4.11 NOISE

This section is based in part on the following documents:

- Psomas. 2024d. Supplemental Noise Analysis Memorandum for the Hills Preserve Project in the City of Anaheim, California. Pasadena, CA: Psomas. Attached as Appendix M.
- Salt Development. 2023b. The Hills Preserve Skydeck (Roof Deck) Operations Memorandum. Salt Lake City, UT. Salt Development. Attached as Appendix N.

4.11.1 EXISTING CONDITIONS

Noise Basics and Terminology

Characteristics of Noise

"Sound" is a vibratory disturbance in air pressure created by a moving or vibrating source. "Noise" is defined as a sound that is loud, unpleasant, unexpected, or undesired and may therefore be classified as a more specific group of sounds. Although the terms "sound" and "noise" are often used synonymously, perceptions of sound and noise are highly subjective (Caltrans 2013a). The effects of noise on people can include general annoyance; interference with speech communication; sleep disturbance; and, in the extreme, hearing impairment.

Decibels and Frequency

Noise effects can be caused by pitch or loudness. In its most basic form, a continuous sound can be described by its frequency or wavelength (pitch) and its amplitude (loudness). Frequency is expressed in cycles per second, or hertz. Frequencies are heard as the pitch or tone of sound. High-pitched sounds produce high frequencies; low-pitched sounds produce low frequencies. Higher-pitched sounds are louder to humans than lower-pitched sounds.

Sound pressure levels are described in units called the decibel (dB) (Caltrans 2013a). Decibels are measured on a logarithmic scale that quantifies sound intensity in a manner similar to the Richter scale used for earthquake magnitudes. The 0 point on the dB scale is based on the lowest sound level that the healthy, unimpaired human ear can detect. Changes of 3 dB or less are only perceptible in laboratory environments. Audible increases in noise levels generally refer to a change of 3 dB or more, as this level has been found to be barely perceptible to the human ear in outdoor environments. Only audible changes in existing ambient or background noise levels are considered potentially significant. Because decibels are logarithmic units, they cannot be added or subtracted by ordinary arithmetic means. A doubling of the energy of a noise source, such as doubling of traffic volume, would increase the noise level by 3 dB (Caltrans 2013a).

Perception of Noise and A-Weighting

A typical noise environment consists of a base of steady "background" noise that is the sum of many distant and indistinguishable noise sources. Superimposed on this background noise is the sound from individual local sources. The local sources can vary from an occasional aircraft or train passing by, to intermittent periods of sound (such as amplified music), to virtually continuous noise from, for example, traffic on a major highway.

The human ear is not equally sensitive to all frequencies within the sound spectrum such as very high or low frequency sounds. To accommodate this phenomenon, the A-scale was devised; the A-weighted decibel scale (dBA or db[A]) approximates the frequency response of the average healthy ear when listening to most ordinary everyday sounds. When people make relative judgments of the loudness or annoyance of a sound, their judgments correlate well with the A-weighted sound levels of those sounds. Therefore, the "A-weighted" noise scale is used for measurements and standards involving the human perception of noise (Caltrans 2013a).

Human perception of noise has no simple correlation with acoustical energy. Due to subjective thresholds of tolerance, the annoyance of a given noise source is perceived very differently from person to person. The most common sounds vary between 40 dBA (very quiet) to 100 dBA (very loud). Normal conversation at 3 feet is approximately 60 dBA, while loud jet engine noises at 1,000 feet equate to 100 dBA, which can cause serious discomfort (Caltrans 2013a). Table 4.11-1 shows the relationship of various noise levels in dBA to commonly experienced noise events.

TABLE 4.11-1
NOISE LEVELS FOR COMMON ACTIVITIES

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
–	110	Rock Band
Jet Fly-over at 300 m (1,000 ft)	100	–
Gas Lawn Mower at 1 m (3 ft)	90	–
Diesel Truck at 15 m (50 ft) at 80 km/hr (50 mph)	80	Food Blender at 1 m (3 ft); Garbage Disposal at 1 m (3 ft)
Noisy Urban Area, Daytime Gas Lawn Mower at 30 m (100 ft)	70	Vacuum Cleaner at 3 m (10 ft)
Commercial Area, Heavy Traffic at 90 m (300 ft)	60	Normal Speech at 1 m (3 ft)
Quiet Urban Daytime	50	Large Business Office Dishwasher in Next Room
Quiet Urban Nighttime	40	Theater, Large Conference Room (Background)
Quiet Suburban Nighttime	30	Library
Quiet Rural Nighttime	20	Bedroom at Night, Concert Hall (Background)
–	10	Broadcast/Recording Studio
Lowest Threshold of Human Hearing	0	Lowest Threshold of Human Hearing
dBA: A-weighted decibels; m: meter; ft: feet; km/hr: kilometers per hour, mph: miles per hour. Source: Caltrans 2013a.		

Two noise sources do not "sound twice as loud" as one source. As stated above, a doubling of noise sources results in a noise level increase of 3 dBA. Thus, for example, if one noise source produces a noise level of 70 dB, the addition of another noise source with the same noise level would not produce 140 dB; rather, they would combine to produce a noise level of 73 dB. It is widely accepted that (1) the average healthy ear can barely perceive changes of a 3 dBA increase or decrease in outdoor environments; (2) a change of 5 dBA is readily perceptible; and (3) an increase (or decrease) of 10 dBA sounds twice (or half) as loud (Caltrans 2013a). Therefore, the generally accepted level at which changes in community noise levels become "barely perceptible" typically occurs at values greater than 3 dBA.

Noise Propagation

From the source to the receiver, noise changes both in level and frequency spectrum. The most obvious change is the decrease in noise level as the distance from the source increases. The manner in which noise reduces with distance depends on the factors described below.

Geometric Spreading from Point and Line Sources: Sound from a small, localized source (approximating a "point" source) radiates uniformly outward as it travels away from the source in a spherical pattern. For point sources, such as Heating, Ventilation, and Air Conditioning (HVAC) units or construction equipment, the sound level attenuates (or drops

off) at a rate of 6 dBA for each doubling of the distance (i.e., if the noise level is 70 dBA at 25 feet, it is 64 dBA at 50 feet). Vehicle movement on a road makes the source of the sound appear to emanate from a cylindrical pattern rather than a point when viewed over some time interval. The sound level attenuates or drops off at a rate of 3 dBA per doubling of distance for line sources (FTA 2018a).

Ground Absorption: To account for the ground-effect attenuation (absorption), two types of site conditions are commonly used in noise prediction: soft site and hard site conditions. Hard sites (i.e., sites with a reflective surface between the source and the receiver, such as parking lots or smooth bodies of water) receive no reduction from ground attenuation relate to absorption, and the changes in noise levels with distance (drop-off rate) are simply the geometric spreading of the source. Soft sites are sites that have an absorptive ground surface (e.g., soft dirt, grass, or scattered bushes and trees) and receive a ground attenuation value of 1.5 dBA per doubling of distance (FHWA 2006a).

Atmospheric Effects: Wind speed will bend the path of sound to "focus" (increase) it on the downwind side and make a "shadow" (reduction) on the upwind side of the source. At short distances, the wind has minor influence on the measured sound level. For longer distances, the wind effect becomes appreciably greater. Temperature gradients create effects similar to those of wind gradients, except that they are uniform in all directions from the source. On a sunny day with no wind, temperature decreases with altitude, giving a shadow effect for sound. On a clear night, temperature may increase with altitude, focusing sound on the ground surface (Caltrans 2013a).

Shielding by Natural and Man-Made Features, Noise Barriers: A large object in the path between a noise source and a receiver can significantly attenuate noise levels at that receiver location. The amount of attenuation provided by this "shielding" depends on the size of the object, proximity to the barrier, and the frequencies of the noise levels. Natural terrain or landform features as well as man-made features (e.g., buildings and walls) can significantly alter noise exposure levels at a receptor. For a noise barrier to work, it must be high enough and long enough to block the view from the receiver to a road or to the noise source. Effective noise barriers can reduce outdoor noise levels at the receptor by up to 15 dB whereas enclosures can achieve 20 dB or greater reductions in noise levels (FTA 2018a).

Noise Descriptors

There are many ways to rate noise for various intervals, but an appropriate rating of ambient noise affecting humans also accounts for the annoying effects of sound. Several rating scales (or noise "metrics") exist to analyze effects of noise on a community. These scales include the equivalent noise level (L_{eq}), the community noise equivalent level (CNEL), and the day-night average sound level (L_{dn}). Average noise levels over a period of minutes or hours are usually expressed as dBA L_{eq}, which is the equivalent noise level for that period of time. The period of time averaging may be specified; for example, $L_{eq(3)}$ would be a 3-hour average. When no period is specified, a one-hour average is assumed. Noise of short duration (i.e., substantially less than the averaging period) is averaged into ambient noise during the period of interest. Thus, a loud noise lasting many seconds or a few minutes may have

minimal effect on the measured sound level averaged over a one-hour period (Caltrans 2013a).To evaluate community noise impacts, L_{dn} was developed to account for human sensitivity to nighttime noise. L_{dn} represents the 24-hour average sound level with a penalty for noise occurring at night. /The L_{dn} computation divides the 24-hour day into two periods: daytime (7 a.m. to 10 p.m.) and nighttime (10 p.m. to 7 a.m.). The nighttime sound levels are assigned a 10 dBA penalty prior to averaging with daytime hourly sound levels. CNEL is similar to L_{dn} except that it separates a 24-hour day into 3 periods:[1] daytime (7 a.m. to 7 p.m.), evening (7 p.m. to 10 p.m.), and nighttime (10 p.m. to 7 a.m.). The evening sound levels are assigned a 5 dBA penalty and the nighttime sound levels are assigned a 10 dBA penalty prior to averaging with daytime hourly sound levels (FHWA 2006a).

Several other statistical descriptors are often used to describe noise including L_{max}, L_{min}, and $L_{\%}$, when assessing the annoyance factor.

L_{max} and L_{min} are respectively the highest and lowest A-weighted sound levels that occur during a noise event. The $L_{\%}$ signifies the noise level that is exceeded a certain percent of the time; for example, L_{10} denotes the level that was exceeded 10 percent of the time (Caltrans 2013a). A table containing noise-related terms and their definitions is provided as Table 4.11-2.

[1] CNEL and L_{dn} are within one dBA of each other and are normally exchangeable.

TABLE 4.11-2
SOUND TERMINOLOGY

Term	Definition
Sound	A vibratory disturbance created by a vibrating object which, when transmitted by pressure waves through a medium such as air, can be detected by a receiving mechanism such as the human ear or a microphone.
Noise	Sound that is loud, unpleasant, unexpected, or otherwise undesirable.
Ambient Noise	The composite of noise from all sources near and far in a given environment.
Decibel (dB)	A unitless measure of sound on a logarithmic scale, which represents the squared ratio of sound pressure amplitude to a reference sound pressure. The reference pressure is 20 micropascals, representing the threshold of human hearing (0 dB).
A-Weighted Decibel (dBA)	An overall frequency-weighted sound level that approximates the frequency response of the human ear.
Equivalent Noise Level (L_{eq})	The average sound energy occurring over a specified time period. In effect, L_{eq} is the steady-state sound level that in a stated period would contain the same acoustical energy as the time-varying sound that actually occurs during the same period.
Maximum and Minimum Noise Levels (L_{max} and L_{min})	The maximum or minimum instantaneous sound level measured during a measurement period.
Day-Night Level (DNL or L_{dn})	The energy average of the A-weighted sound levels occurring during a 24-hour period, with 10 dB added to the A-weighted sound levels occurring between 10:00 p.m. and 7:00 a.m. (nighttime).
Community Noise Equivalent Level (CNEL)	The energy average of the A-weighted sound levels occurring during a 24-hour period, with 5 dB added to the A-weighted sound levels occurring between 7:00 p.m. and 10:00 p.m. and 10 dB added to the A-weighted sound levels occurring between 10:00 p.m. and 7:00 a.m.
Source: Data compiled by Psomas 2024.	

Traffic (Mobile Source) Noise

The level of traffic (or mobile source) noise depends on the three primary factors: (1) the volume of the traffic, (2) the speed of the traffic, and (3) the number of trucks in the flow of traffic. Generally, the loudness of traffic noise is increased by heavier traffic volumes, higher speeds, and greater number of trucks. Vehicle noise is a combination of the noise produced by the engine, exhaust, and tires. Because of the logarithmic nature of noise levels, a doubling

of the traffic volume (assuming that the speed and truck mix do not change) results in a noise level increase of 3 dBA. Based on the Federal Highway Administration (FHWA) community noise assessment criteria, this change is "barely perceptible"; for reference, a doubling of perceived noise levels would require an increase of approximately 10 dBA. The truck mix on a given roadway also has an effect on community noise levels. As the number of heavy trucks increases and becomes a larger percentage of the vehicle mix, adjacent noise levels increase.

Stationary Noise

A stationary noise producer is any entity in a fixed location that emits noise. Examples of stationary noise sources include machinery, engines, energy production, and other mechanical or powered equipment and activities such as loading and unloading or public assembly that may occur at commercial, industrial, manufacturing, or institutional facilities. Furthermore, while noise generated by the use of motor vehicles over public roads is preempted from local regulation, although the use of these vehicles is considered a stationary noise source when operated on private property such as at a construction site, a truck terminal, or warehousing facility. The emitted noise from the producer can be mitigated to acceptable levels either at the source or on the adjacent property through the use of proper planning, setbacks, block walls, acoustic-rated windows, dense landscaping, or by changing the location of the noise producer.

