies. Therefore, the Project's operational noise impacts from on- and off-site sources would be less than significant.

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

Roadway Segment	Adjacent Land Use	Calculated Traffic Noise Levels (CNEL (dBA))		Increase in Noise Levels due to Project (CNEL (dBA))	Significant Impact?[a]
		Existing	Existing Plus Project		
Flower Street					
Between 7th St. and 8th St.	Commercial	71.9	71.9	0.0	No
Between 8th St. and 9th St.	Residential	71.7	71.7	0.0	No
Hope Street					
Between 7th St. and 8th St.	Hotel, Residential, Religious	69.3	69.5	0.2	No
Between 8th St. and 9th St.	Residential	69.3	69.4	0.1	No
Grand Avenue					
Between 7th St. and 8th St.	Residential	70.7	70.8	0.1	No
Between 8th St. and 9th St.	Residential, Hotel	71.1	71.1	0.0	No
Olive Street					
Between 7th St. and 8th St.	Residential	69.6	69.6	0.0	No
Between 8th St. and 9th St.	Residential	70.2	70.2	0.0	No
7th Street					
Between Hope St. and Grand Ave.	Residential	68.9	69.0	0.1	No
8th Street					
Between Hope St. and Grand Ave.	Residential	70.8	70.7	0.0	No
9th Street					
Between Figueroa St. and Hope St.	Residential	69.4	69.4	0.0	No
Between Hope St. and Grand Ave.	Residential, Park, School	69.9	69.9	0.0	No

[a] *Significant impact is identified if the increase is 3 dBA and the estimated noise levels fall within the "normally unacceptable" or "clearly unacceptable" land use categories or the increase is 5 dBA and the estimated noise levels fall within the "normally acceptable" or "conditionally acceptable" land use categories, per the City of Los Angeles Noise Element.*

Source: AES, 2021. See Appendix E to this Draft EIR.

Table IV.E-20
Composite Noise Impacts

Receptor Location	Existing Ambient Noise Levels (CNEL (dBA)) (A)	Calculated Project-Related Noise Sources (CNEL (dBA))					Project Composite Noise Levels (CNEL (dBA)) (G=B+C+D+E+F)[b]	Ambient Plus Project Composite Noise Levels (CNEL (dBA)) (H=A+G)[b]	Increase in Noise Levels due to Project (CNEL (dBA)) (H-A)	Sig Criteria[a] (CNEL (dBA))	Sig. Impact?
		Traffic (B)	Mechanical (C)	Parking (D)	Loading & Trash Compactor (E)	Outdoor Spaces[c] (F)					
R1	70.7	57.4	49.0	43.3	51.8	55.4	60.6	71.1	0.4	73.7	No
R2	70.2	44.1	52.8	40.7	25.8	52.6	56.1	70.4	0.2	73.2	No
R3	68.4	54.8	44.2	32.3	24.7	45.7	55.6	68.6	0.2	73.4	No
R4	69.5	54.8	45.1	45.5	44.6	51.9	57.4	69.8	0.3	74.5	No
R5	69.4	45.2	49.9	48.3	28.6	68.4	68.5	72.0	2.6	72.4	No
R6	71.5	45.7	52.2	46.8	23.1	67.3	67.5	73.0	1.5	74.5	No
R7	72.4	47.7	47.4	51.1	19.6	63.4	63.9	73.0	0.6	75.4	No
R8	67.8	53.0	51.3	46.1	27.4	52.0	57.3	68.2	0.4	72.8	No
R9	69.4	44.1	50.7	44.6	40.7	61.3	61.9	70.1	0.7	72.4	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.*

[b] *Adding sound levels in dB are calculated based on energy (logarithmic) basis.*

[c] *Estimated noise levels for the outdoor spaces include both occupants and amplified sound as well as use of the pet amenity area/dog run (see Appendix E of this Draft EIR, under the Outdoor Noise Calculations).*

Source: AES, 2021. See Appendix E to this Draft EIR.

