IV.E NOISE

Introduction

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

1. Environmental Setting

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

a) Noise and Vibration Basics

(1) Noise Principles and Descriptors

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

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

---

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

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

dB corresponding to the thresholds of feeling and pain. Pressure waves traveling through air exert a force registered by the human ear as sound.[3]

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

The typical human ear is not equally sensitive to the frequency range from 20 to 20,000 Hz. As a consequence, when assessing potential noise impacts, sound is measured using an electronic filter that deemphasizes the frequencies below 1,000 Hz and above 5,000 Hz in a manner corresponding to the human ear's decreased sensitivity to these extremely low and extremely high frequencies. This method of frequency filtering or weighting is referred to as A-weighting, expressed in units of A-weighted decibels (dBA), which is typically applied to community noise measurements.[5] Some representative common outdoor and indoor noise sources and their corresponding A-weighted noise levels are shown in Figure IV.E-1, Decibel Scale and Common Noise Sources.

(2) Noise Exposure and Community Noise

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

---

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

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

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

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

Figure IV.E-1 Decibel Scale and Common Noise Sources

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

Source: State of California, Department of Transportation (Caltrans), Technical Noise Supplement to the Traffic Noise Analysis Protocol, September 2013.

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

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

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

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

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

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

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

(3) Effects of Noise on People

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

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

Although exposure to high noise levels has been demonstrated to cause physical and physiological effects, the principal human responses to typical environmental noise exposure are

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

related to subjective effects and interference with activities. Interference effects interrupt daily activities and include interference with human communication activities, such as normal conversations, watching television, telephone conversations, and interference with sleep.

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

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

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

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

---

8 Berglund et al, Guidelines Berglund, Birgitta, Lindvall, Thomas, Schwela, Dietrich H & World Health Organization. Occupational and Environmental Health Team. 1999. Guidelines for community noise. World Health Organization.

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

resulting sound level at a given distance would be approximately 3 dBA higher than one of the sources under the same conditions. For example, if two identical noise sources produce noise levels of 50 dBA, the combined sound level would be 53 dBA, not 100 dBA. Under the dB scale, three sources of equal loudness together produce a sound level of approximately 5 dBA louder than one source, and ten sources of equal loudness together produce a sound level of approximately 10 dBA louder than the single source.[10]

(4) Noise Attenuation

When noise propagates over a distance, the noise level reduces, or attenuates, with distance depending on the type of noise source and the propagation path. Noise from a localized source (i.e., point source) propagates uniformly outward in a spherical pattern, referred to as "spherical spreading." The rate of sound attenuation for a point source, such as a piece of mechical or electrical equipment (e.g., air conditioner) or idling vehicle (e.g., bulldozer), is 6 dBA per doubling of distance from the noise source to the receptor over acoustically "hard" sites and 7.5 dBA per doubling of distance from the noise source to the receptor over "soft" sites.[11] Hard sites are those with a reflective surface between the source and the receiver, such as asphalt or concrete surfaces or smooth bodies of water.[12] No excess ground attenuation is assumed for hard sites and the reduction in noise levels with distance (drop-off rate) is simply the geometric spreading of the noise from the source.[13] Soft sites are those that have an absorptive ground surface, such as soft dirt, grass, or scattered bushes and trees, which in addition to geometric spreading, provides an excess ground attenuation value of 1.5 dBA (per doubling distance).[14] For example, an outdoor condenser fan that generates a sound level of 60 dBA at a distance of 50 feet from a point source at an acoustically hard site would attenuate to 54 dBA at a distance of 100 feet from the point source and attenuate to 48 dBA at 200 feet from the point source.

Roadways and highways consist of several localized noise sources on a defined path, and hence are treated as "line" sources, which approximate the effect of several point sources.[15] Noise from a line source propagates over a cylindrical surface, often referred to as "cylindrical spreading."[16] Line sources (e.g., traffic noise from vehicles) attenuate at a rate between 3 dBA for hard sites

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

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

12 California Department of Transportation, Technical Noise Supplement to the Traffic Noise Analysis Protocol, Section 2.1.4.2, September 2013.

13 California Department of Transportation, Technical Noise Supplement to the Traffic Noise Analysis Protocol, Section 2.1.4.2, September 2013.

14 California Department of Transportation, Technical Noise Supplement to the Traffic Noise Analysis Protocol, Section 2.1.4.2, September 2013.

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

16 California Department of Transportation, Technical Noise Supplement to the Traffic Noise Analysis Protocol, Section 2.1.4.1, September 2013.

and 4.5 dBA for soft sites for each doubling of distance from the reference measurement.[17] Therefore, noise due to a line source attenuates less with distance than that of a point source with increased distance.

Structures (e.g., buildings and solid walls) and natural topography (e.g., hills and berms) that obstruct the line-of-sight between a noise source and a receptor further reduce the noise level if the receptor is located within the "shadow" of the obstruction, such as behind a sound wall. This type of sound attenuation is known as "barrier insertion loss." If a receptor is located behind the wall but still has a view of the source (i.e., the line-of-sight is not fully blocked), barrier insertion loss would still occur but to a lesser extent. Additionally, a receptor located on the same side of the wall as a noise source may actually experience an increase in the perceived noise level as the wall can reflect noise back to the receptor, thereby compounding the noise. Noise barriers can provide noise level reductions ranging from approximately 5 dBA (where the barrier just breaks the line-of-sight between the source and receiver) to an upper range of 20 dBA with a larger barrier.[18] Additionally, structures with closed windows can further attenuate exterior noise by a minimum of 20 dBA to 30 dBA.[19]

Receptors located downwind from a noise source can be exposed to increased noise levels relative to calm conditions, whereas locations upwind can have lowered noise levels.[20] Atmospheric temperature inversion (i.e., increasing temperature with elevation) can increase sound levels at long distances. Other factors such as air temperature, humidity, and turbulence can, under the right conditions, also have substantial effects on noise levels.[21]

(5) Vibration Fundamentals

Vibration can be interpreted as energy transmitted in waves through the ground or man-made structures, which generally dissipate with distance from the vibration source. Vibration is an oscillatory motion through a solid medium in which the motion's amplitude can be described in terms of displacement, velocity, or acceleration. Since energy is lost during its transfer from one particle to another, vibration becomes less perceptible with increasing distance from the source.

As described in the Federal Transit Administration's (FTA) *Transit Noise and Vibration Impact Assessment Manual*, groundborne vibration can be a serious concern for nearby neighbors of a transit system route or maintenance facility, causing buildings to shake and rumbling sounds to

17 California Department of Transportation, Technical Noise Supplement to the Traffic Noise Analysis Protocol, Section 2.1.4.1, September 2013.

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

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

20 California Department of Transportation, Technical Noise Supplement to the Traffic Noise Analysis Protocol, Section 2.1.4.3, September 2013.

21 California Department of Transportation, Technical Noise Supplement to the Traffic Noise Analysis Protocol, Section 2.1.4.3, September 2013.

be heard.[22] In contrast to airborne noise, groundborne vibration is not a common environmental problem, as it is unusual for vibration from sources such as rubber-tired buses and trucks to be perceptible, even in locations close to major roads. Some common sources of groundborne vibration are trains, heavy trucks traveling on rough roads, and certain construction activities, such as blasting, pile-driving, and operation of heavy earth-moving equipment.[23] Groundborne vibration generated by man-made activities (e.g., road traffic, construction operations) typically weakens with greater horizontal distance from the source of the vibration.