As noted above, the effects of stationary noise depend on factors such as characteristics of the equipment and operations, distance and pathway between the generator and receptor, and weather. Stationary noise sources may be regulated at the point of manufacture (e.g., equipment or engines), with limitations on the hours of operation, or with provision of intervening structures, barriers or topography.

Construction activities are a common source of stationary noise. Construction-period noise levels are higher than background ambient noise levels but ultimately cease once construction is complete. Construction is performed in discrete steps, each of which has its own mix of equipment and, consequently, its own noise characteristics. These various sequential phases would change the character of the noise generated on each construction site and, therefore, would change the noise levels as construction progresses. Despite the variety in the type and size of construction equipment, similarities in the dominant noise sources and patterns of operation allow construction–related noise ranges to be categorized by work phase. Table 4.11-3 shows typical noise levels of construction equipment as measured at a distance of 50 feet from the operating equipment.

TABLE 4.11-3
TYPICAL CONSTRUCTION EQUIPMENT MAXIMUM NOISE LEVELS

Type of Equipment	Impact Device? (Yes/No)	Specification Maximum Sound Levels for Analysis (dBA at 50 feet)
Impact Pile Driver	Yes	95
Auger Drill Rig	No	85
Vibratory Pile Driver	No	95
Jackhammers	Yes	85
Pneumatic Tools	No	85
Pumps	No	77
Scrapers	No	85
Cranes	No	85
Portable Generators	No	82
Rollers	No	85
Bulldozers	No	85
Tractors	No	84
Front-End Loaders	No	80
Backhoe	No	80
Excavators	No	85
Graders	No	85
Air Compressors	No	80
Dump Truck	No	84
Concrete Mixer Truck	No	85
Pickup Truck	No	55

Notes:
dBA = A-weighted decibel
Source: FHWA 2018a.

Noise from Multiple Sources

As noted above, because sound pressure levels in decibels are based on a logarithmic scale, they cannot be added or subtracted in the usual arithmetical way. Therefore, sound pressure levels in decibels are logarithmically added on an energy summation basis. In other words, adding a new noise source to an existing noise source, both producing noise at the same level, will not double the noise level. Instead, if the difference between two noise sources is 10 dBA or more, the louder noise source will dominate, and the resultant noise level will be equal to the noise level of the louder source. In general, if the difference between two noise sources is 0–1 dBA, the resultant noise level will be 3 dBA higher than the louder noise source, or both sources if they are equal. If the difference between two noise sources is 2–3 dBA, the resultant noise level will be 2 dBA above the louder noise source. If the difference between two noise sources is 4–10 dBA, the resultant noise level will be 1 dBA higher than the louder noise source.

Groundborne Vibration and Noise

In contrast to airborne noise, groundborne vibration is not a common environmental problem. Whereas airborne noise transmits pressure waves through air, groundborne vibration is transmitted through a solid medium such as the ground or a structure. Some common sources of groundborne vibration are specific types of construction activities such as blasting, pile driving, and operating heavy earth-moving equipment. Trains and similar rail vehicles can also produce vibration. It is unusual for vibration from sources such as buses and trucks to be perceptible. The effects of groundborne vibration typically only cause a nuisance to people, but in extreme cases, excessive groundborne vibration has the potential to cause structural damage to buildings. Although groundborne vibration can be felt outdoors, it is typically only an annoyance to people indoors where the associated effects of the shaking of a building can be notable. Groundborne noise is an effect of groundborne vibration and only exists indoors, since it is produced from noise radiated from the motion of the walls and floors of a room, and may also consist of the rattling of windows or dishes on shelves.

Vibration displacement is the distance that a point on a surface moves away from its original static position. The instantaneous speed that a point on a surface moves is described as the velocity, and the rate of change of the speed is described as the acceleration. Each of these descriptors can be used to correlate vibration to human response, building damage, and acceptable equipment vibration levels. During construction of a project, the operation of certain types of construction equipment can cause groundborne vibration, as noted above and described further below. During the operational phase of a project, although unusual, receptors may be subject to levels of vibration that can cause annoyance due to noise generated from vibration of a structure or items within a structure depending on the nature of the subject use(s). Analysis of this type of vibration is best measured in velocity and acceleration.

The propagation of groundborne vibration is not as simple to model as airborne noise. This is because noise in the air travels through a relatively uniform medium, while groundborne vibrations travel through the earth, which may contain significant geological differences. Factors that influence groundborne vibration include:

- **Vibration source:** Type of activity or equipment, such as impact or mobile, and depth of vibration source;
- **Vibration path:** Soil type, rock layers, soil layering, depth to water table, and frost depth; and
- **Vibration receiver:** Foundation type, building construction, and acoustical absorption.

Among these factors that influence groundborne vibration, there are significant differences in the vibration characteristics when the source is underground compared to at the ground surface. In addition, soil conditions are known to have a strong influence on the levels of groundborne vibration. Among the most important factors are the stiffness and internal

damping of the soil and the depth to bedrock. Vibration propagation is more efficient in stiff clay soils than in loose sandy soils, and shallow rock seems to concentrate the vibration energy close to the surface, and can result in groundborne vibration problems at large distance from the source. Factors such as layering of the soil and depth to the water table can have significant effects on the propagation of groundborne vibration. Soft, loose, sandy soils tend to attenuate more vibration energy than hard, rocky materials. Vibration propagation through groundwater is more efficient than through sandy soils.

The three main wave types of concern in the propagation of groundborne vibrations are surface or Rayleigh waves, compression or P-waves, and shear or S-waves (Caltrans 2020a).

- Surface or Rayleigh waves travel along the ground surface. They carry most of their energy along an expanding cylindrical wave front, similar to the ripples produced by throwing a rock into a lake. The particle motion is more or less perpendicular to the direction of propagation (known as retrograde elliptical).
- Compression or P-waves are body waves that carry their energy along an expanding spherical wave front. The particle motion in these waves is longitudinal, in a push-pull motion. P-waves are analogous to airborne sound waves.
- Shear or S-waves are also body waves, carrying their energy along an expanding spherical wave front. Unlike P-waves, however, the particle motion is transverse, or perpendicular to the direction of propagation.

The peak particle velocity (ppv) or the root mean square (rms) velocity is usually used to describe vibration amplitudes. The ppv is defined as the maximum instantaneous peak of the vibration signal and the rms is defined as the square root of the average of the squared amplitude of the signal. The ppv is appropriate for evaluating potential building damage and also used for evaluating human response.

The units for ppv velocity are normally inches per second (in/sec). Often, vibration is presented and discussed in dB units in order to compress the range of numbers required to describe the vibration. In this study, all ppv velocity levels are provided in in/sec and all vibration levels are in dB relative to one microinch per second. The threshold of perception is approximately 0.3 ppv. Typically, groundborne vibration generated by human activities attenuates rapidly with distance from the source of the vibration. Even the more persistent Rayleigh waves decrease relatively quickly as they move away from the source of the vibration. Manmade vibration problems are, therefore, usually confined to short distances (500 feet or less) from the source (Caltrans 2020a).

Construction generally includes a wide range of activities, some of which can generate groundborne vibration. In general, blasting and demolition of structures generate the highest vibrations. Heavy trucks can also generate groundborne vibrations, which vary depending on vehicle type, weight, and pavement conditions. Potholes, pavement joints, discontinuities, differential settlement of pavement, and other anomalies all increase the vibration levels from vehicles passing over a road surface. Construction vibration is normally of greater concern than vibration of normal traffic on streets and freeways with smooth pavement conditions (FTA 2018a).

Typically, developed areas are continuously affected by vibration velocities of 50 dB or lower. Human perception to vibration starts at levels as low as 67 dB. Annoyance due to vibration in residential settings starts at approximately 70 dB.

Typical vibration source levels from construction equipment are shown in Table 4.11 4.

TABLE 4.11-4
VIBRATION LEVELS OF CONSTRUCTION EQUIPMENT

Construction Equipment	PPV at 25 Feet (inches/second)	Velocity in Decibels (dB) at 25 Feet
Water Trucks	0.001	57
Scraper	0.002	58
Bulldozer—small	0.003	58
Jackhammer	0.035	79
Concrete Mixer	0.046	81
Concrete Pump	0.046	81
Paver	0.046	81
Pickup Truck	0.046	81
Auger Drill Rig	0.051	82
Backhoe	0.051	82
Crane (Mobile)	0.051	82
Excavator	0.051	82
Grader	0.051	82
Loader	0.051	82
Loaded Trucks	0.076	86
Bulldozer—Large	0.089	87
Caisson drilling	0.089	87
Vibratory Roller (small)	0.101	88
Compactor	0.138	90
Clam shovel drop	0.202	94
Vibratory Roller (large)	0.210	94
Pile Driver (impact-typical)	0.644	104
Pile Driver (impact-upper range)	1.518	112

Notes:
PPV = peak particle velocity
rms = root mean square
dB = decibels
Source: FTA 2018a.

Ambient Noise Environment

Field Survey

To document the existing ambient noise environment on the Project Site and in the Project vicinity, a field survey was conducted on September 15, 2023. Four short-term noise measurements (15-20 minutes) were collected at the locations shown in Exhibit 4.11-1. Noise data were collected using a Larson Davis LxT Type 1 Sound Level Meter. The results of the field study are summarized in Table 4.11-5. Given that there are no existing urban uses on-site, there are no existing on-site stationary noise sources. Traffic noise as well as noise from birds and wind are the only existing noise sources.

Also, each monitoring location is discussed individually below. Except for noise monitoring location NR-4, which was collected along the northern property line of the Project Site, the existing noise levels within the Project Site are relatively low.

TABLE 4.11-5
EXISTING SITE NOISE MEASUREMENT RESULTS

Noise Monitoring Location	Maximum (L_{max} dBA)	Average (L_{eq} dBA)	Minimum (L_{min} dBA)	Noise Sources
NR-1 – Center of Property	65.1	50.0	39.1	Distant traffic noise. Background bird and wind noise.
NR-2 – Southern Property Line	63.0	47.7	35.0	Distant traffic noise. Background bird and wind noise.
NR-3 Eastern Property Line	59.4	46.2	37.9	Distant traffic noise. Background bird and wind noise.
NR-4 Northern Property Line	90.8	72.1	53.2	Traffic noise from E Santa Ana Canyon Road and State Route 91.

NR: noise reading; dBA: A-weighted decibel scale.

Note: The L_{eq} represents the equivalent sound level and is the numeric value of a constant level that over the given period of time transmits the same amount of acoustic energy as the actual time-varying sound level. The Lmin and Lmax represent the minimum and maximum root-mean-square noise levels obtained over a period of 1 second during the measurement.

Source: Psomas 2023d, which is attached as Appendix M.

Sensitive Noise Receptors

Noise-sensitive receptors include those land uses that require serenity or are otherwise adversely affected by noise events or excessively noisy conditions. Furthermore, the City of Anaheim attempts to minimize exposure to excessive noise levels to residents, workers, and visitors to the City by adopting the noise-related California General Plan Land Use Compatibility Guidelines (City of Anaheim 2004a). The land use categories requiring the

D:\Projects\3ANA_BaseFiles\TheHills\PRO\TheHills_Project\TheHills_Project.aprx\ex_Ambient_Noise

Ambient Noise Measurements

Exhibit 4.11-1

Hills Preserve Project

N W E S

400 200 0 400 Feet

PSOMAS

(Rev: 6-13-2024 PLO) R:\Projects\ANA\3ANA009406\Graphics\DEIR\ex_Ambient_Noise.pdf

lowest noise thresholds are schools, libraries, religious institutions, hospitals, convalescent facilities, and residences, all of which are considered as "noise sensitive receptors".

Exhibit 3-2 reflects existing off-site noise sensitive receptors and other existing uses in proximity to the Project Site, as well as undeveloped areas that are currently planned to accommodate future sensitive receptors (e.g. lands zoned for residential uses).

As shown in Exhibit 3-2, Aerial Photograph, Santa Ana Canyon Road is north of the Project Site. Further to the north across Santa Ana Canyon road is a self-storage facility, SR-91, and a California Highway Patrol weigh station. A utility transmission corridor containing Southern California Edison (SCE) overhead power lines is immediately east of the Project site. Also, the Anaheim Hills Festival commercial center is approximately 350 feet to the east of the Project Site. Undeveloped, privately-owned parcels that are zoned Hillside Single-Family Residential are located immediately south of the Project Site. Approximately 825 feet (0.16-mile) south of the Project Site is the Deer Canyon Park Preserve. The west boundary of the Project Site is adjacent to a single-family residential subdivision that is accessible via South Eucalyptus Drive [Avenue?]. The existing residential uses near the Project Site would be classified as sensitive receptors for noise; none of the other foregoing uses would be considered sensitive receptors for purposes of this analysis.

As noted above, since the Project Site is vacant, there are no existing on-site sensitive receptors.