(2) Mitigation Measures

(a) On-Site Construction Noise

As analyzed above, construction of the Project would have the potential to result in significant noise impacts at the off-site sensitive receptor locations from on-site construction activities. 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 eastern property line of the Project Site between the construction areas and the residential uses on the east side of Grand Avenue (receptor locations R1 and R2). The temporary sound barrier shall be designed to provide a minimum 11-dBA and 5-dBA noise reduction at the ground level of receptor locations R1 and R2, respectively.
- Along the southern property line of the Project Site between the construction areas and residential use across the Project Site to the south (receptor location R5) and the SP Lofts on the east side of Grand Avenue to the south (receptor location R4). The temporary sound barrier shall be designed to provide a minimum 11-dBA and 5-dBA noise reduction at the ground level of receptor locations R5 and R4, respectively.
- Along the western property line of the Project Site between the construction areas and residential uses at the southwest corner of 8th Street and Hope Street (receptor location R6). The temporary sound barrier shall be designed to provide a minimum 6-dBA noise reduction at the ground level of receptor location R6.

(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 11 dBA at the residential uses on east side of Grand Avenue (receptor location R1) and on the south side of 8th Street (receptor location R5), and by 6 dBA at the residential uses at the southwest corner of 8th Street and Hope Street (receptor location R6). The specified sound barriers along the Project eastern and southern boundaries

would also reduce the construction-related noise levels at the receptor locations R2 and R4 by minimum 5 dBA. As presented in Table IV.E-21 on page IV.E-43, the estimated construction-related noise levels at off-site sensitive receptor locations R1, R2, R4, R5, and R6 would be reduced to below a level of significance with implementation of Mitigation Measure NOI-MM-1, at the ground level. However, the temporary sound barriers would not be effective in reducing the construction-related noise levels for the upper levels of these residential buildings, including the 7-story apartment building at receptor location R1, the 33-story apartment building at receptor location R2, the 9-story apartment building at receptor location R4, the 24-story apartment building at receptor location R5, and the 22-story apartment building at receptor location R6. In order to be effective, the temporary noise barrier would need to be as high as the building (i.e., up to 33-stories), which would not be feasible (i.e., cost prohibitive and impractical). Other potential mitigation measures such as moveable noise barriers and modification to the construction equipment mix were considered. However, these potential measures were found to infeasible. Specifically, moveable noise barriers are generally limited in height, typically 6–8 feet high and are not practical in reducing noise associated with moveable construction equipment (e.g., an excavator or bulldozer). That is, taller moveable noise barriers (higher than 8 feet) would require heavy equipment (i.e., loaders) to move the noise barrier support, which would generate additional noise. In addition, in order for the moveable noise barrier to be effective, it would need to move in tandem with the mobile construction equipment and would require multiple noise barriers for each of the on-site equipment pieces, which would not be feasible. With respect to the construction mix, as discussed in detail in Section V, Alternatives, reducing the number of construction equipment by 50 percent would reduce construction noise levels by approximately 3 dBA, which would not reduce the impacts to a less than significant level. In addition, reducing the construction equipment would increase the overall construction duration and the number of days that sensitive receptors would be impacted by construction activities. Furthermore, due to the close proximity of the off-site noise sensitive receptors (e.g., receptor locations R1 and R5 that are located across the street from the Project Site), it would not be feasible to reduce the on-site construction noise levels to below the significance threshold as a single piece of equipment would result in noise levels above the significance threshold. There are no other feasible mitigation measures to further reduce the construction noise at the upper levels of receptor locations R1, R2, R4, R5 and R6 to below the significance threshold. **Therefore, construction noise impacts associated with on-site noise sources would remain significant and unavoidable.**

(b) Off-Site Construction Noise

Noise impacts from off-site construction would be less than significant without mitigation. Therefore, no mitigation measures were required or included, and the impact level remains less than significant.