Several different methods are used to quantify vibration. The peak particle velocity (PPV) is defined as the maximum instantaneous peak of the vibration signal in inches per second (in/sec), and is most frequently used to describe vibration impacts to buildings.[24] The root mean square (RMS) amplitude is defined as the average of the squared amplitude of the signal and is most frequently used to describe the effect of vibration on the human body.[25] Decibel notation (VdB) is commonly used to express RMS vibration velocity amplitude. The relationship of PPV to RMS velocity is expressed in terms of the "crest factor," defined as the ratio of the PPV amplitude to the RMS amplitude. PPV is typically a factor of 1.7 to 6 times greater than RMS vibration velocity; FTA uses a crest factor of 4. [26] The decibel notation VdB acts to compress the range of numbers required to describe vibration. Typically, groundborne vibration generated by man-made activities attenuates rapidly with distance from the source of the vibration. Sensitive receptors for vibration include buildings where vibration would interfere with operations within the building or cause damage (especially older masonry structures), locations where people sleep, and locations with vibration sensitive equipment.[27]

Groundborne noise specifically refers to the rumbling noise emanating from the motion of building room surfaces due to the vibration of floors and walls; it is perceptible only inside buildings.[28] The relationship between groundborne vibration and groundborne noise depends on the frequency of the vibration and the acoustical absorption characteristics of the receiving room. For typical buildings, groundborne vibration that causes low frequency noise (i.e., the vibration spectrum peak is less than 30 Hz) results in a groundborne noise level that is approximately 50 decibels lower than the velocity level. For groundborne vibration that causes mid-frequency noise (i.e., the vibration spectrum peak is between 30 and 60 Hz), the groundborne noise level will be approximately 35 to 37 decibels lower than the velocity level.[29] Therefore, for typical buildings,

---

22 Federal Transit Administration, Transit Noise and Vibration Impact Assessment Manual, Section 7, 2018.

23 Federal Transit Administration, Transit Noise and Vibration Impact Assessment Manual, Section 7, 2018.

24 Federal Transit Administration, Transit Noise and Vibration Impact Assessment Manual, Section 5.1, 2018.

25 Federal Transit Administration, Transit Noise and Vibration Impact Assessment Manual, Section 5.1, 2018.

26 Federal Transit Administration, Transit Noise and Vibration Impact Assessment Manual, Section 5.1, 2018.

27 Federal Transit Administration, Transit Noise and Vibration Impact Assessment Manual, Section 6.1, 6.2, and 6.3, 2018.

28 Federal Transit Administration, Transit Noise and Vibration Impact Assessment Manual, Section 5.4, 2018.

29 Federal Transit Administration, Transit Noise and Vibration Impact Assessment Manual, Table 6-3 and Table 6-14, pages 126 and 146, 2018.

the groundborne noise decibel level is lower than the groundborne vibration velocity level at low frequencies.

b) Regulatory Framework

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

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

(1) Federal

(a) *Noise Control Act of 1972*

Under the authority of the Noise Control Act of 1972, the United States Environmental Protection Agency (USEPA) established noise emission criteria and testing methods published in Parts 201 through 205 of Title 40 of the Code of Federal Regulations (CFR) that apply to some transportation equipment (e.g., interstate rail carriers, medium trucks, and heavy trucks) and construction equipment. In 1974, USEPA issued guidance levels for the protection of public health and welfare in residential areas of an outdoor L_{dn} of 55 dBA and an indoor L_{dn} of 45 dBA.[30] These guidance levels are not standards or regulations and were developed without consideration of technical or economic feasibility. There are no federal noise standards that directly regulate environmental noise related to the construction or operation of the Project. Moreover, the federal noise standards are not reflective of urban environments that range by land use, density, proximity to commercial or industrial centers, etc. As such, for purposes of determining acceptable sound levels to determine and evaluate intrusive noise sources and increases, this document utilizes the City of Los Angeles Noise Regulations, discussed below.

(b) *Federal Transit Administration Vibration Standards*

There are no federal vibration standards or regulations adopted by any agency that are applicable to evaluating vibration impacts from land use development projects such as the Project. However, the Federal Transit Administration (FTA) has adopted vibration criteria for use in evaluating

30 United States Environmental Protection Agency, EPA Identifies Noise Levels Affecting Health and Welfare, April 1974. https://archive.epa.gov/epa/aboutepa/epa-identifies-noise-levels-affecting-health-and-welfare.html. Accessed February 23, 2021.

vibration impacts from construction activities.[31] The vibration damage criteria adopted by the FTA are shown in Table IV.E-1, *Construction Vibration Damage Criteria*.

TABLE IV.E-1
CONSTRUCTION VIBRATION DAMAGE CRITERIA

Building Category	PPV (in/sec)
I. Reinforced-concrete, steel, or timber (no plaster)	0.5
II. Engineered concrete and masonry (no plaster)	0.3
III. Non-engineered timber and masonry buildings	0.2
IV. Buildings extremely susceptible to vibration damage	0.12
SOURCE: FTA, Transit Noise and Vibration Impact Assessment Manual, 2018.	

The FTA has also adopted standards associated with human annoyance for determining the groundborne vibration and noise impacts from ground-borne noise on the following three off-site land-use categories: Vibration Category 1 – High Sensitivity, Vibration Category 2 – Residential, and Vibration Category 3 – Institutional.[32] The FTA defines Category 1 as buildings where vibration would interfere with operations within the building, including vibration-sensitive research and manufacturing facilities, hospitals with vibration-sensitive equipment, and university research operations. Vibration-sensitive equipment includes, but is not limited to, electron microscopes, high-resolution lithographic equipment, and normal optical microscopes. Category 2 refers to all residential land uses and any buildings where people sleep, such as hotels and hospitals. Category 3 refers to institutional land uses such as schools, churches, other institutions, and quiet offices that do not have vibration-sensitive equipment but that still potentially involve activities that could be disturbed by vibration. The vibration thresholds associated with human annoyance for these three land-use categories are shown in Table IV.E-2, *Groundborne Vibration and Groundborne Noise Impact Criteria for General Assessment*. No thresholds have been adopted or recommended for commercial or office uses.

31 Federal Transit Administration, Transit Noise and Vibration Impact Assessment Manual, Table 7-5, page 186, 2018.

32 Federal Transit Administration, Transit Noise and Vibration Impact Assessment Manual, Table 6-1, page 124, 2018.

TABLE IV.E-2
GROUNDBORNE VIBRATION AND GROUNDBORNE NOISE IMPACT CRITERIA FOR GENERAL ASSESSMENT

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

a “Frequent Events” is defined as more than 70 vibration events of the same source per day.

b “Occasional Events” is defined as between 30 and 70 vibration events of the same source per day.

c “Infrequent Events” is defined as fewer than 30 vibration events of the same kind per day.

d This criterion is based on levels that are acceptable for most moderately sensitive equipment such as optical microscopes.

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

(c) *Occupational Safety and Health Act of 1970*

Under the Occupational Safety and Health Act of 1970 (29 United States Code [USC] Sections 1919 et seq.), the Occupational Safety and Health Administration (OSHA) has adopted regulations designed to protect workers against the effects of occupational noise exposure. These regulations list permissible noise level exposure as a function of the amount of time during which the worker is exposed. The regulations further specify a hearing conservation program that involves monitoring noise to which workers are exposed, ensuring that workers are made aware of overexposure to noise, and periodically testing the workers’ hearing to detect any degradation.[33]

(2) State

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

The State of California has not adopted statewide standards for environmental noise, but the Governor’s Office of Planning and Research (OPR) has established guidelines for evaluating the