4.11.2 REGULATORY SETTING

Federal

U.S. Department of Housing and Urban Development

The U.S. Department of Housing and Urban Development (HUD) has set a goal of 45 dBA L_{dn} as a desirable maximum interior noise standard for residential units developed under HUD funding (HUD 1984a). While HUD does not specify acceptable exterior noise levels, standard construction of residential dwellings constructed pursuant to standards established under Title 24 of the California Code of Regulations typically provides 20 dBA, or more, of attenuation with the windows closed. Based on this premise, the exterior L_{dn} should not exceed 65 dBA (CBSC 2023a).

Noise Control Act

The adverse impact of noise was officially recognized by the federal government in the Noise Control Act of 1972, which serves three purposes:

- Promulgating noise emission standards for interstate commerce
- Assisting state and local abatement efforts
- Promoting noise education and research

This act authorized the United States Environmental Protection Agency (EPA) to publish descriptive data on the effects of noise and establish levels of sound "requisite to protect the public welfare with an adequate margin of safety." These levels are separated into health (hearing loss levels) and welfare (annoyance levels). The EPA cautions that these identified levels are not standards because they do not take into account the cost or feasibility of the levels.

For protection against hearing loss, 96 percent of the population would be protected if sound levels are less than or equal to an Leq(24) of 70 dBA. The "(24)" signifies an Leq duration of 24 hours. The USEPA activity and interference guidelines are designed to ensure reliable speech communication at about 5 feet in the outdoor environment. For outdoor and indoor environments, interference with activity and annoyance should not occur if levels are below 55 dBA and 45 dBA, respectively.

At 55 dBA Ldn, 95 percent sentence clarity (intelligibility) may be expected at 11 feet, and no substantial community reaction. However, 1 percent of the population may complain about noise at this level and 17 percent may indicate annoyance.

The Federal Office of Noise Abatement and Control (ONAC) was initially tasked with implementing the Noise Control Act. However, the ONAC has since been eliminated, leaving the development of federal noise policies and programs to other federal agencies and interagency committees.

Among the agencies now regulating noise are the Occupational Safety and Health Administration (OSHA), which limits noise exposure of workers to 90 dB L_{eq} or less for 8 continuous hours or 105 dB L_{eq} or less for 1 continuous hour; the United States Department of Transportation (USDOT), which assumed a significant role in noise control through its various operating agencies; and the Federal Aviation Administration (FAA), which regulates noise of aircraft and airports. Surface transportation system noise is regulated by a host of agencies, including the FTA. Transit noise is regulated by the federal Urban Mass Transit Administration, while freeways that are part of the interstate highway system are regulated by the FHWA.

Finally, the federal government encourages local jurisdictions use their land use regulatory authority to site new development in such a way that "noise-sensitive" uses are either prohibited from being sited adjacent to a highway, or alternatively, that developments are planned and constructed in such a manner that minimize potential noise impacts.

Since the federal government has preempted the setting of standards for noise levels that can be emitted by transportation sources, local jurisdictions are limited to regulating the noise generated by the transportation system through nuisance abatement ordinances and land use planning.

Federal Transit Administration Standards and Guidelines

FTA has established industry accepted standards for vibration impact criteria and impact assessment. These guidelines are published in its Transit Noise and Vibration Impact

Assessment document (FTA 2006). The FTA guidelines include thresholds for construction vibration impacts for various structural categories as shown in Table 4.11-6.

TABLE 4.11-6
FEDERAL TRANSIT ADMINISTRATION
CONSTRUCTION VIBRATION IMPACT CRITERIA

Building Category	PPV (in/sec)	Approximate dB
I. Reinforced-Concrete, Steel or Timber (no plaster)	0.5	102
II. Engineered Concrete and Masonry (no plaster)	0.3	98
III. Non-engineered Timber and Masonry Buildings	0.2	94
IV. Buildings Extremely Susceptible to Vibration Damage	0.12	90
Notes: PPV = peak particle velocity dB = decibels Source: Federal Transit Administration (FTA) 2018. Transit Noise and Vibration Impact Assessment Manual.		

State

The State of California has established regulations that help prevent adverse impacts to occupants of buildings located near noise sources. In addition to the following documents, the State has also established land use compatibility guidelines for determining acceptable noise levels for specified land uses.

General Plan Guidelines/California Office of Noise Control—Noise Compatibility Standards

Established in 1973, the California Department of Health Services Office of Noise Control was instrumental in developing regularity tools to control and abate noise for use by local agencies. One significant model is the "Land Use Compatibility for Community Noise Environments Matrix," which allows the local jurisdiction to delineate compatibility of sensitive uses with various incremental levels of noise.[2]

The California Office of Noise Control has set acceptable noise limits for sensitive uses. Sensitive land uses, such as homes, are "normally acceptable" in exterior noise environments up to 65 dBA CNEL and "conditionally acceptable" in areas up to 70 dBA CNEL. A "conditionally acceptable" designation implies that new development should be undertaken only after a detailed analysis of the necessary noise reduction measures that would need to be incorporated into the new development to ensure that acceptable noise levels could be achieved (e.g., needed noise insulation features are incorporated in the design). By comparison, a "normally acceptable" designation indicates that standard construction could

[2] California Department of Health Services Office of Noise Control, "Land Use Compatibility for Community Noise Environments Matrix," 1976.

occur with no special noise reduction requirements incorporated into the design of the new development (OPR 2017a).

Government Code Section 65302 mandates that the legislative body of each county and city in California adopt a noise element as part of its comprehensive general plan. The local noise element must recognize the land use compatibility guidelines referenced above, which rank noise/land use compatibility in terms of normally acceptable, conditionally acceptable, normally unacceptable, and clearly unacceptable. As discussed further below, because the Project is subject to review under CEQA, the impact thresholds for potential noise and vibration impacts set forth in Appendix G of the CEQA Guidelines are relevant in applying the foregoing guidelines.

California Noise Insulation Standards

The State of California has established noise insulation standards for new hotels, motels, apartment houses, and dwellings (other than single-family detached housing). These requirements are provided in Title 24 of the California Code of Regulations, also known as the California Building Standards Code or, more commonly, the California Building Code. Specifically, these provisions require that residential structures other than detached single-family dwellings be designed to prevent exterior noise intrusion so that the interior Day-Night L_{dn} or CNEL attributable to exterior sources does not exceed 45 dBA in any habitable room with closed windows, and specify the extent to which walls, doors, and floor ceiling assemblies must block or absorb sound (CBSC 2023a). When such structures are located within a 65-dBA CNEL (or greater) exterior noise contour associated with a traffic noise along a roadway, an acoustical analysis is required to ensure that interior levels do not exceed the 45-dBA CNEL threshold. These noise insulation standards are achieved through design and/or building materials that would offset any noise source in the vicinity of the building. Title 24 standards are typically enforced by local jurisdictions through the building permit application process.

California Assembly Bill 1307

The State of California passed Assembly Bill 1307, which went into effect January 1, 2024, added Sections 21085 and 21085.2 to the Public Resources Code. This act was treated as an "urgency statute" that went into immediate effect; this was based on the current "substantial housing crisis" that California is facing, and thus the Act is "ensure housing projects are not subject to further uncertainty, delay, or risk of lawsuit." Specifically, it provides that "…for residential projects, the effects of noise generated by project occupants and their guests on human beings is not a significant effect on the environment." Therefore, this analysis does not address potential noise impacts from future Project residential occupants and their guests on sensitive receptors in the Project vicinity.

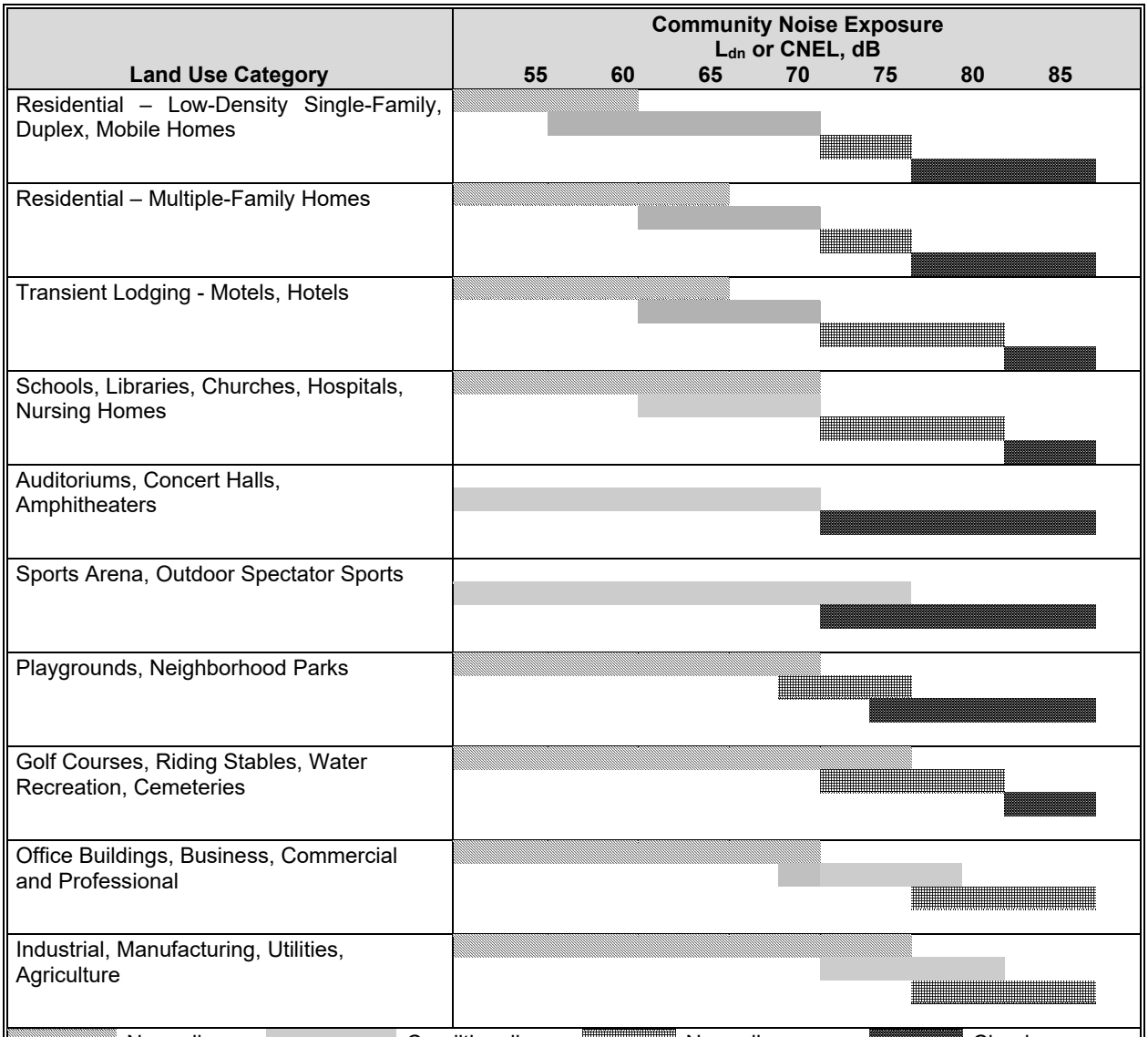
Local

City of Anaheim General Plan – Noise Element

In the Noise Element of the City's General Plan, the City adopted land use-noise compatibility standards, which are shown in Table 4.11-7 (City of Anaheim 2004a). The land use compatibility standards are used to identify "normally acceptable", "conditionally acceptable", "normally unacceptable", and "clearly unacceptable" noise levels for varying land uses and may be used to ascertain construction noise impacts to the surrounding land uses.

For single-family residential land uses impacted by construction, the "normally acceptable" and "conditionally acceptable" community noise levels according to the compatibility matrix would be 60 dBA and 70 dBA CNEL, respectively. If the noise levels from construction are below 65 dBA CNEL then no changes to the intended construction plans are required; however, if the levels are above 65 dBA CNEL then noise reduction measures may need to be considered to reduce the noise impact to the surrounding land uses. An analysis of Project consistency with the goals and policies from the Noise Element that are applicable to the Project are provided in Table 4.10-1 in Section 4.10, Land Use.

TABLE 4.11-7
LAND USE COMPATIBILITY FOR NOISE EXPOSURE



Normally Acceptable	Conditionally Acceptable	Normally Unacceptable	Clearly Unacceptable
Specified land use is satisfactory based upon the assumption that any buildings involved are of normal, conventional construction, without any special noise insulation requirements.	New construction or development should be undertaken only after a detailed analysis of the noise reduction requirement is made and needed noise insulation features are included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning, will normally suffice.	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. Outdoor areas must be shielded.	New construction or development should generally not be undertaken. Construction costs to make the indoor environment acceptable would be prohibitive, and the outdoor environment would not be acceptable.

L_{dn}: day-night noise level; CNEL: Community Noise Equivalent Level; dB: decibels

Source: City of Anaheim 2004a.

Anaheim Municipal Code

As described further below, the AMC addresses specific types of noise and related standards. Of relevance here, first, it contains interior and exterior noise standards that must be adhered to (with certain exceptions) when designing and building new residential developments. Second, the AMC limits the generation of noise by stationary sources for extended periods from any premises in excess of 60 decibels at the property line. Third, the AMC addresses construction-related noise impacts. Specifically, the AMC exempts construction noise from AMC standards so long as the construction occurs during specified hours (i.e., 7:00 a.m. and 7:00 p.m., unless otherwise extended by City). Finally, the AMC also regulates the use of amplified sound.