Table IV.E-21
Construction Noise Impacts With Mitigation Measures

Off-Site Receptor Location	Minimum Noise Reduction Provided by Mitigation Measures[b] (dBA)	Estimated Construction Noise Levels by Construction Phases At Ground Level (L_{eq} (dBA))					Existing Daytime Ambient Noise Levels (L_{eq} (dBA))	Significance Criteria (L_{eq} (dBA))[a]	Maximum Noise Exceedance Above the Criteria (L_{eq} (dBA))	Significant Impact With Mitigation?
		Demo	Grading/ Excavation	Building Foundation	Building Construction	Paving/ Landscape				
R1	11	71.2	67.3	68.1	68.7	69.8	66.5	71.5	[c]	Yes[c]
R2	5	67.9	64.5	64.8	65.8	66.4	65.8	70.8	[c]	Yes[c]
R3	0	69.3	66.0	66.3	67.6	67.8	66.0	71.0	0.0	No
R4	5	69.2	65.8	66.2	67.2	67.7	67.4	72.4	[c]	Yes[c]
R5	11	72.0	68.1	68.9	69.5	70.6	67.3	72.3	[c]	Yes[c]
R6	6	74.3	70.6	71.2	71.9	72.9	70.1	75.1	[c]	Yes[c]
R7	0	73.2	69.8	70.2	71.3	71.7	71.9	76.9	0.0	No
R8	0	62.8	59.3	59.8	60.6	61.4	65.2	70.2	0.0	No
R9	0	72.8	69.4	69.8	70.8	71.3	67.9	72.9	0.0	No

[a] *Significance criteria are equivalent to the measured daytime ambient noise levels (see Table IV.E-7 on page IV.E-16) 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] *Noise reduction provided by temporary noise barrier along the Project boundaries.*

[c] *Noise barriers would not be effective in reducing the on-site construction noise at the upper levels of receptor locations R1, R2, R4, R5 and R6. Therefore, on-site construction noise impacts would remain significant and unavoidable. On-site construction noise levels shown for R1, R2, R4, R5 and R6 are for the ground level of the building only.*

Source: AES, 2021. See Appendix E to this Draft EIR.

(c) Operational Noise

Noise impacts associated with on-site noise sources and off-site traffic would be less than significant without mitigation. Therefore, no mitigation measures were required or included, and the impact level remains less than significant.

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

(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

As discussed in the Project's Initial Study, which is included as Appendix A of this Draft EIR, there are no historical resources located on or adjacent to the Project Site. The nearest historic resource would be the Boston Store-J.W. Robinson's Building, which is located along 7th Street and approximately 250 feet north of the Project Site. 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 0.12-PPV significance criteria for buildings extremely susceptible to vibration damage (applicable to the historic structure) and the 0.5 PPV significance criteria for reinforced-concrete, steel and timber building (applicable to the multi-story buildings and structures surrounding the Project Site).

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.E-22 on page IV.E-45 provides the estimated ground vibration velocity levels (in terms of inch per second PPV) at the nearest off-site structures

Table IV.E-22
Construction Vibration Impacts—Building Damage

Nearest Off-Site Building Structure[a]	Approx. Distance from Building to Constr. Equipment (feet)	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]					Signifi-cance Criteria (PPV)	Sig. Impact?
		Large Bulldozer	Caisson Drilling	Loaded Trucks	Jack-hammer	Small Bulldozer		
FTA Reference Vibration Levels at 25 feet	25	0.089	0.089	0.076	0.035	0.003	—	—
4- and 8-Story Parking Structures to the North	5	0.523	0.523	0.446	0.206	0.018	0.5[c]	Yes
13-Story Commercial and 24-Story Residential Buildings the South	78	0.016	0.016	0.014	0.006	0.001	0.5[c]	No
7-Story Residential building to the east	85	0.014	0.014	0.012	0.006	0.001	0.5[c]	No
12 Story Commercial Building to the west	85	0.014	0.014	0.012	0.006	0.001	0.5[c]	No
Boston Store-J.W. Robinson's Building (historic structure) to the north	250	0.003	0.003	0.002	0.001	<0.001	0.12[d]	No

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

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

[c] *FTA criteria for reinforced-concrete, steel or timber buildings.*

[d] *FTA criteria for buildings extremely susceptible to vibration damage, such as historic buildings.*

Source: FTA, 2018; AES, 2021. See Appendix E to this Draft EIR.

to the Project Site.[34] 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-3 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 indicated in Table IV.E-22, the estimated vibration levels from the construction equipment would be well below the most stringent 0.12 PPV building damage significance criteria for the nearest off-site historic building structure and the 0.5 PPV building damage significance criteria for the off-site building structures adjacent to the east, south and west.