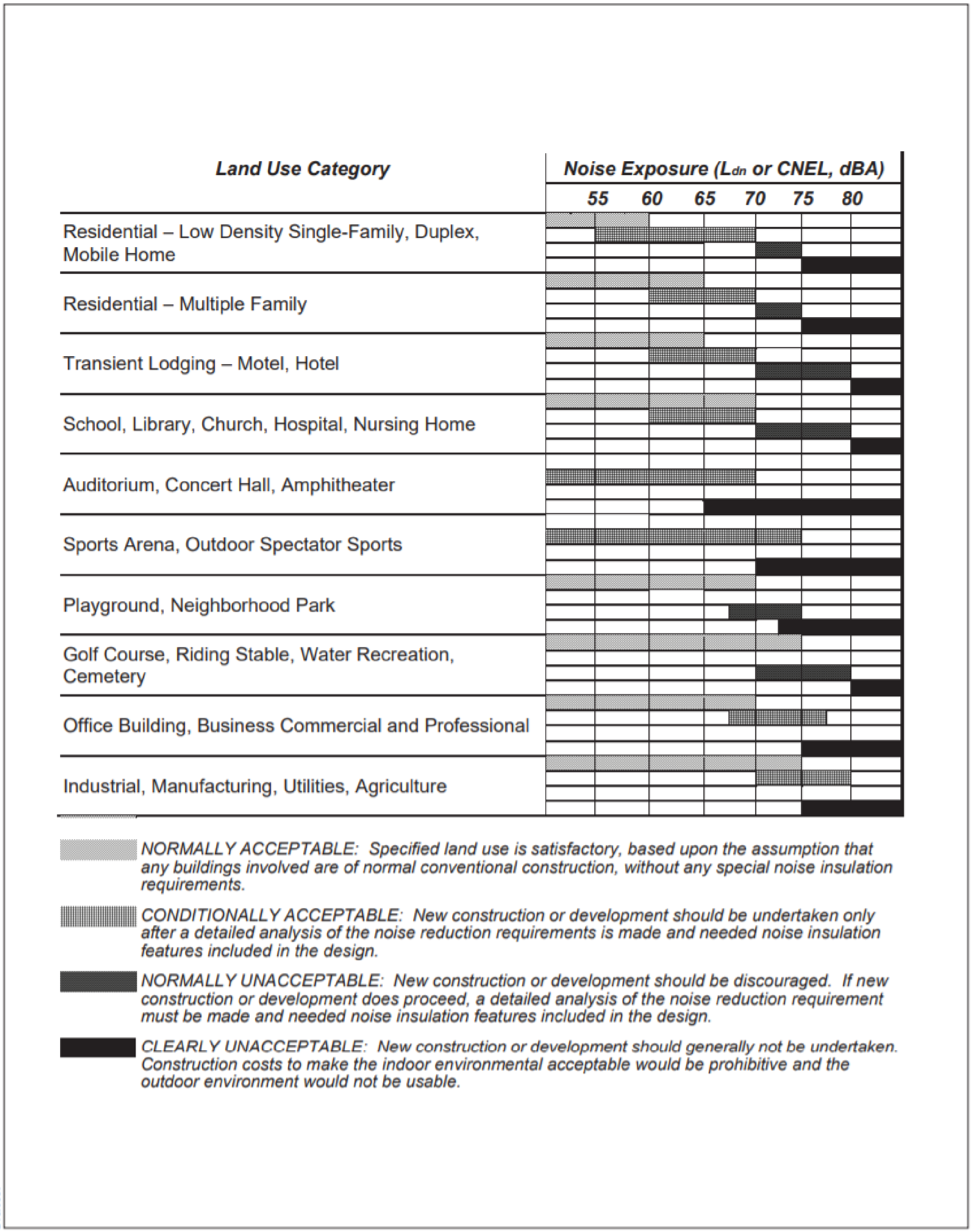
33 United States Department of Labor. OSH Act of 1970.

compatibility of various land uses as a function of community noise exposure, as presented in Figure IV.E-2, *Guidelines for Noise Compatible Land Use*.[34]

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

34 State of California, Governor’s Office of Planning and Research, General Plan 2017 Guidelines, page 377.

Figure IV.E-2 Guidelines for Noise Compatible Land Use



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

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

(3) Regional

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

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

(4) Local

(a) *Los Angeles Municipal Code*

The City of Los Angeles Noise Regulations are provided in Chapter XI of the Los Angeles Municipal Code (LAMC). LAMC Section 111.02 provides procedures and criteria for the measurement of the sound level of "offending" noise sources. In accordance with the LAMC, a noise source that causes a noise level increase of 5 dBA over the existing average ambient noise level as measured at an adjacent property line creates a noise violation. This standard applies to radios, television sets, air conditioning, refrigeration, heating, pumping and filtering equipment, powered equipment intended for repetitive use in residential areas, and motor vehicles driven on-site. To account for people's increased tolerance for short-duration noise events, the Noise Regulations provide a 5 dBA allowance for a noise source that causes noise lasting more than 5 but less than 15 minutes in any one-hour period, and an additional 5 dBA allowance (for a total of 10 dBA) for a noise source that causes noise lasting 5 minutes or less in any one-hour period.[35]

35 Los Angeles Municipal Code, Chapter XI, Article I, Section 111.02-(b). Accessed February 23, 2021.

The LAMC provides that in cases where the actual ambient conditions are not known, the City's presumed daytime (7:00 A.M. to 10:00 P.M.) and nighttime (10:00 P.M. to 7:00 A.M.) minimum ambient noise levels as defined in LAMC Section 111.03 should be used. The presumed ambient noise levels for these areas where the actual ambient conditions are not known as set forth in the LAMC Sections 111.03 are provided in Table IV.E-3, *City of Los Angeles Presumed Ambient Noise Leve*ls. For example, for residential-zoned areas, the presumed ambient noise level is 50 dBA during the daytime and 40 dBA during the nighttime.

TABLE IV.E-3
CITY OF LOS ANGELES PRESUMED AMBIENT NOISE LEVELS

Zone	Daytime Hours (7 A.M. to 10 P.M.) dBA (L_{eq})	Nighttime Hours (10 P.M. to 7 A.M.) dBA (L_{eq})
Residential (A1, A2, RA, RE, RS, RD, RW1, RW2, R1, R2, R3, R4, and R5)	50	40
Commercial (P, PB, CR, C1, C1.5, C2, C4, C5, and CM)	60	55
Manufacturing (M1, MR1 and MR2)	60	55
Heavy Manufacturing (M2 and M3)	65	65
Source: LAMC Section 111.03.		

LAMC Section 112.02 limits increases in noise levels from air conditioning, refrigeration, heating, pumping and filtering equipment. Such equipment may not be operated in such manner as to create any noise which would cause the noise level on the premises of any other occupied property, or, if a condominium, apartment house, duplex, or attached business, within any adjoining unit, to exceed the ambient noise level by more than 5 dB.

LAMC Section 112.05 sets a maximum noise level for construction equipment of 75 dBA at a distance of 50 feet when operated within 500 feet of a residential zone. Compliance with this standard shall not apply where compliance therewith is technically infeasible.[36] LAMC Section 41.40 prohibits construction between the hours of 9:00 P.M. and 7:00 A.M. Monday through Friday, 6:00 P.M. and 8:00 A.M. on Saturday, and at any time on Sunday (i.e., construction is allowed Monday through Friday between 7:00 A.M. to 9:00 P.M.; and Saturdays and National Holidays between 8:00 A.M. to 6:00 P.M.). In general, the City's Department of Building and Safety enforces

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

Noise Ordinance provisions relative to equipment, and the Los Angeles Police Department (LAPD) enforces provisions relative to noise generated by people.

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

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

(b) *City of Los Angeles General Plan Noise Element*

The Noise Element of the City's General Plan policies includes the CNEL guidelines for land use compatibility as shown in Table IV.E-4 and includes a number of goals, objectives, and policies for land use planning purposes. The overall purpose of the Noise Element is to guide policymakers in making land use determinations and in preparing noise ordinances that would limit exposure of citizens to excessive noise levels.[37] The following policies and objectives from the Noise Element apply to the Project:

> **Objective 2** (Non-airport): Reduce or eliminate non-airport related intrusive noise, especially relative to noise sensitive uses.
>
> > **Policy 2.2:** Enforce and/or implement applicable city, state, and federal regulations intended to mitigate proposed noise producing activities, reduce intrusive noise and alleviate noise that is deemed a public nuisance.