The following sections of the AMC that are relevant to this analysis are as follows:

18.40.090. Sound Attenuation for Residential Developments

.010 Applicability. Residential developments involving the construction of two (2) or more dwelling units, or residential subdivisions resulting in two (2) or more parcels, and located within six hundred (600) feet of any railroad, freeway, expressway, major arterial, primary arterial or secondary arterial, as designated by the Circulation Element of the General Plan, shall comply with the provisions of this section. The construction of an Accessory Dwelling Unit or Accessory Dwelling Unit – Junior shall not constitute a residential development subject to the provisions of this section.

.020 Study Required. A noise level analysis shall be performed for any new residential development or subdivision to determine the projected interior and exterior noise levels within the development. The study shall include mitigation measures that would be required to comply with applicable City noise standards, as identified in this section. The study shall be provided by the applicant, at its sole expense, to the City at the time of application for development of the residential development or subdivision.

.030 Attenuation. Mitigation measures, without limitation, may include masonry walls, an earthen berm or a combination thereof. Masonry walls must comply with the requirements of Chapter 18.46 (Landscaping and Screening). The height of any proposed walls shall be determined by the approval authority based on the recommendation of a sound attenuation study prepared by a state-licensed acoustical engineer, unless a variance is granted by the approval authority, or City Council on appeal, in accordance with the procedures established in Chapter 18.60 (Common Procedures) for the processing of variances.

.040 Single-Family Detached. Exterior noise within the private rear yard of any single-family lot and/or within any common recreation areas, shall be attenuated to a maximum of sixty-five (65) dB CNEL. Interior noise levels shall be attenuated to a maximum of forty-five (45) dB CNEL, or to a level designated by the Uniform Building Code, as adopted by the City.

.050 Single-Family Attached or Multiple-Family. Exterior noise within common recreation areas of any single family attached or multiple family dwelling project shall be attenuated to a maximum of sixty-five (65) dB CNEL. Interior noise levels shall be attenuated to a

maximum of forty-five (45) dB CNEL, or to a level designated by the Uniform Building Code, as adopted by the City.

.060 Minor Deviations. Notwithstanding any provision of this Code to the contrary, the Planning Commission may grant a deviation from the requirements imposed by subsections .040 and .050 of this section pertaining to exterior noise levels in accordance with the procedures established in Chapter 18.60 (Common Procedures) for the processing of variances except that the findings set forth in Section 18.74.060 (Findings) of Chapter 18.74 (Variances) shall not be required and provided that before any such deviation is granted by the Planning Commission, the evidence presented shows that all of the following conditions exist:

.0601 The deviation from prescribed levels does not pertain to interior noise levels;

.0602 The deviation does not exceed five (5) dB CNEL above the prescribed levels for exterior noise; and

.0603 Measures to attenuate noise to the prescribed levels would compromise or conflict with the aesthetic value of the project. (Ord. 6000 § 3; November 8, 2005: Ord. 6101 § 33; April 22, 2008: Ord. 6317 § 14; March 3, 2015: Ord. 6419 § 10; August 29, 2017: Ord. 6483 § 9; June 9, 2020.)

Chapter 6.70. Sound Pressure Levels

6.70.010 Established.

Sound produced in excess of the sound pressure levels permitted herein are hereby determined to be objectionable and constitute an infringement upon the right and quiet enjoyment of property in this City.

No person shall within the City create any sound radiated for extended periods from any premises which produces a sound pressure level at any point on the property line in excess of sixty decibels (Re 0.0002 Microbar) read on the A-scale of a sound level meter. Readings shall be taken in accordance with the instrument manufacturer's instructions, using the slowest meter response.

The sound level measuring microphone shall be placed at any point on the property line, but not closer than three (3) feet from any wall and not less than three (3) feet above the ground, where the above listed maximum sound pressure level shall apply. At any point the measured level shall be the average of not less than three (3) readings taken at two (2) minute intervals. To have valid readings, the levels must be five (5) decibels or more above the levels prevailing at the same point when the sources of the alleged objectionable sound are not operating.

Sound pressure levels shall be measured with a sound level meter manufactured according to American Standard S1.4-1961 published by the American Standards Association, Inc., New York City, New York.

Traffic sounds created by emergency activities and sounds created by governmental units, or their contractors shall be exempt from the applications of this chapter. Sound created by construction or building repair of any premises within the City shall be exempt from the applications of this chapter during the hours of 7:00 AM to 7:00 PM. Additional work hours may be permitted if deemed necessary by the Director of Public Works or Building Official. (Ord. 2526 § 1 (part); June 18, 1968; Ord. 3400 § 1; February 11, 1975: Ord. 6020 § 1; April 25, 2006.)

Chapter 6.72. AMPLIFIED SOUND

6.72.010 PURPOSE.

This City Council enacts this legislation for the sole purpose of securing and promoting the public health, comfort, safety, and welfare of its citizenry. While recognizing that certain uses of sound-amplifying equipment are protected by the constitutional rights of freedom of speech and assembly, the City Council, nevertheless, feels obligated to reasonably regulate the use of sound-amplifying equipment in order to protect the correlative constitutional rights of the citizens of this community to privacy and freedom from public nuisance of loud and raucous noise. (Ord. 4059 § 1 (part); October 9, 1979; Ord. 5941 § 1 (part); September 14, 2004.)

6.72.020 REGULATION OF AMPLIFIED SOUND.

Notwithstanding the provisions of Chapter 6.70 of this code, it shall be unlawful for any person to use or operate, or cause to be used or operated, within the City of Anaheim any sound-amplifying equipment in a fixed or movable position, or mounted upon any vehicle, except when used or operated in compliance with the following provisions:

.010 In all residential zones and within two hundred feet of any boundary thereof, no sound-amplifying equipment shall be operated or used for commercial purposes, except sound-amplifying equipment may be used for commercial purposes upon a moving vehicle between the hours of 8:00 a.m. and 8:00 p.m. to announce the presence of such vehicle in an area or location for commercial purposes; provided that such sound-amplifying equipment shall not be used during periods that the vehicle is stopped, parked or otherwise in a stationary position.

.020 In all residential zones and within two hundred feet of any boundary thereof, no sound-amplifying equipment shall be operated or used for noncommercial purposes between the hours of 8:00 p.m. and 8:00 a.m. of the following day.

.030 In all non-residential zones, except such portions thereof as may be included within two hundred feet of the boundary of any residential zone, the operation or use of sound-amplifying equipment for commercial purposes is prohibited between the hours of 9:00 p.m. and 8:00 a.m. of the following day.

.040 In all non-residential zones, except such portions thereof as may be included within two hundred feet of the boundary of any residential zone, the operation or use of sound-

amplifying equipment for noncommercial purposes is prohibited between the hours of 10:00 p.m. and 7:00 a.m. of the following day.

.050 Sound emanating from sound-amplifying equipment shall not be audible to a person of normal hearing acuity within an enclosed building (other than a building within which the sound emanate) at a distance in excess of two hundred feet from the sound-amplifying equipment.

.060 In no event shall the sound-amplifying equipment be unreasonably loud, raucous, jarring or disturbing to a person of normal sensitiveness within the area of audibility, or disturb the peace or quiet of any neighborhood.

.070 It shall be unlawful for any person to operate or use any sound-amplifying equipment within, upon or adjacent to the premises of any hospital, school, or publicly owned or operated arena, stadium, convention center or auditorium, while in use, in a manner which disturbs, disrupts or interferes with the conduct of any event, business or activity of any nature then occurring within such building or premises. Nothing contained in this subsection shall be deemed to prohibit any conduct which is otherwise prohibited by California Penal Code Sections 302 or 403, or any other provision of State law. (Ord. 4059 § 1 (part); October 9, 1979; Ord. 5781 § 1; September 25, 2001; Ord. 5941 § 1 (part); September 14, 2004.)

4.11.3 THRESHOLDS OF SIGNIFICANCE

In accordance with the City of Anaheim's Environmental Checklist, the Project would result in significant impacts related to noise if it would:

a) 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 a local general plan or noise ordinance or applicable standards of other agencies.

b) Result in generation of excessive groundborne vibration or groundborne noise levels.

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

4.11.4 IMPACT ANALYSIS

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 a local general plan or noise ordinance or applicable standards of other agencies?

Less Than Significant With Mitigation Incorporated.

Construction Noise

The Project would involve a substantial amount of grading and excavation activities to develop building pads and underground parking garages to accommodate the proposed Project. Construction of the proposed buildings and related infrastructure improvements would also result in additional noise generation. Certain off-site properties that are nearest to the Project Site would be subject to elevated noise levels temporarily during construction due to the operation of construction equipment and traffic noise from construction workers. Construction activities are carried out in discrete steps; each of which would have its own mix of equipment and, consequently, its own noise characteristics. Construction of the Project would generally occur over an 8-hour period per day and would be required to occur between the specified hours of 7:00 AM to 7:00 PM. No construction activity would occur at night, on Sundays, or on federal holidays in accordance with the applicable requirements contained in the AMC.

Noise from Construction Traffic

In terms of construction-related noise, two types of short-term noise impacts would occur during site preparation and project construction. The first type would result from the increase in traffic flow on local streets associated with the transport of workers, equipment, and materials to and from the Project Site, which would incrementally increase noise levels on access roads leading to the Project Site. Typically, a doubling of the ADT hourly volumes on a roadway segment is required in order to result in an increase of 3 dBA in traffic noise levels, which, as discussed in the characteristics of noise discussion above, is the lowest change that can be perceptible to the human ear in outdoor environments. The Project's construction trips would not be expected to double the hourly or daily traffic volumes along roadway segments in the vicinity of a construction work area associated with the Project because __of the high volume of trips that occur on Santa Ana Canyon Road and SR-91. For this reason, short-term intermittent noise from construction trips would not be expected to result in a perceptible increase in hourly or daily average traffic noise levels. Moreover, as explained further below, construction-related noise is exempted from otherwise applicable noise standards in the AMC. Therefore, short-term construction–related noise impacts associated with the transportation of workers and equipment to the Project Site would be less than significant and no mitigation would be required.

Noise from Construction Equipment

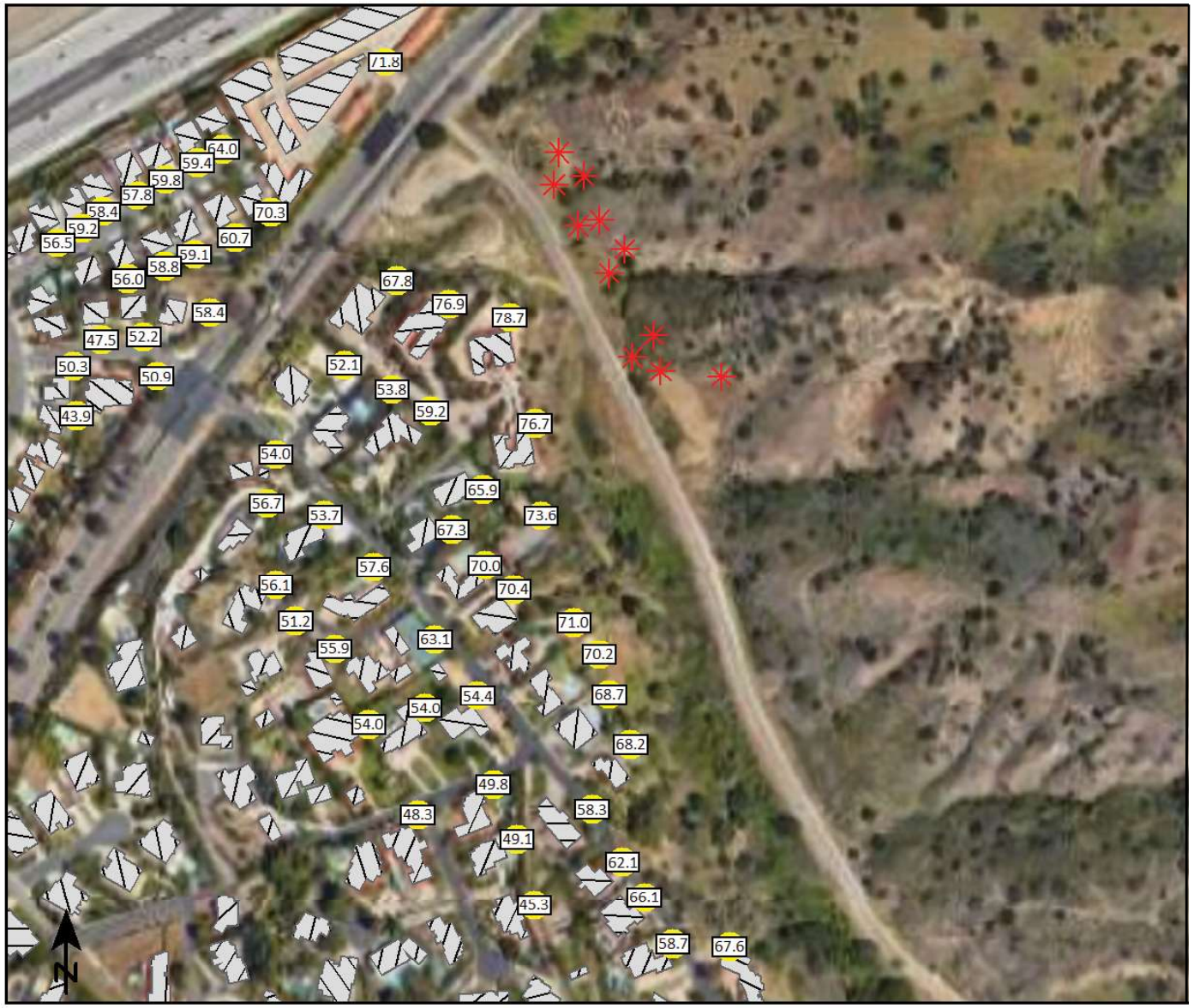
The second type of short-term noise impact is related to noise generated during site preparation, grading, and construction activities (i.e., non-mobile source). Construction is performed in discrete steps, each of which has its own mix of equipment and, consequently, its own noise characteristics. These various sequential phases would change the character of the noise generated on-site. Thus, the noise levels vary as construction progresses. Despite the variety in the types and sizes of construction equipment, similarities in the dominant noise sources and patterns of operation allow construction noise ranges to be categorized by work phase.