[34] *Vibration impacts are evaluated based on the maximum peak vibration (i.e., PPV) levels by each construction equipment, in accordance with FTA guidelines.*

The estimated ground-borne vibration levels up 0.523 PPV at the multi-story parking structures adjacent to Project Site to the north would exceed the 0.5 PPV building damage criteria. **Therefore, the on-site vibration impacts during construction of the Project, pursuant to the significance criteria for building damage, would be significant, prior to mitigation measures.**

(ii) Human Annoyance Impacts from On-Site Construction

Table IV.E-23 on page IV.E-47 provides the estimated vibration levels at the off-site sensitive uses due to construction equipment operation 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 (receptor locations R1, R2, R4 to R7) and hotel (receptor locations R3 and R9) uses, assuming there are a minimum of 70 vibration events occurring during a typical construction day. As indicated in Table IV.E-23, the estimated ground-borne vibration levels from construction equipment would be below the significance criteria for human annoyance at all off-site sensitive receptor locations, with the exception of receptor location R5. The estimated ground-borne vibration levels at receptor location R5 would be up to 72.2 VdB, which would exceed the 72 VdB significance criteria during the demolition and grading/excavation phases when large construction equipment (i.e., a large bulldozer and caisson drilling) operates near the Project southern property line (i.e., within 78 feet of receptor location R5). **Therefore, on-site vibration impacts during construction of the Project, pursuant to the significance criteria for human annoyance, would be significant prior to implementation of mitigation measures.**

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

As described above, construction delivery/haul trucks would travel between the Project Site and SR-110 via 8th Street, James M. Wood Boulevard/9th Street, and Olive 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.

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.[35] 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,

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

Table IV.E-23
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	71.1	71.1	70.1	63.1	42.1	72	No
R2	55.8	55.8	54.8	47.8	26.8	72	No
R3	50.1	50.1	49.1	42.1	21.1	72	No
R4	57.8	57.8	56.8	49.8	28.8	72	No
R5	72.2	72.2	71.2	64.2	43.2	72	Yes
R6	67.7	67.7	66.7	59.7	38.7	72	No
R7	56.2	56.2	55.2	48.2	27.2	72	No
R8	63.7	63.7	62.7	55.7	34.7	75	No
R9	55.5	55.5	54.5	47.5	26.5	72	No

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

Source: FTA, 2018; AES, 2021. See Appendix E to this Draft EIR.

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 E to this Draft EIR. This estimated vibration generated by construction trucks traveling along the anticipated haul route(s) 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 in the road.[36] The estimated vibration levels generated by construction trucks traveling along the anticipated haul routes were assumed to be within 24 feet of the sensitive use (i.e., residential and hotel uses) along the anticipated truck

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

routes, including: 8th Street (future mixed-use building at the northeast corner of Figueroa Street and 8th Street), James M. Wood Boulevard/9th Street (7-story apartment building between Hope Street and Flower Street), and Olive Street (Atelier apartment tower at the southwest corner of Olive Street and 8th Street). As indicated in the noise calculation worksheets included in Appendix E to this Draft EIR, the temporary vibration levels could reach approximately 72.6 VdB periodically as trucks pass sensitive receptors along the anticipated haul route(s) at 24 feet (estimated distance between the building structure and the truck traveled lane). Therefore, the residential and hotel uses along the anticipated haul routes would be exposed to ground-borne vibration levels up to 72.6 VdB, which would be exceed the 72-VdB significance criteria from the construction trucks and would result in a significant impact. **As such, 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(s) would be significant prior to implementation of mitigation measures.**

(iv) Summary of Construction Vibration Impacts

As discussed above, the estimated vibration levels from on-site construction equipment would be below the building damage significance criteria of 0.12 PPV for the off-site historic structure and 0.5 PPV for the off-site buildings to the east, south and west of the Project Site. However, the estimated vibration levels at the multi-story parking structures adjacent to the Project Site to the north would exceed the 0.5 PPV significance criteria. **Therefore, vibration impacts (pursuant to the significance criteria for building damage) during construction of the Project would be significant prior to mitigation. In addition, vibration impacts from on-site construction activities would be significant pursuant to the significance criteria for human annoyance prior to implementation of mitigation measures.**

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

(b) Operation 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 parking structure, 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 result in the generation of excessive ground-borne vibration levels that would be perceptible in the vicinity of the Project Site. As such, vibration impacts associated with operation of the Project would be less than significant.**

(2) Mitigation Measures

(a) *Construction Vibration*

As discussed above, Project vibration levels generated from on-site construction activities would result in significant impacts with respect to both building damage and human annoyance. As it relates to potential damage to adjacent buildings from Project construction, the Project would be subject to LAMC Section 91.3307 (Protection of Adjoining Property). Specifically, Section 91.3307.1 (Protection Required) states adjoining public and private property shall be protected from damage during construction, remodeling, and demolition work. Additionally, the following mitigation measure is provided to reduce construction-related vibration impacts associated with 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 multi-story parking structures adjacent to the Project Site to the north to inspect and document the apparent physical condition of the structures' readily-visible features. The inspection survey shall be made to the extent feasible from the public right of way and within the Project Site's property line.