Exhibit I of the Noise Element also contains guidelines for noise compatible land uses.[38] Table IV.E-4 summarizes these guidelines, which are based on OPR guidelines from 1990.

37 City of Los Angeles. General Plan, Noise Element adopted February 3, 1999. Pages 1.1-2.4.

38 City of Los Angeles. General Plan, Noise Element adopted February 3, 1999. Page I-1.

Table IV.E-4

CITY OF LOS ANGELES LAND USE COMPATIBILITY FOR COMMUNITY NOISE

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

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

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

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

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

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

c) Existing Conditions

(1) Existing Noise Environment

The Project Site is occupied by an approximately 13,956 square foot commercial building that is vacant and boarded up, and is therefore assumed to generate no noise.

In September 2020, DKA Planning took short-term noise measurements near the Project Site to determine the ambient noise conditions of the neighborhood near sensitive receptors.[39] Noise- and vibration-sensitive land uses are locations where people reside or where the presence of unwanted sound could adversely affect the use of the land. Residences, schools, hospitals, guest lodging, libraries, and some passive recreation areas would each be considered noise- and vibration-sensitive and may warrant unique measures for protection from intruding noise. There are several clusters of residential and institutional sensitive receptors within 1,000 feet of the Project Site (see Figure IV.E-3 for a map of surrounding sensitive receptors). As shown in Table IV.E-5, existing noise levels range from 55.3 dBA L_{eq} at the receptor closest to the Project Site (11900 Saltair Terrace) to 71.7 dBA L_{eq} at the Brentwood Science Magnet School, and are largely a function of vehicle traffic on nearby streets. Transportation noise is the main source of noise in urban environments, largely from the operation of internal combustion engines and frictional contact between the vehicle and the ground and air.[40]

Table IV.E-5
Existing Noise Levels

Sensitive Receptor Locations	Sound Levels (dBA, L_{eq})
Residence – 640 Saltair Avenue (approximately 265 feet northwest of the Barry Building)	57.4
Residence – 11900 Saltair Terrace (approximately 175 feet north of the Barry Building)	55.3
Residence – 529 Westgate Avenue (approximately 260 feet northeast of the Barry Building)[1]	55.3
Chabad Jewish Center of Brentwood – 644 Bundy Drive (approximately 650 feet west of the Barry Building)	60.0
Gan Chaya Jewish Early Childhood Center – 647 Saltair Avenue (approximately 410 feet west of the Barry Building)	60.5
Brentwood Science Magnet School – 740 Gretna Green Way (approximately 640 feet (to the field) southwest of the Barry Building)	71.7
Brentwood Presbyterian Church and School – 12000 San Vicente Boulevard (approximately 250 feet southwest of the Barry Building)	66.3

[1] The ambient noise level measured at 11900 Saltair Terrace was also applied to the 529 Westgate Avenue receptor due to these receptors' proximity to one another and their similar noise environments.
Source: DKA Planning, 2020.

39 Noise measurements were taken using a Quest Technologies Sound Examiner Sound Level Meter. The Sound Examiner meter complies with the American National Standards Institute (ANSI) and International Electrotechnical Commission (IEC) for general environmental measurement instrumentation. The meter was equipped with an omni-directional microphone, calibrated before the day's measurements, and set at approximately five feet above the ground.

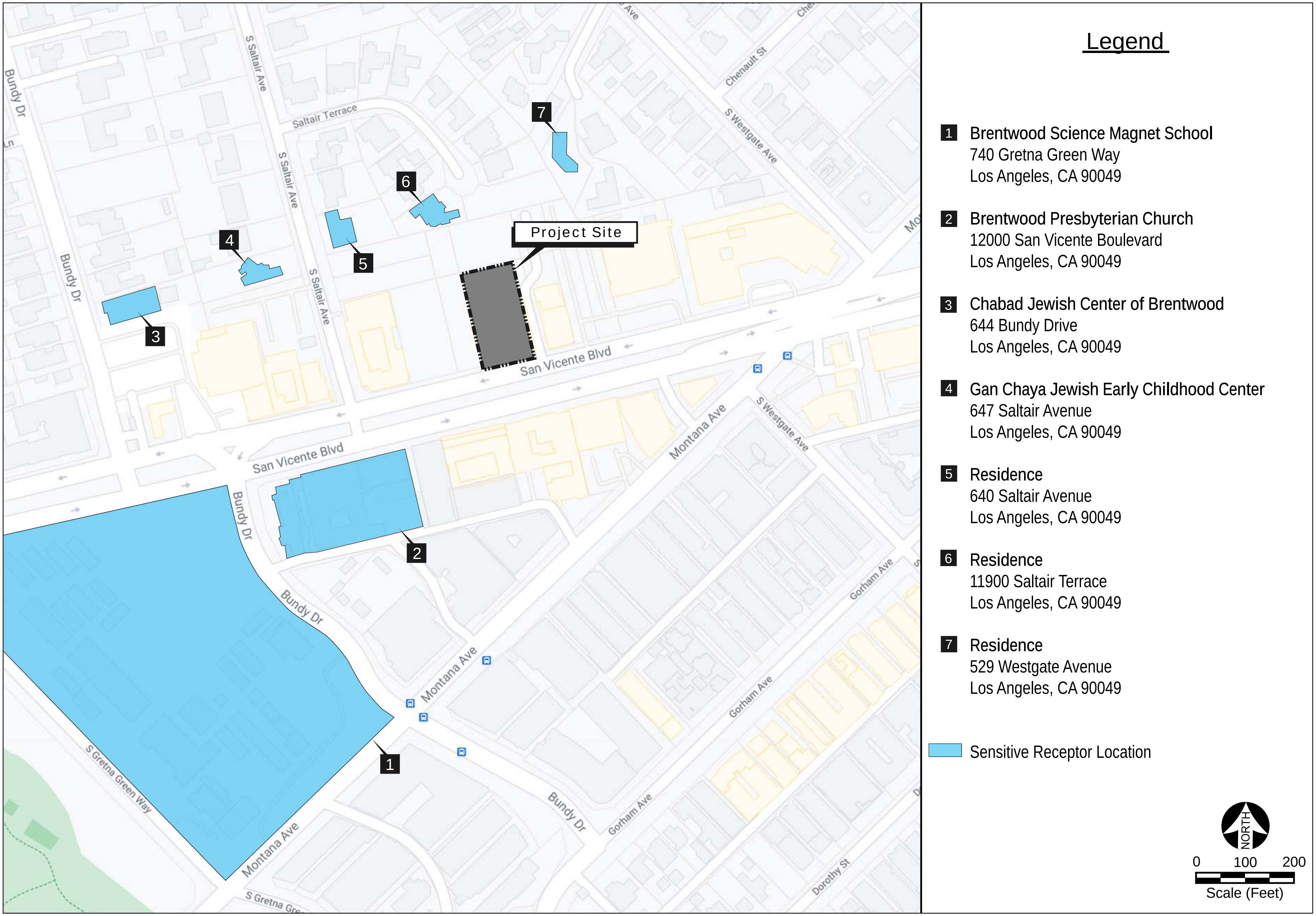
40 World Health Organization, https://www.who.int/docstore/peh/noise/Comnoise-2.pdf accessed April 18, 2020.

(2) Existing Ground-Borne Vibration Levels

During the course of the noise measurement field study, no stationary sources capable of generating meaningful ground-borne vibrations were identified, and no instances of perceptible ground-borne vibration were noted. This suggests that background ambient ground-borne vibration levels in the vicinity of the Project Site are generally below thresholds of human perception, which are approximately 0.04 inches per second PPV for transient vibration sources and 0.01 inches per second PPV for continuous, frequent, or intermittent vibration sources.[41] In terms of RMS, the FTA reports that the threshold of perception for humans is approximately 65 VdB.[42] However, given the Project Site's location adjacent to a major roadway, it is likely that perceptible ground-borne vibrations may be occasionally produced by passing heavy vehicles.