Noise from grading activities is typically the foremost concern when evaluating a project's construction noise impact, as grading activities often require extensive use of heavy-duty, diesel-powered earthmoving equipment. For the Project, grading would have the greatest – and thus noisiest – construction equipment requirements, as multiple grading vehicles working in concert would be required to rough grade individual subdivision improvement areas within the Project Site. Other construction phases would have reduced equipment requirements and/or would involve less daily usage of equipment. The estimated construction noise levels for a construction project are governed primarily by the equipment that produces the highest noise levels. Construction noise levels that were assumed for each generalized construction phase (i.e., ground clearing/demolition of the existing maintenance road/existing utilities, excavation, foundation/building construction, paving, and site cleanup) were based on a typical construction equipment mix for residential and commercial project types. Consistent with common construction practices, this analysis assumed that all construction equipment would be fitted with the original manufacturer-installed muffler equipment or manufacturer-approved equivalent mufflers or intake silencers to maintain, at minimum, published noise emission levels.

Based on available information, it is assumed that the Project's construction activities would be carried out in three development phases. The multiple-family residential component of the Project (Phase 1) would be located on the western portion of the Project Site. It is assumed that Phase 1 would be built first and would be open approximately in 2027. It is assumed that the commercial uses (Phase 2), which would be located on the northern portion of the Project Site, would be open approximately in 2029. It is assumed that the single-family residential component of the Project (Phase 3), which would be located on the southwestern portion of the Project Site, would be open in approximately 2031.

This analysis takes into account existing sensitive receptors near the Project Site, as well as future on-site sensitive receptors since the proposed Project would be built over time. As discussed above, the degree to which noise-sensitive receptors would be affected by construction activities depends heavily on their proximity. The Project Site is located in an area containing existing residential, commercial, and open space land uses nearby. Estimated construction noise levels for the Project were developed using a three-dimensional noise modeling software, SoundPlan Essentials, the results of which are depicted in Exhibits 4.11-2 through Exhibit 4.11-4. To provide a conservative analysis, no reduction was incorporated into the predicted noise levels that are presented in Exhibit 4.11-2 through Exhibit 4.11-4 for noise attenuation that may occur due to the presence of the off-site existing walls, structures, and vegetation.

The noise exposure levels shown in Exhibit 4.11-2 through Exhibit 4.11-4 approximate noise exposure with the conservative assumption that equipment would be operated simultaneously at the locations indicated on the exhibits, which were chosen to represent a reasonable worst-case scenario for off-site sensitive noise receptors. When equipment operates in closer proximity to nearby land uses, construction noise would be higher, and conversely, noise levels would be lower when equipment are operating further away. Noise levels that were used in the SoundPlan Essentials modeling are based on estimates of noise levels for construction equipment that are provided within the Federal Transit



Legend

Receiver

Point source

D:\Projects\3ANA_BaseFiles\TheHills\Graphics\Noiselex_Phase_01_Construction_20240327.ai

Phase 1 Construction

Exhibit 4.11-2

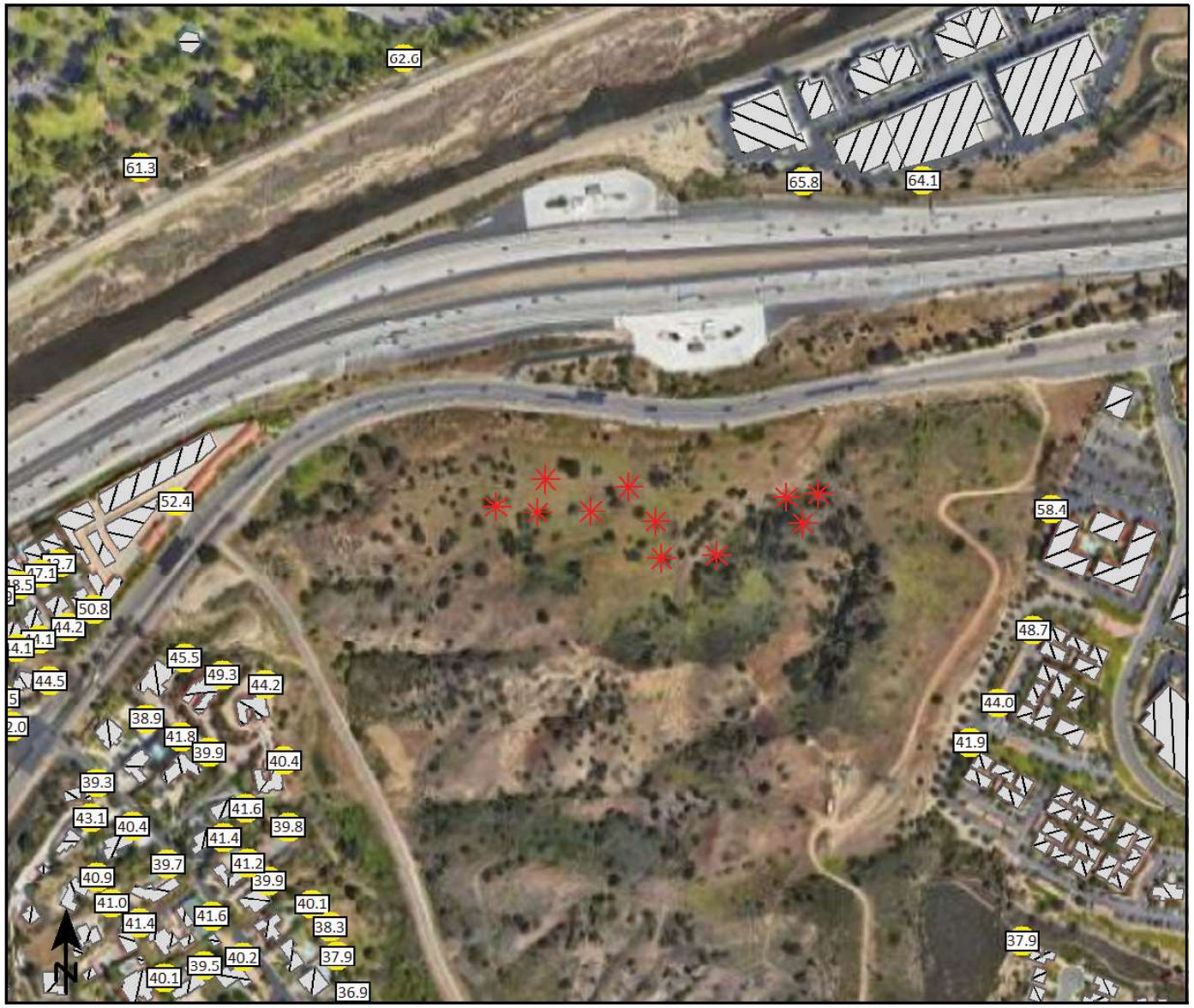
Hills Preserve Project

N
W E
S

Not to scale

PSOMAS

(06/17/2024 PLO) R:\Projects\ANA\3ANA009406\Graphics\DEIR\ex_Phase_01_Construction.pdf



Legend

- Receiver
- Point source

Phase 2 Construction

Exhibit 4.11-3

Hills Preserve Project

N
W E
S

Not to scale

PSOMAS

(06/17/2024 PLO) R:\Projects\ANA\3ANA009406\Graphics\DEIR\ex_Phase_02_Construction.pdf

D:\Projects\3ANA_BaseFiles\TheHills\Graphics\Noise\ex_Phase_02_Construction_20240327.ai

Phase 3 Construction

Exhibit 4.11-4

Hills Preserve Project

N
W E
S

Not to scale

PSOMAS

(06/17/2024 PLO) R:\Projects\ANA\3ANA009406\Graphics\DEIR\ex_Phase_03_Construction.pdf

D:\Projects\3ANA_BaseFiles\TheHills\Graphics\Noiselex_Phase_03_Construction_20240416.ai

Administration's *Transit Noise and Vibration Impact Assessment Manual* (FTA 2018). As noted above, this analysis assumes that all construction equipment would be fitted with the original equipment manufacturer or manufacturer approved equivalent mufflers or intake silencers to maintain, at minimum, published noise emission levels.

Phase One of Construction

The Project's first phase of construction would involve the development of the proposed multiple-family residential uses and related improvements which would occur near existing residences that are located to the west of the Project Site. The construction equipment that was assumed for the Project's construction phases include scrapers, excavators, graders, backhoes, bulldozer, and trucks. As shown in Exhibit 4.11-2, construction activities for Phase 1 would result in noise levels of between approximately 68 to 79 dBA L_{eq} for the backyards of existing residences immediately west of the Project Site. Noise levels at these locations would be comparable to and sometimes noticeably higher than existing conditions of approximately 72 dBA L_{eq}, which was measured nearby these existing residences at the western edge of the Project Site. As indicated by existing noise levels, these residences are already significantly affected by existing traffic noise from SR-91 and Santa Ana Canyon Road. Due to the presence of the hillside atop which these existing residences are located, the second row of existing residences would be exposed to substantially less noise than the first row of residences would experience due to Project construction.

Phase Two of Construction

The second phase of the Project's construction would involve the development of the Project's proposed commercial uses and related improvements in the northeastern portion of the Project Site, which is located away from noise-sensitive uses, the closest of which is as close as 30 feet to the west of the Project Site. The locations of the modeled construction equipment for this construction phase are shown in Exhibit 4.11-3. As shown in Exhibit 4.11-3, the construction noise exposure levels at the existing off-site residential receptors would be relatively low. To the west and east of the construction area, existing residential uses would be exposed to construction noise levels in the low to high 40 dBA L_{eq} range which is considered to be equivalent to the "Quiet urban daytime" category that is provided in Caltrans guidance that is summarized in Table 4.11-1. This noise range would be [consistent with?] existing noise levels in and adjacent to the Project Site. The hotel that is located to the east of the construction activities would experience noise levels of 58 dBA from construction, which would be similar to existing noise levels.

Phase Three of Construction

The Project's third phase would involve construction of up to six single-family residential lots and related improvements on the southern portion of the Project Site. This portion of the Project Site is near existing residential uses that are located approximately 30 feet, to the west of the Project Site. As shown in Exhibit 4.11-4, construction noise exposure levels at these existing off-site single-family residences to the west of the Project Site would, at their maximum, be up to the low 70 dBA L_{eq} range during the third phase of construction. Existing

single-family residences to the east of the construction area for the Project's third phase would be exposed to noise levels in the high 30s to low 40s dBA L_{eq} range, which is also comparable to or below ambient noise levels. These noise levels would be lower due to the distance of the construction activities to these residences and the intervening hilly topography.

Conclusion

This analysis described, for purposes of full disclosure, the nature of the anticipated construction noise for each Project phase. A significant impact would occur if Project–related, noise producing construction activities would result in a substantial temporary increase in ambient noise levels in excess of the established standards. However, pursuant to AMC Section 6.70.010, "sound created by construction or building repair of any premises within the City shall be exempt from the applications of this chapter during the hours of 7:00 a.m. to 7:00 p.m. Additional work hours may be permitted if deemed necessary by the Director of Public Works or Building Official." Because the Project's construction activities would be required to comply with the City's construction noise limits, noise from construction activities from both construction traffic and equipment would result in a less than significant noise impact and no mitigation is required.

Operational Noise

Potential sources of noise during Project operation could include vehicle traffic, noise from the heating, ventilation, and air conditioning (HVAC) units, parking lot/loading and unloading activities and landscaping equipment as well as noise from use of the on-site recreational areas (the rooftop deck) by residents and members. Noise generated by these sources was quantified and assessed against the applicable noise limits established within the General Plan and AMC. Impacts from these noise sources are evaluated below.

Parking Lot and Landscaping Equipment Noise

Noise generated from parking lot loading and unloading activities and from landscaping equipment and other on-site sources within the Project Site was evaluated as part of this noise analysis. Noise similar to parking lot loading and unloading is already generated in the Project Site vicinity due to the existing presence of cars and roadways north, east, and west of the Project Site. Landscaping equipment would be required to be operated in accordance with requirements contained in AMC Chapter 6.70. Therefore, noise levels from parking areas and landscaping equipment would be substantially similar to existing ambient conditions.