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 property line of the parking structure adjacent to the Project Site to the north during demolition and grading/excavation phases. 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 0.45 PPV and a regulatory level of 0.5 PPV. The system shall also provide real-time alert when the vibration levels exceed the two preset levels.

In the event the warning level (0.45 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 (0.5 PPV) is triggered, the contractor shall halt the construction activities in the vicinity of the parking

structure and visually inspect the building for any damage. Results of the inspection must be logged, and repairs will be provided in the event any damage occurred. The contractor shall identify the source of vibration generation and provide feasible steps to reduce the vibration level. Construction activities may then restart once the vibration level is measured and below the warning level.

Vibration impacts from on-site and off-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, is cost prohibitive for temporary applications such as construction, and is considered infeasible. In addition, constructing a wave barrier to reduce the Project's construction-related vibration impacts would, in and of itself, generate ground-borne vibration from the excavation equipment. In addition, 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.

(b) Operation Vibration Impacts

As discussed above, operation of the Project would not result in a significant vibration impact during operation and no mitigation measures are required.

(3) Level of Significance After Mitigation

(a) Construction Vibration

Vibration impacts (pursuant to the significance criteria for building damage) at the adjacent parking structures associated with on-site construction activities would be reduced to a less than significant level with implementation of Mitigation Measure NOI-MM-2 and compliance with LAMC Section 91.3307. However, vibration impacts from both on-site and off-site construction with respect to human annoyance would remain significant and unavoidable.

(b) Operation Vibration

Vibration impacts associated with Project operation were determined to be less than significant without mitigation. Therefore, no mitigation measures were required or included, and the impact level remains less than significant.

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 evaluated in the Initial Study included as 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 Los Angeles International Airport located approximately 10.5 miles southwest 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 clearly insignificant and unlikely to occur. **Thus, the Project would have no impact with respect to Threshold (c) and no further analysis is required.**

e. Cumulative Impacts

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.

(1) Construction Noise

(a) On-Site Construction Noise

As indicated in Section III, Environmental Setting, of this Draft EIR, 74 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. 2, a mixed-use development located at 820 Olive Street, approximately 550 feet southeast of the Project Site. However, construction for this related project is complete. Therefore, the Related Project No. 2 would not contribute to cumulative construction-related noise impacts.

- Related Project No. 10 (8th & Figueroa), a mixed-used development located at 744 Figueroa Street, approximately 650 feet west of the Project Site. There are

noise sensitive receptors located between the Related Project No. 10 and the Project Site, as represented by receptor locations R6 and R7. As analyzed above in Subsection 2.c.(2) (see Table IV.E-11 on page IV.E-27), the estimated Project-related construction noise levels at the uses represented by receptor location R6 would exceed the significance criteria by 5.2 dBA during the demolition phase. The Project-related construction noise level at receptor R7 would be 3.7 dBA below the significance criteria. However, since Related Project No. 10 has a direct line-of-sight to both receptor locations R6 and R7, there is a potential for cumulative construction noise impacts to occur at the uses represented by both receptor locations R6 and R7 in the event Project construction occurs concurrently with construction of Related Project No. 10.

- Related Project No. 18, a mixed-use development at 400 7th Street, approximately 800 feet northeast of the Project Site. There are noise sensitive receptors located between the Related Project No. 18 and the Project Site, represented by the receptor location R1. There are several buildings (including the 7-story apartment building at 8th Street and Grand Avenue) located between Related Project No. 18 and the Project, which would provide shielding of construction-related noise between the two projects. Therefore, the Project would not contribute to cumulative construction-related noise impacts in the event of concurrent construction with Related Project No. 18.