41 Caltrans, Transportation and Construction Vibration Guidance Manual, Table 20, page 38, April 2020.

42 Federal Transit Administration, Transit Noise and Vibration Impact Assessment Manual, Section 7.2.1, page 7-5, 2018.



Source: CAJA Environmental Services LLC.

Figure IV.E-3
Sensitive Receptor Location Map

3. Project Impacts

a) Thresholds of Significance

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

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, would the project expose people residing or working in the project area to excessive noise levels.*

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

(1) 2006 L.A. CEQA Thresholds Guide

The *L.A. CEQA Thresholds Guide* identifies the following criteria to evaluate impacts related to construction noise. Based on guidance from the City of Los Angeles Department of Planning, the on-site construction noise impact would be considered significant if:

- Construction activities lasting more than one day would exceed existing ambient exterior sound levels by 10 dBA 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 L_{eq} or more at a noise-sensitive use; or
- Construction activities of any duration would exceed the ambient noise level by 5 dBA 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.

The averaging period shall be equivalent to the duration of a single work day, from start to finish of that day's construction activities.

(2) FTA Ground-Borne Vibration Standards and Guidelines

The City of Los Angeles currently does not have significance criteria to assess vibration impacts during construction. Thus, FTA guidelines set forth in FTA's Transit Noise and Vibration Assessment, dated May 2006, 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 could be considered significant if the following were to occur (applicable to frequent events; more than 70 vibration events per day):

- Project construction activities cause frequent ground-borne vibration events (more than 70 events per day) in excess of 72 VdB at off-site sensitive uses, including residential, hospital, and theater uses.

- Project construction activities cause occasional ground-borne vibration events (between 30 and 70 vibration events per day) in excess of 75 VdB at off-site sensitive uses, including residential, hospital, and theater uses.

- Project construction activities cause infrequent ground-borne vibration events (fewer than 30 vibration events per day) in excess of 80 VdB at off-site sensitive uses, including residential, hospital, and theater uses.

b) Methodology

On-Site Construction Noise-Generating Activities. The Project's on-site construction noise impact associated with its on-site demolition activities and landscape buffer installation was determined by identifying the noise levels of construction equipment with the greatest potential to cause substantial noise levels at nearby sensitive receptors and assessing the noise increases that could result from their operations. Reference equipment noise levels were derived from the Federal Highway Administration's Roadway Construction Noise Model, version 2.0 (FHWA RCNM 2.0).

Off-Site Construction Noise-Generating Activities. The Project's off-site construction noise impact from construction trucks was projected using the FHWA's Traffic Noise Model version 2.5 (TNM 2.5). This noise prediction software uses traffic volumes, vehicle mix, average speeds, roadway geometry, and other inputs to calculate average noise levels along roadway segments. Truck-related roadside noise levels were estimated with TNM 2.5 and then compared with existing ambient noise conditions along the haul route, namely San Vicente Boulevard, to determine significance.

On- and Off-Site Demolition Vibration-Producing Activities. The Project's potential to generate damaging levels of groundborne vibration was analyzed by identifying construction vibration sources and estimating the maximum vibration levels that they could produce at nearby buildings, all based on principles and guidelines recommended by the FTA in its 2006 Transit Noise and Vibration Impact Assessment manual. Vibration levels were then compared with the manual's suggested damage criteria for various types of building categories.

The Project's potential to disrupt and/or annoy nearby people or land uses due to construction-related groundborne vibration was analyzed in a similar fashion. Groundborne vibration levels at nearby land uses were modeled and then compared with the FTA impact criteria for various land uses.

c) Project Design Features

No specific project design features (PDFs) are proposed with regard to noise.

d) Analysis of Project Impacts

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?***

(1) Impact Analysis

(a) Construction

Construction would generate noise during the approximately 36 working days of demolition activities (see Table II-1 in Section II, Project Description, for the proposed Project schedule), with one additional day to install the landscape buffer. Noise-generating activities could occur at the Project Site between 7:00 A.M. and 9:00 P.M. Monday through Friday, in accordance with LAMC Section 41.40(a). On Saturdays, construction activites would be permitted to occur between 8:00 A.M. and 6:00 P.M. No construction is permitted on Sundays.

(i) *On-Site Construction Activities*

Asbestos abatement for the Project would require the use of powered hand tools such as electric or pneumatic equipment, but no heavy-duty off-road construction vehicles. Subsequent building demolition would require an excavator and two loaders. The bulk of demolition activity would be characterized by an excavator demolishing the Barry Building and depositing debris into haul trucks or dumpsters for removal. Loaders would assist by consolidating debris and also transferring it into haul trucks or dumpsters. The existing surface parking lot would not be demolished. After the Barry Building structure has been demolished, a backhoe would be utilized to dig and backfill trenches in order to facilitate removal of the building's underground utilities. For installation of the landscape buffer, a skidsteer loader or mini-excavator may be utilized. Given its greater equipment requirements, building demolition would be the phase with the greatest potential to result in substantial noise increases at surrounding sensitive receptors. Excavators can produce noise levels of 75.9 dBA L_{eq} at 50 feet when performing work cycles, and they often operate in relatively fixed positions while doing so. This stationary positioning means that, at times, an excavator may operate rather continuously in set positions at minimum or reduced Project-to-receptor distances. However, an excavator would not work at exactly the minimum Project-to-receptor distances for the entire duration of demolition activities. Excavator work would move across the Project Site from hour to hour and day to day, and noise levels at receptors would fluctuate accordingly. Loaders can produce noise levels of 72.4 dBA L_{eq} at 50 feet when performing work cycles, but loader operations are more mobile in nature. As a result, loaders would not work at exactly the minimum Project-to-receptor distances for any appreciable length of time. Loader operations would similarly move about the Project Site, and noise levels at receptors would fluctuate accordingly. Despite the fact that the required excavator and loader activities would not occur continuously at minimum Project-to-receptor distances, the noise impacts from these vehicles' usage have been conservatively modeled by assuming that an entire workday's operations would occur at fixed, reduced noise source-to-receptor distances.

Table IV.E-6, below, shows the estimated unmitigated noise impacts that could result from excavator and loader usage during the Project's proposed demolition of the Barry Building. As shown, resultant noise increases at 640 Saltair Avenue, 11900 Saltair Terrace, and 529 Westgate

Avenue could exceed the City's 5 dBA L_{eq} increase significance criteria. As a result, without mitigation, this impact would be considered significant.

Additionally, with respect to LAMC Section 112.05, no individual piece of equipment (i.e., no individual excavator or loader or backhoe) is estimated to generate a noise level in excess of 75 dBA L_{eq} as measured at a distance of 50 feet. As a result, the Project's impact as it pertains to the generation of noise levels in excess of noise ordinance standards would be considered less than significant.

Table IV.E-6
Construction Noise Impacts at Off-Site Sensitive Receptors (Unmitigated)

Receptor	Maximum Construction Noise Level (dBA L_{eq})	Existing Ambient Noise Level (dBA L_{eq})	New Ambient Noise Level (dBA L_{eq})	Increase (dBA L_{eq})	Potentially Significant?
Residence – 640 Saltair Avenue	61.1	57.4	62.7	5.3	Yes
Residence – 11900 Saltair Terrace	64.7	55.3	65.2	9.9	Yes
Residence – 529 Westgate Avenue	61.3	55.3	62.3	7.0	Yes
Chabad Jewish Center of Brentwood	48.3	60.0	60.3	0.3	No
Gan Chaya Jewish Early Childhood Center	57.3	60.5	62.2	1.7	No
Brentwood Science Magnet School	53.5	71.7	71.8	0.1	No
Brentwood Presbyterian Church	61.6	66.3	67.6	1.3	No
Calculations provided in Appendix D of this Draft EIR. Source: DKA Planning, 2020, and Noah Tanski Environmental Consulting (NTEC), 2022.					