Heating Ventilation and Air Conditioning

Noise associated with the Project's proposed buildings, including any HVAC systems, would be required to comply with the City's 60 dBA Leq noise limit identified in AMC Section 6.70.010.

The Project's HVAC systems for the commercial buildings and the single-family residential buildings would be located sufficiently far from the nearest existing off-site noise-sensitive uses and future on-site noise-sensitive land uses that these proposed HVAC systems would not result in an exceedance of the City's noise limit. This conclusions is based on intervening topography and distance, which would attenuate the noise.

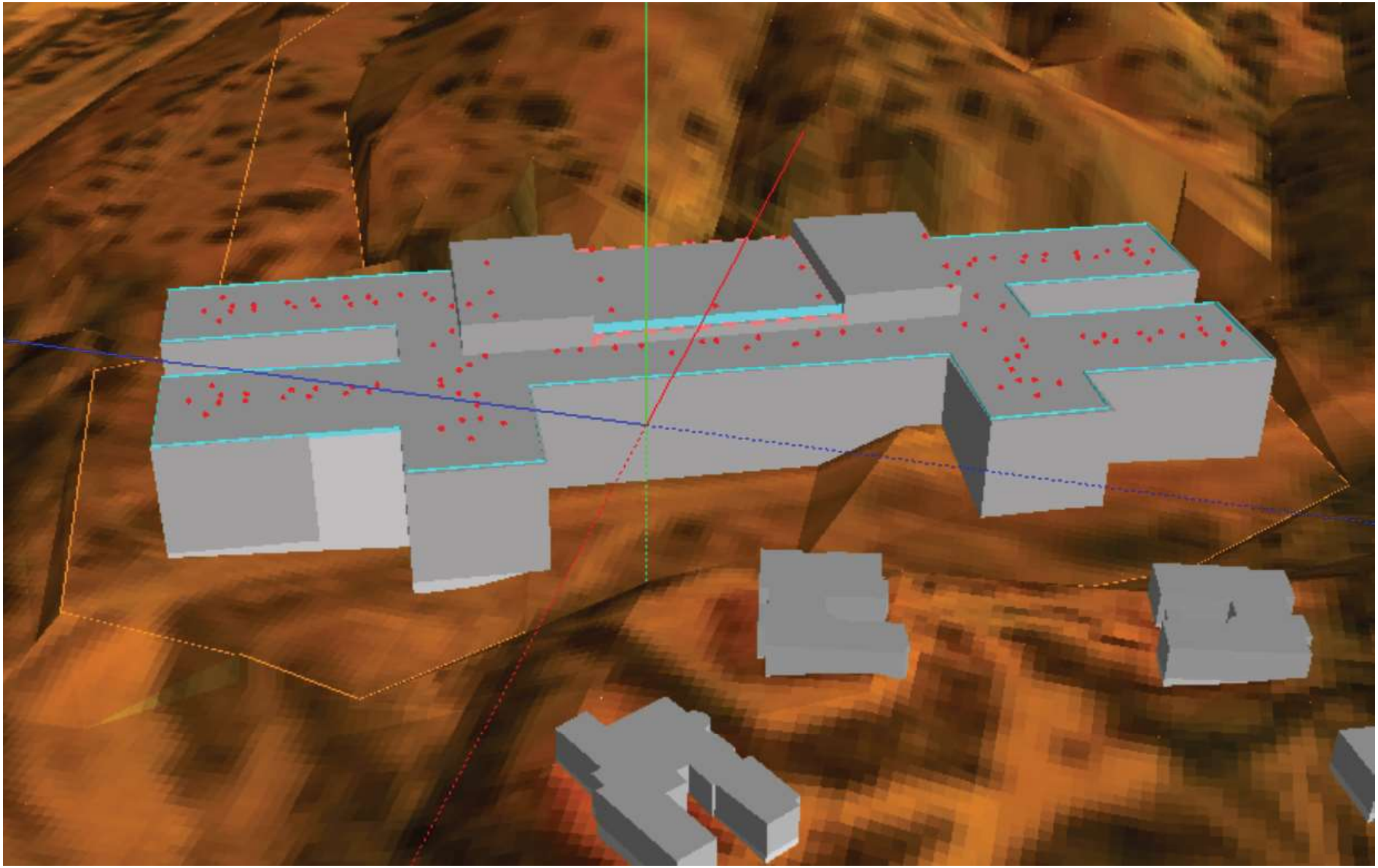
The Project's proposed multiple-family residential building would have a centralized HVAC system within the building itself; therefore, only exhaust vents would be located on the roof of the multiple-family residential building, which means that noise would be much less than would typically be the case with roof-mounted HVAC equipment. Exhibit 4.11-5 shows the approximate locations of the centralized HVAC system exhaust vents that would be installed on the roof of the multiple-family residential building. As indicated by the referenced architectural plans, there would be a rooftop parapet of at least 3 feet which would reduce noise exposure from the ventilation system that might be emitted from the vents. Noise generated by the HVAC system was modeled in SoundPlan Essentials using the reasonable worst-case assumption that each of the rooftop vents were to create the same amount of noise as a standard air conditioning unit. Exhibit 4.11-6 depicts the noise exposure levels at the closest offsite residential uses that would result. As shown in Exhibit 4.11-6, noise exposure levels at these existing off-site residential uses would be 52 dBA L_{eq} or less as a result of the HVAC system that would be installed in the Project's multiple-family residential building.

The Project's future rooftop deck users would be exposed to noise levels from the HVAC system of 52 dBA Leq or less.

Because the HVAC system would result in noise levels that are less than the City's 60 dBA Leq noise limit for neighboring properties and for future on-site users, the Project's HVAC system would adhere to the AMC and would not result in the generation of a substantial permanent increase in ambient levels of noise in excess of applicable standards, and thus impacts would be less than significant in this regard.

Rooftop Deck

The proposed multiple-family residential building would include a rooftop deck that would have amenities including an enclosed fitness center, an enclosed clubhouse, and outdoor amenities such as a swimming pool, spas, cabanas, fire bowls, lounging areas, and landscaped spaces. Hours of operation for all amenities would be from 5 AM to midnight, except for the enclosed fitness center which would always be open. These rooftop deck uses would generate noise from people talking and from amplified background music (Exhibit 4.11-7). Based on the rooftop deck operations memorandum prepared for the Project by the Property Owner/Developer on October 3, 2023, the use of common areas like the rooftop deck would be regulated by terms of each subject lease/membership agreement that would include prohibitions against loud noises and disturbances, which would be enforced by management through access denial, fines, membership termination, and in some cases, evictions. For example, the rooftop deck operations memorandum cites Page 7, Section 29 (g) of the subject lease form that would be used for the Project's multiple-family residential units, which states



D:\Projects\3ANA_BaseFiles\TheHills\Graphics\Noise\ex_HVAC_Locations_20240327.ai

HVAC Locations

Exhibit 4.11-5

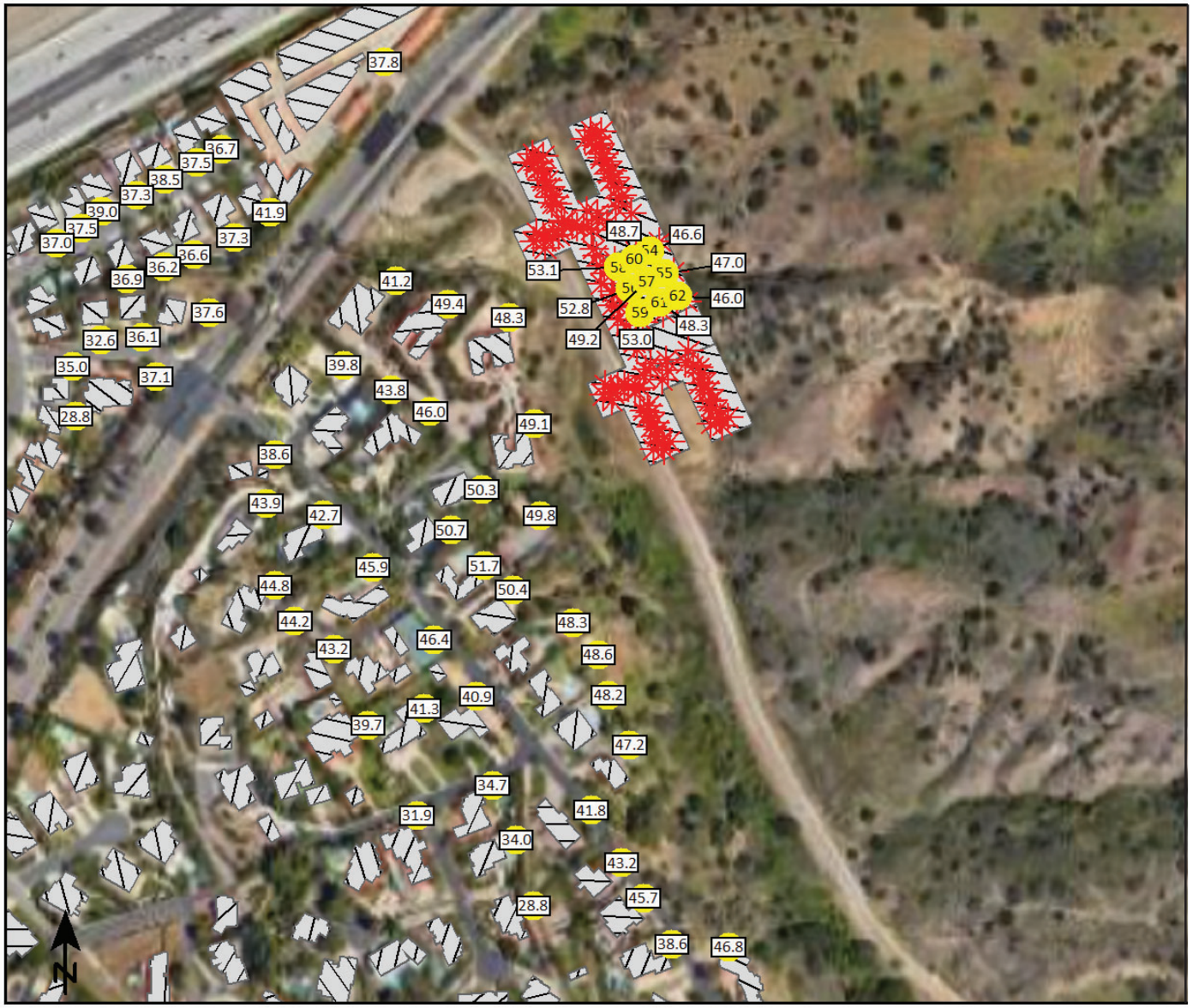
Hills Preserve Project

N
W E
S

Not to scale

PSOMAS

(06/17/2024 PLO) R:\Projects\ANA\3ANA009406\Graphics\DEIR\ex_HVAC Locations.pdf



D:\Projects\3ANA_BaseFiles\TheHills\Graphics\Noise\ex_HVAC_20240327.ai

HVAC Noise Exposure Levels

Exhibit 4.11-6

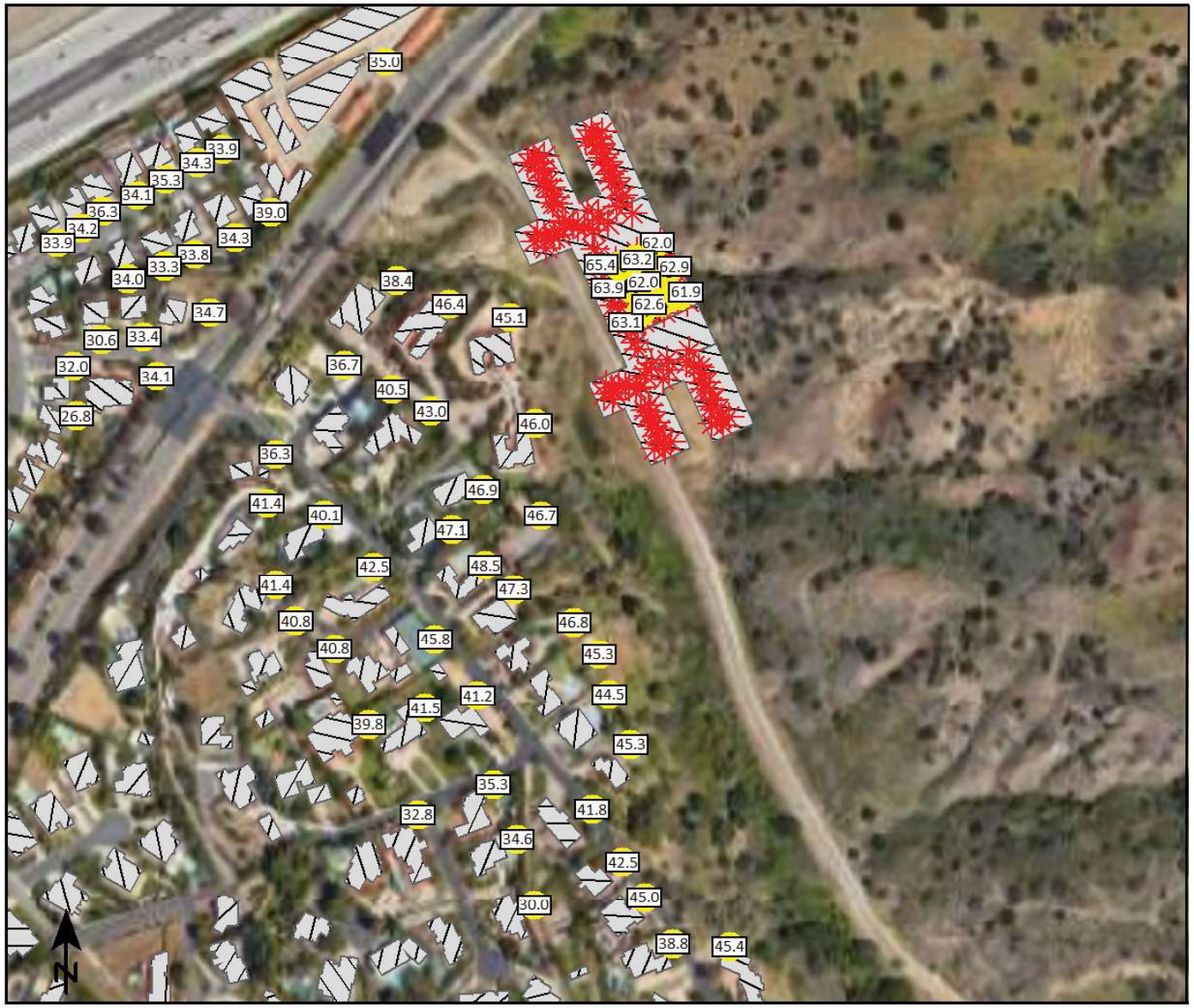
Hills Preserve Project

N
W E
S

Not to scale

PSOMAS

(06/17/2024 PLO) R:\Projects\ANA\3ANA009406\Graphics\DEIR\ex_HVAC_Noise_Exposure.pdf