- Related Project No. 23 (Apex Phase II), a mixed-use development located at 700 9th Street, approximately 890 feet southwest of the Project Site. However, construction for this related project is complete. Therefore, this related project would not contribute to cumulative construction-related noise impacts.

- Related Project No. 30, a mixed-use development located at 845 Olive Street, approximately 530 feet southeast of the Project Site. There are noise sensitive receptors located between the Related Project No. 30 and the Project Site, as represented by receptor locations R2, R3 and R4. As analyzed above in Subsection 2.c.(2) (see Table IV.E-11 on page IV.E-27), the estimated Project-related construction noise levels at the uses represented by receptor locations R2 and R4 would exceed the significance criteria by 2.1 and 1.8 dBA during the demolition phase, respectively. Since Related Project No. 30 has a direct line-of-sight to both receptor locations R2 and R4 and is adjacent to receptor location R3, there is a potential for cumulative construction noise impacts to occur at the uses represented by receptor locations R2, R3 and R4 in the event Project construction occurs concurrently with construction of Related Project No. 30.

- Related Project No. 33, a residential development located at 888 Hope Street, approximately 500 feet south of the Project Site. However, construction for this related project is complete. Therefore, the Related Project No. 33 would not contribute to cumulative construction-related noise impacts.

- Related Project No. 57, a mixed-use development located at 949 Hope Street, approximately 870 feet southwest of the Project Site. There are noise sensitive

receptors located along Hope Street between the Related Project No. 57 and the Project Site, represented by the receptor location R6. There are several buildings located between Related Project No. 57 and the Project, which would provide shielding of construction-related noise between the two projects. Therefore, the Project would not contribute to cumulative construction-related noise impacts in the event of concurrent construction with Related Project No. 57.

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 would be potential cumulative noise impacts at the nearby sensitive uses (e.g., residential uses) located in proximity to the Project Site and Related Project Nos. 10 and 30, in the event of concurrent construction activities. **As such, cumulative noise impacts from on-site construction would be significant.**

(b) 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 in Subsection 2.c.(2) (see Table IV.E-12 on page IV.E-27), the estimated off-site construction noise levels would be below the significance criteria along the anticipated truck routes, including 8th Street, James M. Wood Boulevard/9th Street, and Olive Street. Therefore, any additional number of trucks from the Project and related projects would incrementally increase the noise levels, which would contribute to cumulative impacts. Based on the existing ambient noise levels along the anticipated truck routes, it is estimated that cumulative off-site construction noise impacts could occur (i.e., increase the ambient by 5 dBA or more) if the total truck trips per hour along 8th Street, James M. Wood Boulevard/9th Street, and Olive Street would exceed 51, 34, and 44 truck trips per hour, respectively. Therefore, if the total number of trucks from the Project and related projects were to add up to 52 truck trips per hour along Pico Boulevard, 35 truck trips along James M. Wood Boulevard/9th Street, and 45 truck trips along Olive Street, the estimated noise level the truck trips plus the ambient would be would increase the ambient noise levels by 5 dBA and exceed the significance criteria.[37] Based on review of the related projects

[37] *It is estimated that the noise level along 8th Street (with 52 truck trips per hour), James M. Wood Boulevard/9th Street (with 35 truck trips per hour), and Olive Street (with 45 truck trips) would be 70.6, 69.6 and 70.0 dBA, respectively. When added to the existing noise levels, the cumulative noise levels would equal to 72.3 (along 8th Street), 71.4 (along James M. Wood Boulevard/9th Street) and 71.7 dBA*
(Footnote continued on next page)

locations map, there are related projects in the vicinity of the Project Site, including: Related Project No. 10 (8th and Figueroa), Related Project No. 30 (845 Olive Street), Related Project No. 57 (949 Hope Street), and Related Project No. 55 (Figueroa Centre), which could utilize the same truck routes as the Project. Specifically, Related Project No. 10 would utilize 8th Street and 9th Street (same truck route as the Project) and would generate up to 50 truck trips per hour during the peak construction period, which together with the Project (19 truck trips) would exceed the 52 and 35 truck trips threshold for 8th Street and 9th Street, respectively.[38] In addition, the cumulative truck trips from the Project (19 truck trips) and the Related Project No. 30 could exceed the 44 truck trips along Olive Street. Therefore, cumulative noise due to construction truck traffic from the Project and other related projects has the potential to increase the ambient noise levels along the truck route by 5 dBA. **As such, cumulative noise impacts from off-site construction would be significant.**

(c) 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 temporary generation of noise levels in excess of standards established by the City. **Therefore, cumulative noise impacts from on-site and off-site construction activities would be significant.**

(2) 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.