(ii) *Off-Site Construction Activities*

The Project would also generate noise at off-site locations from haul trucks removing debris from the Project Site during demolition activities. Haul trucks would access the Project Site via San Vicente Boulevard. The Project's peak haul truck trip generation would occur during its building demolition phase. This phase would generate approximately 270 haul trips (round trips) over a 16-day period to haul an estimated 4,044 cubic yards of debris from the Project Site. This equates to an average of approximately 34 haul trips (17 empty inbound trips and 17 loaded outbound trips) per day, or about 6 haul trips per hour over a six-hour daily hauling period. According to FHWA TNM 2.5 modeling, 6 haul trips per hour would be capable of generating roadside noise levels of just 54.3 dBA L_{eq} along San Vicente Boulevard. As field measurements indicate that existing daytime noise levels along San Vicente Boulevard are in excess of 65 dBA L_{eq}, the Project's building demolition-related haul truck trips would not be capable of increasing San Vicente Boulevard's roadside ambient noise levels by an appreciable degree. Other construction phases, such as asbestos abatement and landscape buffer installation, would generate no more than 2 haul truk trips per hour. As a result, the off-site noise impact from these phases would be even less: just 49.6 dBA L_{eq} along San Vicente Boulevard. Given these considerations, the Project's off-site noise impacts from construction-related traffic truck traffic would be less than significant.

(b) Operation

The Project does not include an operational component besides the creation of a modest landscaped buffer, which would require a timed irrigation system and occasional landscaping maintenance. Any operational noise impact(s) associated with these operational features would be minimal and this impact would be less than significant.

(2) Mitigation Measures

To ensure that the Project's construction-related noise increases at 640 Saltair Avenue, 11900 Saltair Terrace, and 529 Westgate Avenue do not exceed the City's 5 dBA L_{eq} threshold of significance, the following mitigation measure is required:

MM-NOI-1 Sound barriers rated to achieve a sound attenuation of at least 15 dBA shall be erected along the following boundaries:

- The east and west parking area boundaries (both the Project Site's east and west parking area boundaries and the east and west boundaries of the parcel immediately to the north of the Project Site (APN 4404-025-016)). (While the parcel to the north of the Project Site is not part of the Project, that parcel would be used for construction staging.)
- The northern property line of the parcel to the north of the Project Site (APN 4404-012-016) that separates this parcel from the residential uses to the north. Sound barriers along this property line shall be connected to the previously described sound barriers for the east and west property lines, so that there are no gaps.

All sound barriers shall be tall enough to shield line of sight paths from operating demolition equipment to the 2nd stories of nearby residential uses. The prescribed sound barriers shall be installed for the duration of the Project's demolition activities, which are estimated to last approximately 36 working days. At plan check, building plans shall include documentation prepared by a noise consultant to verify compliance with this measure.

(3) Level of Significance After Mitigation

Implementation of Mitigation Measure MM-NOI-1 would reduce demolition-related noise impacts to below the City's 5 dBA L_{eq} significance criteria. As shown in Table IV.E-7, building demolition-related noise increases at 640 Saltair Avenue, 11900 Saltair Terrace, and 529 Westgate Avenue would be no greater than 1.1 dBA after implementation of Mitigation Measure MM-NOI-1.

Therefore, the Project's noise impact from on-site demolition activities would be considered less than significant with mitigation.

Table IV.E-7
Demolition Noise Impacts at Off-Site Sensitive Receptors (Mitigated)

Receptor	Maximum Construction Noise Level (dBA L_{eq})	Existing Ambient Noise Level (dBA L_{eq})	New Ambient Noise Level (dBA L_{eq})	Increase (dBA L_{eq})	Significant?
Residence – 640 Saltair Avenue	46.1	57.4	57.7	0.3	No
Residence – 11900 Saltair Terrace	49.7	55.3	56.4	1.1	No
Residence – 529 Westgate Avenue	46.3	55.3	55.8	0.5	No
Calculations provided in Appendix D of this Draft EIR. Source: DKA Planning, 2020, and NTEC, 2022.					

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

(1) Impact Analysis

(a) Construction

(i) *On-Site Sources*

Equipment used during construction can produce ground-borne vibration based on equipment and methods employed. While this spreads through the ground and diminishes in strength with distance, buildings on nearby soil can be affected. This ranges from no perceptible effects at the lowest levels, low rumbling sounds and perceptible vibration at moderate levels, and slight damage at the highest levels. Table IV.E-8 summarizes vibratory levels for common construction equipment.

Ground-borne vibration would be generated by the construction activities at the Project Site. Heavy-duty steel-tracked equipment such as excavators or loaders, assumed to be the vibrational equivalent of the FTA's "Large Bulldozer" equipment, can produce vibration levels of 0.089 inches per second PPV at a reference distance of 25 feet (see Table IV.E-8, below). As explained earlier, these vehicles would be required by the Project's demolition activities.

As shown in Table IV.E-9, the Project's estimated construction vibration impacts at the nearest off-site structures would not exceed FTA thresholds for potential damage. As a result, construction activities would not be expected to cause architectural damage to structures near the Project Site, and the Project's building damage-related vibration impacts as generated by on-site construction activities would be considered less than significant.

Table IV.E-8
Vibration Source Levels for Construction Equipment

Equipment	Approximate PPV at 25 feet (in/sec)
Pile Driver (impact)	0.644
Pile Drive (sonic)	0.170
Clam shovel drop (slurry wall)	0.202
Hydromill (slurry wall)	0.008
Vibratory Roller	0.210
Hoe Ram	0.089
Large Bulldozer	0.089
Caisson Drilling	0.089
Loaded Truck	0.076
Jackhammer	0.035
Small Bulldozer	0.003
Source: Federal Transit Administration, Transit Noise and Vibration Impact Assessment Manual, 2018.	

Table IV.E-9
Building Damage Vibration Levels – On-Site Sources

Building	Distance (feet)	Condition[1]	Significance Criteria (in/sec)	Estimated Maximum Vibration Velocity (in/sec PPV)	Significant Impact?
11961 San Vicente Boulevard – Commercial Building	10	I. Reinforced-concrete, steel or timber	0.5	0.244	No
11980 San Vicente Boulevard – Commercial Building	125	I. Reinforced-concrete, steel or timber	0.5	0.015	No
11999 San Vicente Boulevard – Commercial Building	150	I. Reinforced-concrete, steel or timber	0.5	0.012	No
11900 West Saltair Terrace – Residential	175	I. Reinforced-concrete, steel or timber	0.5	0.010	No

[1] Structural condition and significance criteria based on FTA guidelines issued in the 2018 FTA Transit Noise and Vibration Impact Assessment manual.
Calculations provided in Appendix D of this Draft EIR.
Source: NTEC, 2021.

With regard to the human annoyance effects of ground-borne vibration, the same excavator and loader vehicles may produce RMS vibration levels of 87 VdB at a reference distance of 25 feet.[43] As shown in Table IV.E-10, the Project's estimated construction vibration impacts at nearby receptors sensitive to the human annoyance effects of ground-borne vibration would not exceed the applicable 72 VdB threshold of significance. Considering that the threshold of perception is approximately 65 VdB, vibration impacts are also not anticipated to be perceptible at these receptors. As a result, the Project's human annoyance-related vibration impacts as generated by on-site construction activities would be less than significant.