Legend

- Wall
- Receiver
- Point source

HVAC, Speakers Casual, and Crowd Noise Exposure Levels

Exhibit 4.11-7

Hills Preserve Project

N
W E
S

Not to scale

PSOMAS

(06/17/2024 PLO) R:\Projects\ANA\3ANA009406\Graphics\DEIR\ex_HVAC_Speaker_Crowd.pdf

D:\Projects\3ANA_BaseFiles\TheHills\Graphics\Noise\ex_SpeakerVolume_20240416.ai

"Profanity, reckless activity, disruptive behavior or excessive noise will be immediate grounds for dismissal and/or permanent ban from the pool/hot tub areas." Subsection (r) of the form lease agreement further states "*Pool parties are prohibited without prior written consent by management. We are unable to provide reservations for any pool/hot tub area and we are unable to allow any type of group gathering in the pool area*." The operations memorandum further states "*Regarding noise management, we are committed to maintaining noise levels on the deck within the range of 50-60 dB, equivalent to normal conversation levels, enforced both day and night. Importantly, these noise levels will not exceed existing ambient noise levels of 70-80 dB, as measured from surrounding homes of Santa Ana Canyon Road and the 91 Freeway. All music is controlled by Management and at a level to allow easy conversations with your friends. Boom Boxes and other portable speakers are not allowed anywhere on the deck. Individuals are required to use earbuds out of respect for the other residents when at the Fitness Center or by the Pool and spas.*"

Based on the available information and reasonable assumptions, including those contained in the rooftop deck operations memorandum, SoundPlan Essentials was used to calculate projected noise levels that would result from the typical operations of the deck. The noise modeling assumed evenly distributed on-site receivers and offsite noise-sensitive receptors.

The noise modeling determined that noise levels at the rooftop deck would be between approximately 53-60 dBA L_{eq}, with much of this noise attributable to speakers (a total of eight speakers were assumed). Noise levels of this magnitude would be consistent with and below the low ambient noise levels necessary to avoid speech interference of rooftop deck users, which occurs at approximately 67 dBA (Caltrans 2020). Noise generated at the rooftop deck would be partially attenuated by the adjacent fitness center and clubhouse buildings as well as by a wall separating the west side of the deck from the rooftop where the HVAC exhaust vents would be located. This wall would further reduce noise exposure to the deck users from the HVAC system and would also further reduce noise from the deck uses to off-site receptors.

Regarding amplified speaker noise, Chapter 6.72 of the AMC regulates noise generated by amplified sound such as speakers used at the rooftop deck. The subsections of this Code that are applicable to the deck's operations are:

.020 In all residential zones and within two hundred feet of any boundary thereof, no sound-amplifying equipment shall be operated or used for noncommercial purposes between the hours of 8:00 p.m. and 8:00 a.m. of the following day.

.050 Sound emanating from sound-amplifying equipment shall not be audible to a person of normal hearing acuity within an enclosed building (other than a building within which the sound emanate) at a distance in excess of two hundred feet from the sound-amplifying equipment.

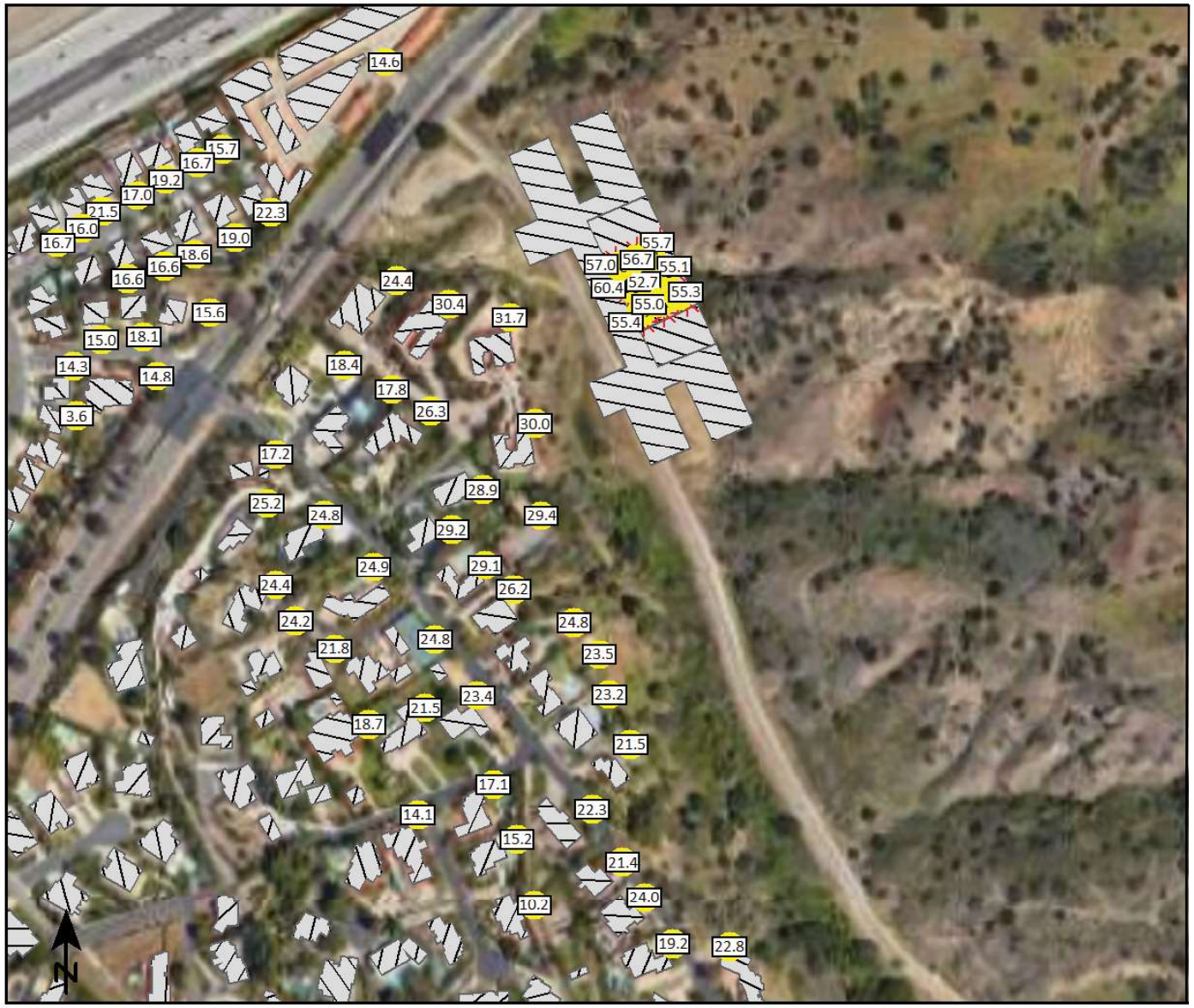
.060 In no event shall the sound-amplifying equipment be unreasonably loud, raucous, jarring or disturbing to a person of normal sensitiveness within the area of audibility, or disturb the peace or quiet of any neighborhood.

AMC Sections 6.72.020.020 through 6.72.020.040 that address noise sources in all residential zones and within 200 feet of residential zones apply to the Project. Also, AMC Section 6.72.020.050 and Section 6.72.020.060 apply to the Project which prohibit audible noise within an enclosed building and unreasonably loud, raucous, jarring or disturbing noises. Regarding the audibility of noise within an enclosed building (AMC Section 6.72.020.050), noise levels are attenuated by approximately 10 dBA from exterior to interior levels with windows open and 20 dBA with windows closed due to the building's structure (Caltrans 2013). Audibility of noise from a noise source is dependent on the volume of ambient background noise as well as differences between the noise source and ambient noise levels. As shown in Exhibit 4.11-8, rooftop deck users would be exposed to noise levels of 53-60 dBA L_{eq} from amplified speaker noise and would result in offsite noise exposure at the nearest existing residences of between 24-32 dBA L_{eq} which is well below measured ambient noise levels and not expected to be audible at the exterior of the existing residential uses closest to the deck since the pre-Project ambient noise level was measured at 72 dBA L_{eq}. Interior noise levels within these existing residential uses would be further reduced by 10-20 dBA by the structures themselves likely rendering the Project's operational noise inaudible for these receptors. As such, typical day-to-day activities would result in offsite noise exposure levels that are well within the City's 60 dBA L_{eq} noise limit.

Use of the rooftop deck would also involve speech from users as well as noise coming from swimming activity in the pool itself. To account for crowd noise, noise levels from 50 people simultaneously speaking in raised voices were estimated. A single person speaking in a raised voice is estimated to be 66 dBA at a listener 3 feet away (Hayne, Rumble, and Mee 2006). The 50 people were represented within SoundPlan Essentials at 10 locations spread out within the rooftop deck. The resulting noise levels for the Project's rooftop deck with crowd noise, ambient speaker system, and HVAC system are shown in Exhibit 4.11-7. As shown in Exhibit 4.11-7, off-site residential noise exposure levels are anticipated to range from 38-49 dBA L_{eq}. Noise exposure levels for rooftop deck users are estimated to range between 62-65 dBA L_{eq}.

Because noise exposure levels from the Project's operations, including the rooftop deck and the HVAC system and other sources, would not exceed the applicable AMC limits, the Project's operations phase noise levels would result in less than significant noise impacts.

To ensure that operational noise from the rooftop deck is maintained at levels assumed in this analysis, **MM NOI-1** would be implemented, which requires the Property Owner/Developer provide a form lease provision to the City for review and approval. The lease provision shall be included in all of the leases for the multiple-family residential units. The lease provision shall include the following minimum requirements for every tenant: (1) adherence to all applicable noise standards in the City's Municipal Code (including those relating to amplified sound in Section 6.72); and (2) adherence to applicable provisions of the Hills Preserve Skydeck (Roof Deck) Operations Memorandum (as it may be amended from time to time by Property Owner/Developer).



Legend

Wall

Receiver

Point source

D:\Projects\3ANA\ BaseFiles\TheHills\Graphics\Noise\ex_SpeakerCasual_20240416.ai

Speaker Noise Exposure Levels

Exhibit 4.11-8

Hills Preserve Project

N
W E
S

Not to scale

PSOMAS

(06/17/2024 PLO) R:\Projects\ANA\3ANA009406\Graphics\DEIR\ex_Speaker_Noise_Exposure.pdf

Traffic (Mobile Source) Noise

In community noise assessments, a 3-dBA increase in noise levels is considered "barely perceptible," and increases over 5 dBA in noise levels are generally considered "readily perceptible" (Caltrans 2009a). As discussed above, operation of the Project would generate new vehicular traffic that would not otherwise occur without the Project. The Project would result in an increase of approximately 3,239 trips per day and 314 trips during the AM peak hour and 320 trips in the PM peak hour (LLG 2023a). The corresponding increase in off-site traffic noise would range from 0.0 to 0.5 dBA for the analyzed roadway segments proximate to the Project Site. The modeled noise increases from the Project's traffic noise are quantified in Table 4.11-8. As shown therein, the traffic noise increases that would result from the Project would be well below 5 dBA, which would be readily perceptible to a receiver. Therefore, traffic noise resulting from the Project would not be perceptible and it would thereby not be a substantial impact.

Therefore, the Project's impact related to traffic noise levels would be less than significant and no mitigation is required.

