5.5 NOISE

This section discusses the fundamentals of sound; examines federal, state, and local noise guidelines, policies, and standards; reviews noise levels at existing receptor locations; and evaluates potential noise impacts associated with the Proposed Project.

Terminology

Noise is most often defined as unwanted sound. Although sound can be easily measured, the perception of noise and the physical response to sound complicate the analysis of its impact on people. People judge the relative magnitude of sound sensation in subjective terms such as "noisiness" or "loudness." The following are brief definitions of terminology used in this chapter:

- **Sound.** A vibratory disturbance that, when transmitted by pressure waves through a medium such as air, is capable of being detected by a receiving mechanism, such as the human ear or a microphone.

- **Noise**. Sound that is loud, unpleasant, unexpected, or otherwise undesirable.

- **Hertz (Hz)**. A unit of frequency of change in state or cycle in a sound wave. The nearly universal usage is one (complete) cycle in one second. The unit 'Hertz', named after the German physicist Heinrich Hertz (1857-1894) replaces the previous 'cycles per second (cps)' nomenclature.

- **Decibel (dB)**. A unitless measure of sound on a logarithmic scale, which indicates the squared ratio of sound pressure amplitude to a reference sound pressure amplitude. The reference pressure is 20 micro-pascals (20 μPa).

- **Vibration Decibel (VdB).** A unitless measure of vibration, expressed on a logarithmic scale and with respect to a defined reference vibration velocity. In the United States, the standard reference velocity is 1 micro-inch per second ($1x10^{-6}$ in/sec).

- **A-Weighted Decibel (dBA).** An overall frequency-weighted sound level in decibels that approximates the frequency response of the human ear.

- **Equivalent Continuous Noise Level (L_{eq}), or Energy-Equivalent Noise Level.** The value of an equivalent, steady sound level that, in a stated time period (often over an hour) and at a stated location, has the same A-weighted sound energy as the time-varying sound. Thus, the L_{eq} metric is a single numerical value that represents the equivalent amount of variable sound energy received by a receptor over the specified duration.

- **Statistical Sound Level (L_n).** The sound level that is exceeded "n" percent of time during a given sample period. For example, the L_{50} level is the statistical indicator of the time-varying noise signal that is exceeded 50 percent of the time (during each sampling period); that is, half of the sampling time, the changing noise levels are above this value and half of the time they are below it. This is called the "median sound level." The L_{10} level, likewise, is the value that is exceeded 10 percent of the time (i.e., near the maximum), and this is often known as the "intrusive sound level." The L_{90} is the sound level exceeded 90 percent of the time and is often considered the "effective background level" or "residual noise level."

- **Day-Night Level (L_{dn} or DNL).** 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 during the period from 10 PM to 7 AM.
- **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 during the period from 7 PM to 10 PM and 10 dB added to the A-weighted sound levels occurring during the period from 10 PM to 7 AM. For general community/environmental noise, CNEL and L_{dn} values rarely differ by more than 1 dB. As a matter of practice for community noise environments, L_{dn} and CNEL values are interchangeable and are treated as equivalent in this assessment.
- **Sensitive Receptor.** Noise- and vibration-sensitive receptors include land uses where quiet environments are necessary for enjoyment and public health and safety. Residences, schools, motels and hotels, libraries, religious institutions, hospitals, and nursing homes are examples.

5.5.1 Environmental Setting

In addition to the following subsections on noise and vibration fundamentals, existing regulations, and pertinent technical standards, Appendix E of this DEIR provides supplementary, Project-specific background information, construction effects calculation worksheets, and Project-generated traffic operations noise modeling results.

5.5.1.1 SOUND FUNDAMENTALS

When an object vibrates, it radiates part of its energy in the form of a pressure wave. Sound is that pressure wave transmitted through the air. Technically, airborne sound is a rapid fluctuation or oscillation of air pressure above and below atmospheric pressure that creates sound waves. Sound is described in terms of loudness or amplitude (measured in dB), frequency or pitch (measured in Hertz [Hz] or cycles per second), and duration or time variations (measured in seconds or minutes).

Amplitude: The range of pressures that causes airborne vibrations (i.e., sound) is quite large and would be cumbersome to measure lineally. Therefore, noise is measured on a logarithmic scale, which has a more manageable range of numbers, and a decibel (dB) is the standard unit for measuring sound pressure amplitude.[1] All noise levels in this study—reported in terms of dB—are relative to the industry-standard reference sound pressure of 20 micropascals.