Table IV.E-10
Human Annoyance Vibration Levels – On-Site Sources

Building	Distance (feet)	Vibration Category[1]	Significance Criteria (VdB)[2]	Estimated RMS Velocity (VdB)	Significant Impact?
640 Saltair Avenue – Residential	265	2. Residences and buildings where people normally sleep	72	56.2	No
11900 West Saltair Terrace – Residential	175	2. Residences and buildings where people normally sleep.	72	61.6	No
529 Westgate Avenue – Residential	260	2. Residences where people normally sleep.	72	56.5	No

[1] As noted earlier in this section, the FTA "Vibration Category 2" includes residential uses and other buildings where people sleep, such as hospitals.
[2] As also noted earlier, 72 VdB is the FTA's Vibration Category 2 threshold for frequent events, which are defined as more than 70 vibration events of the same source per day. It is assumed that construction activities may generate more than 70 "vibration events" per day.
Calculations provided in Appendix D of this Draft EIR.
Source: NTEC, 2021.

(ii) *Off-Site Sources*

Demolition of the commercial building would generate trips from haul trucks hauling debris from the Project Site. Buildings situated along the Project's anticipated haul route on San Vicente Boulevard could be exposed to groundborne vibrations from these vehicles. Based on FTA data, the vibration generated by a typical heavy-duty truck would be approximately 0.076 inches per second PPV at a distance of 25 feet from the truck.[44] This is below the FTA's most stringent 0.12 inches per second PPV threshold for buildings that are extremely susceptible to vibration. As a

43 Federal Transit Administration, Transit Noise and Vibration Impact Assessment Manual, Table 12-2, page 12-12, September 2018.

44 Federal Transit Administration, Transit Noise and Vibration Impact Assessment Manual, Table 12-2, page 12-12, September 2018.

result, the Project's haul trucks would not be expected to expose any roadside building to potentially damaging levels of groundborne vibration.

Regarding human annoyance, the FTA writes that "[i]t is unusual for vibration from sources such as buses and trucks to be perceptible, even in locations close to major roads."[45] Caltrans repeats this by stating that "[v]ehicles traveling on smooth roadways are rarely, if ever, the source of perceptible ground vibration," adding that smoothing "pavement to eliminate the discontinuities…will eliminate perceptible vibration from vehicle operations in virtually all cases."[46]

The FTA shows that at 50 feet, typical vibration from buses or trucks is below the limits of human perception, which is understood to be approximately 65 VdB. Over bumps, ground-borne vibration events of approximately 73 VdB may be produced.[47] However, the FTA simultaneously reports that loaded trucks may produce ground-borne vibration levels of 86 VdB at a reference distance of 25 feet, even though the same reference vibration level extrapolated to 50 feet would be 78 VdB, which is above the FTA's previously reported levels.[48] Notwithstanding this discrepancy, whether trucks and other large on-road vehicles produce perceptible vibrations is largely dependent on environmental factors such as roadway surface conditions and speed, as explained by the FTA and Caltrans. This fact is supported by the findings of the Project's field noise measurement study, which did not note the occurrence of perceptible ground-borne vibrations from trucks and other traffic sources at the time of the study, despite the obvious presence of trucks and other large vehicles driving along San Vicente Boulevard.

The Project's building demolition phase is estimated to result in 34 haul trips per day, which may be capable of causing up to 17 vibration events per day from loaded haul truck trips (the remaining 17 trips would be from unloaded haul trucks accessing the Project Site). The FTA's threshold for Category 2 land uses, which include residences and other buildings where people normally sleep, is 80 VdB. Specifically, this 80 VdB threshold applies when the Category 2 land use is subject to fewer than 30 vibration events per day, which is consistent with the Project's 17 loaded haul truck trips per day. As explained, the FTA methodology indicates that the Project's 17 loaded haul truck trips could cause ground-borne vibrations of up to 86 VdB at roadside land uses that are located 25 feet from the Project's haul route. Beyond 45 feet, the FTA methodology would not predict ground-borne vibrations in excess of the 80 VdB threshold. Thus, it follows that Category 2 land uses located within 45 feet of the Project's haul route may potentially be exposed to 17 daily vibration events that are in excess of the 80 VdB threshold as a result of the Project's hauling. However, the following must additionally be considered:

45 Federal Transit Administration, Transit Noise and Vibration Impact Assessment Manual, page 7-1, September 2018.

46 Caltrans, Transportation and Construction Vibration Guidance Manual, Section 8.5, pages 45-46, April 2020.

47 Federal Transit Administration, Transit Noise and Vibration Impact Assessment Manual, Figure 7-3, page 7-5, September 2018.

48 Federal Transit Administration, Transit Noise and Vibration Impact Assessment Manual, Table 12-2, page 12-12, September 2018.

(1) That a Category 2 land use may be located within 45 feet of the haul route does not guarantee that the land use would be exposed to perceptible ground-borne vibration, much less vibration in excess of 80 VdB. As noted, perceptible ground-borne vibration from trucks and other traffic sources were not noted at the time of the field noise measurement study, despite the presence of such vehicles. This is consistent with FTA and Caltrans guidance stating that the potential for trucks and other large on-road vehicles to produce perceptible vibrations is largely dependent on environmental factors such as speed of travel and roadway conditions – i.e. the presence of features such as cracks, pavement discontinuities, potholes, etc., and the speed at which they are driven over.

(2) If such features do exist, ground-borne vibrations could be generated by any number of trucks and vehicles passing over them – not just the Project's haul trucks. This supports why the nature of existing conditions along San Vicente Boulevard is an additional key consideration in assessing the significance of the Project's potential ground-borne vibration impact from haul trucks. The FTA criteria are absolute numerical limits that do not account for existing conditions and thus do not consider whether a substantial change to the environment has actually occurred. Reasonably, the Project's generation of 17 daily loaded haul truck trips would not constitute a substantial change in the environment when considering that San Vicente Boulevard carries many thousands of vehicle trips per day.

(3) FTA Category 2 land uses are defined as residences and buildings where people normally sleep, and the vibration criteria for these land uses are intended to protect sleeping environments and/or nighttime environments (periods when people are more sensitive to disruption) from the effects of transit systems, which often operate late into the night. However, the Project's 17 daily loaded haul truck trips would occur only during daytime hauling hours. Over the course of a work day, this would amount to approximately 2-3 loaded haul trips per hour, or one potential vibration event per 20-30 minutes.

(4) The FTA human annoyance vibration criteria were developed specifically to evaluate the effects of transit systems, not urban construction. The FTA writes that these "criteria are primarily based on experience with passenger train operations with only limited experience from freight train operations."[49] There are notable distinctions between vibration impacts from commuter rail operations and trucks. For example, vibration events caused by truck passbys last a few seconds at most, and often only a fraction of a second.[50] In contrast, vibration events from passing commuter trains may last many seconds, depending on the length and speed of the train. Additionally, and most significantly, whereas a transit system with consistent operations will have a similar day to day impact at nearby receptors for decades, the Project is estimated to last approximately 37 days. Of this, only 16 work days are anticipated to generate 17 loaded

49 Federal Transit Administration, Transit Noise and Vibration Impact Assessment Manual, page 8-1, September 2018.

50 Caltrans, Transportation Related Earthborne Vibrations, page 13, January 2004.

haul truck trips. Other phases are anticipated to generate a single loaded haul truck trip per day.

(5) In 2004, Caltrans reported its experiences measuring transportation-related ground-borne vibrations. Data compiled from its past studies indicated that the highest traffic-generated vibrations measured on freeway shoulders (approximately 15 feet from the center line of the nearest lane) never exceeded 2.0 millimeters per second, coinciding "with worst combinations of heavy trucks."[51,52] This equates to a ground-borne vibration level of approximately 0.08 inches per second PPV at a distance of 15 feet. According to Caltrans' own vibration annoyance criteria, this is above its applicable 0.04 inches per second PPV "barely perceptible" threshold, but it is well-below the 0.25 inches per second PPV "distinctly perceptible" threshold. It is much further below Caltrans' 0.9 inches per second PPV "strongly perceptible threshold," and it is yet even further below the 2.0 inches per second PPV "severe" threshold.[53]

Given these considerations, the Project's maximum loaded haul truck trip rate of approximately 17 loaded trips per work day, which equates to approximately 2-3 trips per working hour, would not constitute a significant effect on the environment. Not only would this trip generation occur for just 16 work days, but it is unlikely that any haul route-adjacent Category 2 land uses would be exposed to vibration events in excess of 80 VdB at all. The balance of information and data on this topic suggest that the Project's potential to expose such land uses to ground-borne vibrations of such an intensity and frequency that substantial human annoyance may result would be less than significant.