(along Olive Street), which would exceed the ambient noise levels of 67.3, 66.4, and 66.7 dBA by 5.0 dBA, respectively.

[38] *City of Los Angeles, Fig & 8th Project Addendum to the Draft EIR, March 2020.*

(a) On-Site Stationary Noise Sources

Due to provisions set forth in the LAMC that limit stationary source noise from items, such as rooftop 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, mandatory compliance with the LAMC, and the operational noise levels associated with the Project, cumulative stationary source noise impacts associated with operation of the Project and related projects would be less than significant**.

(b) 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" conditions to "Cumulative Future Plus Project" conditions to the applicable significance criteria. Cumulative Future Plus Project conditions include traffic volumes from future ambient growth, related projects, and the Project. The calculated traffic noise levels under "Existing" and "Cumulative Future Plus Project" conditions are presented in Table IV.E-24 on page IV.E-56. As shown therein, cumulative traffic volumes would result in an increase ranging from 0.3 dBA (CNEL) along the roadway segment of Hope Street (between 7th Street and 8th Street), to 1.3 dBA (CNEL) along the roadway segment of 9th Street (between Figueroa Street and Hope Street), which would be below the 3-dBA significance criteria (applicable when noise levels fall within the normally unacceptable or clearly unacceptable land use category). **Therefore, cumulative noise impacts due to off-site mobile noise sources associated with the Project, future growth, and related projects would be less than significant.**

(c) Summary of Cumulative Operational Noise Impacts

As discussed above, on- and off-site operational activities associated with the Project and related projects would not result in the exposure of persons to or generation of noise levels in excess of the significance criteria 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. **Therefore, cumulative operational noise impacts from on- and off-site sources would be less than significant.**

Table IV.E-24
Cumulative Roadway Traffic Noise Impacts

Roadway Segment	Adjacent Land Use	Calculated Traffic Noise Levels (CNEL (dBA))		Increase in Noise Levels due to Project (CNEL (dBA))	Significant Impact?
		Existing	Cumulative Future Plus Project		
Flower Street					
Between 7th St. and 8th St.	Commercial	71.9	72.4	0.5	No
Between 8th St. and 9th St.	Residential	71.7	72.1	0.4	No
Hope Street					
Between 7th St. and 8th St.	Hotel, Residential, Religious	69.3	69.6	0.3	No
Between 8th St. and 9th St.	Residential	69.3	70.1	0.8	No
Grand Avenue					
Between 7th St. and 8th St.	Residential	70.7	71.3	0.6	No
Between 8th St. and 9th St.	Residential, Hotel	71.1	71.7	0.6	No
Olive Street					
Between 7th St. and 8th St.	Residential	69.6	70.4	0.8	No
Between 8th St. and 9th St.	Residential	70.2	71.0	0.8	No
7th Street					
Between Hope St. and Grand Ave.	Residential	68.9	69.4	0.5	No
8th Street					
Between Hope St. and Grand Ave.	Residential	70.8	71.5	0.7	No
9th Street					
Between Figueroa St. and Hope St.	Residential	69.4	70.7	1.3	No
Between Hope St. and Grand Ave.	Residential, Park, School	69.9	70.8	0.9	No

Source: AES, 2021. See Appendix E to this Draft EIR.

(3) Construction Vibration

(a) 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 20 feet as related to building damage and 80 feet as related to human annoyance at residential uses).[39] As discussed above, the closest related project, Related Project No. 30, is approximately 530 feet southeast of the Project Site. Therefore, based on distance attenuation potential cumulative vibration impacts with respect to the building damage from the Project and Related Project No. 30 would be less than significant. **Therefore, the Project would not contribute to a cumulative construction vibration impact with respect to building damage associated with on-site construction and the cumulative impact would be less than significant.**