[1] The commonly held threshold of audibility is 20 micropascals, and the threshold of pain is around 200 million micropascals, a ratio of one to 10 million. By converting these pressures to a logarithmic scale (i.e., decibels), the range becomes a more convenient 0 dB to 140 dB.

On a logarithmic scale, an increase of 10 dB is 10 times more intense than 1 dB, 20 dB is 100 times more intense, and 30 dB is 1,000 times more intense. A sound as soft as human breathing is about 10 times greater than 0 dB. The decibel system of measuring sound gives a rough connection between the physical intensity of sound and its perceived loudness to the human ear. Ambient sounds generally range from 30 dBA (very quiet) to 100 dBA (very loud). Changes of 1 to 3 dB are detectable under quiet, controlled conditions, and changes of less than 1 dB are usually not discernible (even under ideal conditions). A 3 dB change in noise levels is considered the minimum change that is detectable with human hearing in outside environments. A change of 5 dB is readily discernible to most people in an exterior environment, and a 10 dB change is perceived as a doubling (or halving) of the sound. These relationships are summarized in Table 5.5-1.

Table 5.5-1 Noise Perceptibility

± 3 dB	Threshold of human perceptibility
± 5 dB	Clearly noticeable change in noise level
± 10 dB	Half or twice as loud
± 20 dB	Much quieter or louder

Source: Bies and Hansen 2009.

Frequency: The human ear is not equally sensitive to all frequencies. Sound waves below 16 Hz are not heard at all, but “felt” more as a vibration. Similarly, though people with extremely sensitive hearing can hear sounds as high as 20,000 Hz, most people cannot hear above 15,000 Hz. In all cases, hearing acuity falls off rapidly above about 10,000 Hz and below about 200 Hz.

When describing sound and its effect on a human population, A-weighted (dBA) sound levels are typically used to approximate the response of the human ear. The term “A-weighted” refers to a filtering of the noise signal in a manner corresponding to the way the human ear perceives the intensities of different frequencies of sound. The A-weighted noise level has been found to correlate well with people’s judgments of the “noisiness” of different sounds and has been used for many years as a measure of community and industrial noise.

Since most people do not routinely work with decibels or A-weighted sound levels, it is often difficult to appreciate what a given sound pressure level number means. To help relate noise level values to common experience, Table 5.5-2 shows typical noise levels from noise sources.

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Table 5.5-2 Typical Noise Levels

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
Onset of physical discomfort	120+	
	110	Rock Band (near amplification system)
Jet Flyover at 1,000 feet		
	100	
Gas Lawn Mower at three feet		
	90	
Diesel Truck at 50 feet, at 50 mph		Food Blender at 3 feet
	80	Garbage Disposal at 3 feet
Noisy Urban Area, Daytime		
	70	Vacuum Cleaner at 10 feet
Commercial Area		Normal speech at 3 feet
Heavy Traffic at 300 feet	60	
		Large Business Office
Quiet Urban Daytime	50	Dishwasher Next Room
Quiet Urban Nighttime	40	Theater, Large Conference Room (background)
Quiet Suburban Nighttime		
	30	Library
Quiet Rural Nighttime		Bedroom at Night, Concert Hall (background)
	20	
		Broadcast/Recording Studio
	10	
Lowest Threshold of Human Hearing	0	Lowest Threshold of Human Hearing

Source: Caltrans 2009.

Although the A-weighted scale and the energy-equivalent metric are commonly used to quantify the range of human response to individual events or general community sound levels, the degree of annoyance or other response also depends on several other perceptibility factors, including:

- Ambient (background) sound level
- General nature of the existing conditions (e.g., quiet rural or busy urban)
- Difference between the magnitude of the sound event level and the ambient condition
- Duration of the sound event
- Number of event occurrences and their repetitiveness
- Time of day that the event occurs

Temporal Effects: Time variation in noise exposure is typically expressed in terms of a steady-state energy level equal to the energy content of the time varying period (called L_{eq}), or alternately, as a statistical description of the sound level that is exceeded over some fraction of a given observation period. For example, the L_{50} noise level represents the noise level that is exceeded 50 percent of the time; half the time the noise level exceeds this level and half the time the noise level is less than this level. This level is also representative of the level that is exceeded 30 minutes in an hour. Similarly, the L_2, L_8 and L_{25} values represent the noise levels that are exceeded 2, 8, and 25 percent of the time or 1, 5, and 15 minutes per hour, respectively. These "n" values are typically used to demonstrate compliance for stationary noise sources with many cities' noise ordinances. Other values typically noted during a noise survey are the L_{min} and L_{max}. These values represent the minimum and maximum root-mean-square noise levels obtained over the measurement period, respectively.