(b) Operation

The Project does not include an operational component besides the creation of a modest landscaped buffer, which would require a timed irrigation system and occasional landscaping maintenance. Neither of these things would have the potential to generate substantial ground-borne vibrations, and this impact would therefore be less than significant.

(2) Mitigation Measures

No significant impacts with respect to vibration have been identified, and no mitigation measures are required.

51 Caltrans, Transportation Related Earthborne Vibrations, page 14, January 2004.

52 Because trucks driving on the freeway presumably move faster than trucks on surface streets, the Caltrans measurement results most likely exceed ground-borne vibration levels that would be generated by the Project's haul trucks when traveling on San Vicente Boulevard.

53 Caltrans, Transportation and Construction Vibration Guidance Manual, Table 20, page 38, April 2020.

(3) Level of Significance After Mitigation

Project impacts with respect to vibration would be 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 discussed in the Initial Study (refer to Appendix A-1 of this Draft EIR), and in Section V (Other CEQA Considerations) of this Draft EIR, the Project Site is not located within an airport land use plan or within two miles of a public airport or public use airport. Santa Monica Airport is located approximately three miles southeast of the Project Site. Further, there are no private airstrips in the vicinity of the Project. Therefore, no impact would occur and no further analysis is required.

e) Cumulative Impacts

(1) Impact Analysis

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

(a) Construction Noise

(i) *On-Site Construction Noise*

During the Project's demolition activities, there could be other construction activity in the area that could contribute to cumulative noise impacts. 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 City's screening criteria. As such, noise from construction activities for two projects within approximately 1,000 feet of each other or a common receptor can contribute to a cumulative noise impact for receptors located near the two construction sites.

Given the built-out nature of the area, the potential for any related projects to generate substantial noise at common sensitive receptors during construction activities is low. Any cumulative impact would generally require a sensitive receptor to have a line-of-sight to two or more construction sites. Further, the impacts would have to be substantial to result in a 5 dBA or more increase in noise levels, given the ambient noise levels along San Vicente Boulevard and the density and scale of buildings and structures between any two or more locations. The closest related project to the Project Site is Related Project No. 1, located at 625 S. Barrington Avenue, over 1,700 feet from the Project Site. As Related Project No. 1 is more than 1,000 feet from the Project Site, it would not combine with the Project to result in a cumulative construction noise impact. Furthermore, as previously discussed, although on-site noise from the Project's own demolition activities could exceed the 5 dBA L_{eq} significance criteria at nearby sensitive receptors (see Table IV.E-6), impacts would be reduced to less than significant levels with implementation of Mitigation Measure MM-NOI-1 (see Table IV.E-7). As such, Project impacts would not be cumulatively considerable and cumulative construction noise impacts would be less than significant

(ii) *Off-Site Construction Noise*

There is the potential for cumulative impacts to off-site noise levels if the haul trucks, vendor trucks, or worker trips for any related project(s) near the Project Site were to utilize the same routes as the Project. Distributing trips to each potential construction site substantially reduces the potential that cumulative development could more than double traffic volumes on existing streets, which would be necessary to increase ambient noise levels by 3 dBA. For example, cumulative travel on San Vicente Boulevard would have to increase by 2,311 westbound and eastbound vehicles at Saltair Avenue to double existing traffic volumes.[54] Given the built-out nature of the San Vicente Boulevard corridor, the potential for any related project to generate this level of vehicle traffic during construction activities is low. Further, projects closer to other major arterials, such as Barrington Avenue, would use alternatives to San Vicente Boulevard, thereby distributing construction vehicle traffic over a wider network of streets. Therefore, cumulative noise due to construction truck traffic from the Project and related projects would not have the potential to exceed the ambient noise levels along the haul route or other streets by 5 dBA. An additional consideration is the fact that the Project itself would not contribute to appreciable noise increases along San Vicente Boulevard due to its construction truck trips. As such, cumulative noise impacts from off-site construction traffic would be less than significant.

(b) Construction Vibration

(i) *On-Site Construction Vibration*

During demolition and construction activities, vibration impacts are generally limited to buildings and structures located near a construction site (i.e., within 15 feet). The closest related project to the Project Site is Related Project No. 1, located at 625 S. Barrington Avenue, over 1,700 feet from the Project Site. Based on the distance of Related Project No. 1 from the Project Site, there would be no potential for cumulative construction vibration to exceed the FTA's vibration damage criteria at the same sensitive receptors as the projects. Therefore, cumulative on-site construction vibration impacts related to building damage would be less than significant. Similarly, Related Project No. 1 is far too distant from the Project for its on-site construction activities to cause perceptible ground-borne vibrations, much less potentially annoying vibrations, at shared

[54] Based on LADOT 24-Hour Traffic Volumes: https://navigatela.lacity.org/dot/traffic_data/automatic_counts/SANSAL080711.pdf. These traffic volumes were adjusted one percent per year to represent 2020 conditions.

receptors. Cumulative on-site construction vibration impacts related to human annoyance would be less than significant.

(ii) *Off-Site Construction Vibration*

While haul trucks from any related projects and other concurrent construction projects could generate additional vibration along haul routes, the potential to damage buildings is extremely low. As discussed previously, vibration generated by typical heavy-duty haul trucks would be approximately 0.076 inches per second PPV at a distance of 25 feet from the truck, which is below the FTA's most stringent 0.12 inches per second PPV threshold for buildings that are extremely susceptible to vibration. As a result, no Project haul truck would be expected to expose any roadside building to potentially damaging levels of groundborne vibration. The presence of any additional haul trucks from related projects would not reasonably be expected to result in increased peak vibration amplitudes. In general, more vibration sources result in more vibration peaks (i.e., PPV groundborne vibration signals or "events"), not necessarily higher peaks, because the probabilities of constructive wave interference are extremely small.[55]

As discussed previously, the Project's maximum loaded haul truck trip rate of approximately 2-3 trips per working hour would not constitute a significant effect on the environment, nor would it be reasonably expected to expose roadside land uses to ground-borne vibrations of such an intensity and frequency that substantial human annoyance may result. The Project's 2-3 loaded haul truck trips per hour would not individually represent a significant impact, and this additional 2-3 trips per hour to San Vicente Boulevard or other major roadways utilized by the haul route would not be cumulatively considerable given that such arterial roadways can be expected to experience dozens or more truck trips per hour. Also, as noted, the nearest Related Project No. 1 is located at 625 S. Barrington Avenue, over 1,700 feet from the Project Site. It is reasonable to expect that this project's haul trucks would therefore utilize alternatives to San Vicente Boulevard. Therefore cumulative off-site construction vibration impacts related to human annoyance would be less than significant.

(c) Operation

(i) *Noise*

The Project does not include an operational component besides the creation of a modest landscaped buffer, which would require a timed irrigation system and occasional landscaping maintenance. Therefore, the Project would not have the potential to generate a substantial temporary or permanent increase in ambient noise levels during operation or contribute to cumulative increases in ambient noise levels.

55 Caltrans, Transportation and Construction Vibration Guidance Manual, page 10, April 2020.

(ii) *Vibration*

Operation of the Project (i.e., maintenance of a landsape buffer) would not result in Project level vibration impacts or contribute to cumulative increases in ground-borne vibration levels.

(2) Mitigation Measures

No significant cumulative impacts to noise and vibration have been identified, and no mitigation measures are required.

(3) Level of Significance After Mitigation

Cumulative impacts related to noise and vibration would be less than significant without mitigation.