As discussed above, potential vibration impacts associated with Project-related on-site construction activities would be significant with respect to human annoyance at receptor location R5. The nearest related project to receptor location R5 is Related Project No. 10, which is approximately 650 feet west of receptor location R5. Due to the rapid attenuation characteristics of ground-borne vibration, Related Project No. 10 would not contribute to any cumulative construction vibration impacts at receptor location R5. In addition, Related Project No. 10 is located approximately 500 feet from receptor location R6. As analyzed above, the Project's estimated ground-borne vibration level at receptor location R6 is 67.7 VdB, which is below the 72 VdB significance criteria. Due to distance attenuation, the ground-borne vibration from construction of Related Project No. 10 at receptor location R6 would be well below the 72 VdB significance criteria and would not contribute to cumulative construction vibration impacts. As discussed above, the closest related project, Related Project No. 30, is approximately 530 feet northeast of the Project Site. The nearest sensitive receptor to the Related Project No. 30 is receptor location R3. As analyzed above, the estimated ground-borne vibration levels from the Project construction at receptor location R3 would be up to 50.1 VdB, which would be well below the 72 VdB significance criteria and would not contribute to cumulative vibration impacts. As such, cumulative vibration impacts with respect to human annoyance from the Project and Related Project No. 30 would be less than significant. **Therefore, potential cumulative construction vibration impacts with respect to human annoyance associated with on-site construction would be less than significant.**

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[39] *Distances calculated based on estimated vibration levels for typical construction equipment at a distance which would be below the 72 VdB significance threshold with respect to human annoyance and 0.12 PPV significance threshold applicable to buildings extremely susceptible to vibration damage.*

(b) 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.[40] 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., 6th Street, 8th Street, 9th Street, Hope Street, and Grand 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(s) 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). **Therefore, to the extent that other related projects use the same haul route as the Project, potential cumulative vibration impacts with respect to human annoyance associated with temporary and intermittent vibration from haul trucks traveling along the designated haul route(s) would be significant.**

(c) 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**.

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

Cumulative construction vibration impacts from on-site construction activities pursuant to the significance criteria for human annoyance would be less significant in the event concurrent construction of the Project and the related projects were to occur. However, to the extent that other related projects use the same haul route(s) as the Project, potential cumulative human annoyance impacts associated with temporary and intermittent vibration from haul trucks traveling along the designated haul route(s) would be significant. **Therefore, on-site construction activities would not result in cumulative vibration impacts respect to human annoyance. However, cumulative vibration impacts with respect to human annoyance associated with off-site construction activities would be significant.**

(4) 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. The related projects (mixed-use and commercial developments) would generate similar vibration levels as the Project. As described above, the nearest seven related projects are approximately 500 to 890 feet from the Project Site. Since ground-borne vibration decreases rapidly with distance, operation of the related projects would not contribute to cumulative vibration impacts due to distance between the Project and the related projects. As analyzed above, the Project operation would not result in the generation of excessive ground-borne vibration levels that would be perceptible in the 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**.

(5) Mitigation Measures

(a) Construction Noise

As analyzed above, there would be potential cumulative noise impacts at the nearby sensitive uses (e.g., residential uses) located in proximity to the Project Site and Related Project No. 10 and Related Project No. 30, in the event of concurrent 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. The Project's proposed mitigation measures would reduce the Project's contribution to on-site cumulative noise to the extent feasible. 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 be significant.

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 truck routes. There are no other feasible mitigation measures to reduce the temporary significant noise impacts associated with the cumulative off-site construction trucks. As such, cumulative off-site noise impacts from off-site construction trucks would be significant.

(b) Operational Noise

As analyzed above, cumulative-level impacts associated with on- and off-site sources would be less than significant. Therefore, no mitigation measures are required .

(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. Potential cumulative construction vibration impacts with respect to human annoyance associated with on-site construction 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 construction routes. There are no feasible mitigation measures to reduce these potential vibration human annoyance impacts. Even though impacts would be temporary, intermittent, and limited to daytime hours when haul trucks are traveling within 20 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.

(6) Level of Significance After Mitigation

(a) Construction Noise

Cumulative construction noise impacts associated with on-site noise sources and off-site construction traffic would remain significant and unavoidable.

(b) Operational Noise

Cumulative impacts associated with on- and off-site noise sources would be less than significant.

(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 off-site construction trucks would be significant and unavoidable.

(d) Operational Vibration

Cumulative impacts with regard to operational vibration would be less than significant.