Because community receptors are more sensitive to unwanted noise intrusion during the evening and at night, state law and many local jurisdictions use an adjusted 24-hour noise descriptor called the Community Noise Equivalent Level (CNEL) or Day-Night Noise Level (L_{dn}). The CNEL descriptor requires that an artificial increment (or "penalty") of 5 dBA be added to the actual noise level for the hours from 7:00 PM to 10:00 PM and 10 dBA for the hours from 10:00 PM to 7:00 AM. The L_{dn} descriptor uses the same methodology except that there is no artificial increment added to the hours between 7:00 PM and 10:00 PM. Both descriptors give roughly the same 24-hour level, with the CNEL being only slightly more restrictive (i.e., higher). The CNEL or L_{dn} metrics are commonly applied to the assessment of roadway and airport-related noise sources.

Propagation: Sound dissipates exponentially with distance from the noise source. This phenomenon is known as "spreading loss." For a single-point source, sound levels decrease by approximately 6 dB for each doubling of distance from the source (conservatively neglecting ground attenuation effects, air absorption factors, and barrier shielding). For example, if a backhoe at 50 feet generates 84 dBA, at 100 feet the noise level would be 79 dBA, and at 200 feet it would be 73 dBA. This drop-off rate is conservative and is appropriate for noise generated by onsite operations from stationary equipment/activities at a project site. This approach is commonly used for construction equipment noise evaluations. For more detailed assessments, if ground-level absorptive vegetation or other "soft site" conditions are considered, the distance attenuation (drop-off) rate would be increased by 1.5 dB per distance doubling; for a total of 7.5 dB per propagation distance doubling.

If noise is produced by a line source, such as highway traffic, the sound decreases by 3 dB for each doubling of distance over a reflective ("hard site") surface such as concrete or asphalt. Line source noise in a relatively flat environment with ground-level absorptive vegetation decreases by 4.5 dB for each doubling of distance.

Psychological and Physiological Effects of Noise

Physical damage to human hearing begins at prolonged exposure to noise levels higher than 85 dBA. Exposure to high noise levels affects the entire system, with prolonged noise exposure in excess of 75 dBA increasing body tensions, thereby affecting blood pressure and functions of the heart and the nervous system. Extended periods of noise exposure above 90 dBA results in permanent cell damage, which is the main driver for hearing protection regulations in the workplace. When the noise level reaches 120 dBA, an unpleasant "tickling" sensation occurs in the human ear; even with short-term exposure. This is called the threshold of feeling. As the sound reaches 140 dBA, the tickling sensation becomes painful, and this is called the threshold of pain. A sound level of 160 to 165 dBA will result in dizziness or loss of equilibrium. In community environments, the ambient or background noise problem is widespread, though generally worse in urban areas than in outlying, less-developed areas. Elevated ambient noise levels can result in noise interference (e.g., speech interruption/masking, sleep disturbance, disturbance of concentration) and cause annoyance.

Loud noise can be annoying and it can have negative health effects (USEPA 1978). The effects of noise on people fall into three general categories:

- Subjective effects, i.e., annoyance, nuisance, dissatisfaction.
- Interference with activities such as speech, sleep, learning.
- Physiological effects such as startling and hearing loss (temporary and permanent).

In most cases, environmental noise produces effects in the first two categories only. However, unprotected workers in some industrial work settings may experience noise effects in the last category.

5.5.1.2 VIBRATION FUNDAMENTALS

Vibration is an oscillatory motion through a solid medium in which the motion's amplitude can be described in terms of displacement, velocity, or acceleration. Vibration is normally associated with activities stemming from operations of railroads or vibration-intensive stationary sources, but can also be associated with construction equipment such as jackhammers, pile drivers, and hydraulic hammers.

Like noise, vibration is transmitted in waves, but through the earth or solid objects. Unlike noise, vibration is typically of a frequency that is felt rather than heard. Vibration can be either natural as in the form of earthquakes, volcanic eruptions, sea waves, landslides, or man-made as from explosions, the action of heavy machinery or heavy vehicles such as trains. Both natural and man-made vibration may be continuous such as from operating machinery, or transient as from an explosion. As with noise, vibration can be described by both its amplitude and frequency.