TABLE 4.11-8
EXISTING AND PROJECTED TRAFFIC NOISE LEVELS

Roadways		Existing Traffic		Future No Project		Future No Project		Cumulative Plus Project Noise Increase from Existing	Project Only Increase
		ADT	*dBA CNEL*	*ADT*	*dBA CNEL*	*ADT*	*dBA CNEL*	*dBA CNEL*	*dBA CNEL*
Imperial Highway	north of Nohl Ranch	28,674	74.9	32,400	75.4	32,500	75.5	0.5	0.0
	north of 91 Freeway	63,015	79.3	69,400	79.7	69,700	79.7	0.4	0.0
Santa Ana Canyon Road	east of Via Cortez	31,147	76.2	33,300	76.5	34,100	76.6	0.4	0.1
	east of Anaheim Hills Road	26,220	75.5	27,100	75.6	28,500	75.8	0.4	0.2
	east of Fairmont Boulevard	22,126	74.7	22,400	74.8	25,000	75.2	0.5	0.5
	east of Eucalyptus Drive	20,419	75.2	22,800	75.7	24,500	76.0	0.8	0.3
	east of Festival Center	18,764	74.0	21,600	74.6	22,500	74.8	0.8	0.2

ADT: average daily traffic volume. CNEL: Community Noise Equivalent Level. s/o South of. n/o North of. e/o East of.

Note: Noise levels calculated from the FHWA's RD-77-108 Traffic Noise Prediction Model (Calculations can be found in Appendix M). Noise levels calculated at 50 feet from the roadway centerline.

Source: Psomas 2023d, which is provided as Appendix M.

Conclusion

AB 1307 states that "…noise generated by project occupants and their guests on human beings is not a significant effect on the environment for residential projects for purposes of CEQA." As such, through compliance with the noise limits established within the General Plan

and the AMC as well as due to AB 1307, and with implementation of **MM NOI-1,** the Project would result in a less than significant impact related to operational noise.

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

Less Than Significant Impact.

Construction Impacts

The City has not adopted any standards related to vibration-induced annoyance or structural damage caused from vibration. However, Caltrans has adopted vibration damage thresholds, which are shown in Table 4.11-9, which are used to assess the potential for structural damage from vibration to occur for the proposed Project. For residential buildings that are near project sites, 0.5 ppv is the applicable vibration damage threshold using the Caltrans thresholds.

TABLE 4.11-9
VIBRATION DAMAGE THRESHOLD CRITERIA

Structure and Condition	Maximum ppv (in/sec)	
	Transient Sources	Continuous/Frequent Intermittent Sources
Extremely fragile historic buildings, ruins, ancient monuments	0.12	0.08
Fragile buildings	0.2	0.1
Historic and some old buildings	0.5	0.25
Older residential structures	0.5	0.3
New residential structures	1.0	0.5
Modern industrial/commercial buildings	2.0	0.5

ppv: peak particle velocity; in/sec: inch(es) per second

Note: Transient sources create a single isolated vibration event, such as blasting or drop balls. Continuous/frequent intermittent sources include impact pile drivers, pogo-stick compactors, crack-and-seat equipment, vibratory pile drivers, and vibratory compaction equipment.

Source: Caltrans 2013a.

Caltrans has also established vibration annoyance thresholds, which are shown in Table 4.11-10. These thresholds are used to assess the potential for a significant vibration impact to occur that causes human annoyance. Annoyance is evaluated within occupied buildings. The vibration annoyance response of "distinctly perceptible" of 0.24 ppv provides a conservative significance threshold because it is perceptible but is less objectionable than strong or severe levels of vibration.

TABLE 4.11-10
VIBRATION ANNOYANCE
THRESHOLDS

Average Human Response	ppv (in/sec)
Severe	2.0
Strongly perceptible	0.9
Distinctly perceptible	0.24
Barely perceptible	0.035
ppv: peak particle velocity; in/sec: inch(es) per second Source: Caltrans 2013a.	

Site development, asphalt removal, excavation, and repaving would occur at the Project Site. These construction activities would generate vibration since these activities involve the use of typical off-road vehicles and stationary equipment. Given the nature of the Project Site and proposed uses, it is expected that neither pile driving nor blasting would be used during construction of the Project. A summary of typical vibration levels associated with construction activities for various vibration-inducing pieces of equipment that would be used for the Project's construction are provided in Table 4.11-11.

TABLE 4.11-11
VIBRATION LEVELS FOR
CONSTRUCTION EQUIPMENT

Equipment	ppv at 25 ft (in/sec)
Vibratory roller	0.210
Large bulldozer	0.089
Caisson drilling	0.089
Loaded trucks	0.076
Jackhammer	0.035
Small bulldozer	0.003
ppv: peak particle velocity; ft: feet; in/sec: inches per second. Source: Caltrans 2013a; FTA 2006a.	

Vibration is transmitted in proximity to sources. Residential, hotel commercial and recreational uses are located proximate to the Project. To evaluate the Project's vibration effects, the vibration from construction equipment was assessed for the existing off-site buildings that are closest to the Project's construction areas. A summary of the anticipated vibration levels (measured in ppv) at each of the off-site structure locations are provided in Table 4.11-12.

TABLE 4.11-12
ESTIMATED VIBRATION LEVELS AT NEAR RECEPTORS

Construction Phase	Vibration Level (ppv)	Vibration Threshold (Building Damage/Annoyance ppv)	Exceeds
North -Yorba Regional Park Pavilion at approx. 1,255 feet from Structure			
Vibratory roller	0.001	0.5/0.24	No
Large bulldozer	0.000		
Small bulldozer	0.000		
Jackhammer	0.000		
Loaded trucks	0.000		
Western Boundary Assessed at approx. 30 feet from Residential Structure			
Vibratory roller	0.160		
Large bulldozer	0.068	0.5/0.24	No
Small bulldozer	0.002		
Jackhammer	0.027		
Loaded trucks	0.058		
Southern Boundary Assessed at approx. 270 feet from Structure			
Vibratory roller	0.006		
Large bulldozer	0.003	0.5/0.24	No
Small bulldozer	0.000		
Jackhammer	0.001		
Loaded trucks	0.002		
Eastern Boundary Assessed at approx. 505 feet from Structure			
Vibratory roller	0.002		
Large bulldozer	0.001	0.5/0.24	No
Small bulldozer	0.000		
Jackhammer	0.000		
Loaded trucks	0.001		
ppv: peak particle velocity Vibration calculations are provided in Appendix M.			

As shown in Table 4.11-12, vibration levels for existing off-site buildings would not exceed the building damage and annoyance thresholds, even when construction activities occur right at the edge of the Project's construction limits, nor would vibration levels be discernable at any of the off-site buildings that were analyzed.

Groundborne noise refers to noise generated by groundborne vibration. More specifically, groundborne noise is the low-frequency rumbling noise emanating from the motion of building room surfaces due to the vibration of floors and walls; it is perceptible only inside buildings. The relationship between groundborne vibration and groundborne noise depends on the frequency content of the vibration and the acoustical absorption characteristics of the receiving room. According to the FTA, airborne noise levels are usually higher than

groundborne noise levels (FTA 2018a). Therefore, unless indoor receptors have substantial sound insulation (e.g., a recording studio) and would be exposed to vibration velocities great enough to cause substantial levels of groundborne noise, groundborne noise does not need to be assessed. There do not appear to be any substantially insulated indoor receptors located within the area surrounding the Project Site. Therefore, the effects of airborne noise would continue to be higher than groundborne noise levels. In addition, groundborne noise generated by a large bulldozer within five feet of a receptor building would reach an approximate level of 58 dBA, which is not greater than the airborne noise levels generated by construction equipment. As such, impacts related to groundborne noise are not discussed further.

Operational Impacts

During operation of the Project, the primary source of potential vibration would be from vehicles. The streets surrounding the Project Site are paved, smooth, and unlikely to cause significant ground-borne vibration from new vehicular trips that would be generated during ongoing operation of the Project. In addition, the rubber tires and suspension systems of trucks, buses, and other on-road vehicles make it unusual for on-road vehicles to cause ground-borne noise or vibration issues. Otherwise, the operation of the Project would not generate any substantial vibration effects.

Therefore, the Project would result in a less than significant impact related to this threshold and no mitigation is required.

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

No Impact. The Project Site is located approximately 14 miles northeast of John Wayne Airport and 12 miles east of the Fullerton Municipal Airport and is not located within the planning area for the Airport Environs Land Use Plan for John Wayne Airport (OC ALUC 2008a) or Airport Environs Land Use Plan for Fullerton Municipal Airport (OC ALUC 2019a). In addition, the Corona Municipal Airport and Chino Airport are both located approximately 9 miles northeast of the Project site. Due to the large distance between the Project Site and the nearest airports, aircraft overflights do not significantly contribute to the noise environment at the Project Site.

The Project Site is not located within the vicinity of a private airstrip. The nearest heliport is located at the Anaheim Canyon Tower Heliport which is located approximately 5 miles to the west of the Project Site. Due to the distance between the Project Site and the heliport, noise from helicopter flights would not exceed the 65 dBA CNEL noise level.

Therefore, the Project would result in no impact related to this threshold and no mitigation is required.

4.11.5 CUMULATIVE IMPACTS

The geographic scope of the cumulative noise analysis is limited by the range of potential noise impacts. Noise impacts tend to be localized; therefore, noise impacts for traffic (mobile) and stationary noise sources are limited to approximately 500 feet from the source. Past, present and reasonably foreseeable future developments within the geographic scope are considered. The Project vicinity has a number of existing uses; however, as noted on the list of cumulative projects shown in Table 4-1 of this Draft EIR, the nearest known future cumulative project (DEV2023-00043) is located approximately 0.5 mile away and thus there are no known future cumulative projects within 500 feet of the Project Site.

This analysis evaluates whether impacts of the proposed Project, together with impacts of other cumulative development, would result in a cumulatively significant impact with respect to noise. This analysis then considers whether incremental contribution of the impacts associated with implementation of the proposed project would be significant. Both conditions must apply for cumulative effects to rise to the level of significance.

Cumulative Short term (Construction) Noise and Vibration Impact

Adverse noise and vibration impacts during construction of the Project, as well as other cumulative development, would be localized and would occur intermittently for varying periods of time throughout the construction period. Short-term cumulative impacts related to ambient noise and vibration levels could occur if construction associated with the proposed Project as well as other cumulative development were to occur simultaneously. Noise or vibration associated with construction of the proposed Project in combination with other cumulative projects within approximately 500 feet of the Project Site could result in a cumulative noise level greater than the noise generated solely at the Project Site. However, any such increased noise level would not exceed applicable standards since construction noise is exempted from the same Due to the localized nature of construction noise impacts and the fact that construction noise is exempted from otherwise applicable AMC noise standards, no cumulative construction noise impact would result. Moreover, it is anticipated that the Project, as well as other cumulative developments, would incorporate various standard construction-related best management practices, similar to the ones noted above. For this same reason, the Project's contribution to this already less than significant construction noise impact would not be cumulatively considerable.

With respect to cumulative construction-related vibration impacts, given the distance between the cumulative projects and the Project Site, no substantial cumulative impacts would result.

Cumulative Long-Term (Operation) Noise Impact

The Project and other cumulative projects would result in cumulative long-term noise impacts related to on-site uses. Noise from on-site operations would be required to comply with requirements from the AMC, which would ensure no cumulative noise impacts would result from on-site facilities, uses, and users.

Cumulative Traffic (Mobile Source) Noise

Cumulative traffic noise impacts are measured based on projected long-term future traffic noise level increases over existing conditions. This analysis considers the forecasted traffic volumes in the Post-2035 scenario (build-out of the General Plan) plus all other relevant cumulative projects. This is inclusive of the cumulative growth associated with the long-term socioeconomic projections (OCP-2014) and the relevant cumulative projects contributing to traffic on the nearby street network. Long-term cumulative off-site impacts from traffic noise are measured as follows. First, a substantial cumulative noise increase would occur if future traffic noise levels were to increase by more than 5 dBA compared to existing conditions, which would represent a readily perceptible change in the noise environment. Second, the following three criteria must be met for a significant impact to be identified: (1) the roadway segment is adjacent to a noise-sensitive land use; (2) the resulting future With-Project noise level must exceed the criteria level for the noise-sensitive land use (i.e., 65 dBA CNEL for residential, schools, hospitals, and places of worship); and (3) the Project contributes to the cumulative noise exceedance for the noise-sensitive land use.

For the Post-2035 cumulative scenario, a total of 301 roadway segments were evaluated. Table 4.11-8 shows that cumulative noise level increases greater than 3 dBA are projected to occur along 25 roadway segments when compared to Existing Conditions. However, the Project contribution to the traffic noise level increases at those roadway segments would be less than 1 dBA. Thus, the cumulative traffic noise impact would be less than significant.

4.11.6 MITIGATION PROGRAM

MM NOI-1: The Property Owner/Developer provide a form lease provision to the City for review and approval. The lease provision shall be included in all of the leases for the multiple-family residential units. The lease provision shall include the following minimum requirements for every tenant: (1) adherence to all applicable noise standards in the City's Municipal Code (including those relating to amplified sound in Section 6.72); and (2) adherence to applicable provisions of the Hills Preserve Skydeck (Roof Deck) Operations Memorandum (as it may be amended from time to time by Property Owner/Developer).

4.11.7 SIGNIFICANCE AFTER MITIGATION

With implementation of **MM NOI-1**, the Project would result in less than significant impacts related to noise.