Amplitude: Vibration amplitude may be characterized in three ways: displacement, velocity, and acceleration. 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 the velocity, and the rate of change of the speed is the acceleration. Each of these descriptors can be used to correlate vibration to human response, building damage, and acceptable equipment vibration levels. During construction, the operation of construction equipment can cause groundborne vibration. During the operational phase of a project, 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.

Vibration amplitudes are usually described in terms of either the peak particle velocity (PPV) or the root mean square (RMS) velocity. PPV is the maximum instantaneous peak of the vibration signal, and RMS is the square root of the average of the squared amplitude of the signal. PPV is more appropriate for evaluating potential building damage, and RMS is typically more suitable for evaluating human response.

The units for PPV and RMS velocity are normally inches per second (in/sec). However, vibration is often presented and discussed in dB units in order to compress the range of numbers. In this study, PPV and RMS velocities are in in/sec, and vibration levels are in dB relative to 1 microinch per second (abbreviated as VdB). Typically, groundborne vibration generated by human activities attenuates rapidly with distance from the source of the vibration. Man-made vibration problems are therefore usually confined to relatively short distances from the source (500 to 600 feet or less).

Frequency: Vibrations also vary in frequency, and this affects perception. Typical construction vibrations fall in the 10 to 30 Hz range and usually occur around 15 Hz. Traffic vibrations exhibit a similar range of frequencies; however, buses often generate frequencies around 3 Hz at high vehicle speeds due to their suspension systems. It is less common, but possible, to measure traffic frequencies above 30 Hz.

Temporal Effects: Vibration may be comprised of a single pulse, a series of pulses, or a continuous oscillatory motion. The frequency of the vibrations describes how rapidly the object is oscillating, and is measured in Hertz (Hz). Most environmental vibrations consist of a composite, or spectrum, of many frequencies and are generally classified as broadband or random vibrations. The normal frequency range of most ground-borne vibration that can be felt generally starts from a low frequency of less than 1 Hz to a high of approximately 200 Hz. Time variations in vibrational energy often become quite complex (in both the time and frequency domains) due to the coupling dynamics of the various source, propagation, and receptor structures. As such, there are no readily-implemented vibration-related metrics that are directly analogous to the noise-related metrics of L_{eq} or the statistical sound levels (both defined and discussed above).

Human sensitivity to vibration temporal effects varies by frequency and by person, but generally people are more sensitive to low-frequency vibration. Human annoyance is also related to the number and duration of events. The more events or the greater the duration, the more annoying it will be to humans.

Propagation: As with sound moving through the air, the way in which vibration is transmitted through the earth is called propagation. Propagation of groundborne vibrations is complicated and difficult to predict because of the endless variations in the soil and rock through which waves travel. There are three main types of vibration propagation: surface, compression and shear waves. Surface waves, or Raleigh waves, travel along the ground's surface. These waves carry most of their energy along an expanding circular wave front, similar to ripples produced by throwing a rock into a pool of water. Compression waves, or P-waves, are body waves that carry their energy along an expanding spherical wave front. The particle motion in these waves is longitudinal (i.e., in a "push-pull" fashion). P-waves are analogous to airborne sound waves. Shear waves, or S-waves, are also body waves that carry energy along an expanding spherical wave front. However, unlike P-waves, the particle motion is transverse or side-to-side and perpendicular to the direction of propagation. As vibration waves propagate from a source, the energy is spread over an ever-increasing area so that the energy level striking a given point decreases with distance from the energy source. This geometric spreading loss is inversely proportional to the square of the distance. Wave energy is also reduced with distance as a result of material damping in the form of internal friction, soil layering, and void spaces. The amount of attenuation provided by material damping varies with soil type and condition as well as the frequency of the wave.

Psychological and Physiological Effects of Vibration

As with airborne sound, annoyance with vibrational energy is a subjective measure, depending on the level of activity and the sensitivity of the individual. To sensitive individuals, vibrations approaching the threshold of perception can be annoying. Persons accustomed to elevated ambient vibration levels, such as in an urban environment, may tolerate higher vibration levels. Table 5.5-3 displays the human response and the effects on buildings resulting from continuous vibration (in terms of various levels of PPV).

Table 5.5-3 Human Reaction to Typical Vibration Levels

Vibration Level, PPV (in/sec)	Human Reaction	Effect on Buildings
0.006–0.019	Threshold of perception, possibility of intrusion	Vibrations unlikely to cause damage of any type
0.08	Vibrations readily perceptible	Recommended upper level of vibration to which ruins and ancient monuments should be subjected
0.10	Level at which continuous vibration begins to annoy people	Virtually no risk of “architectural” (i.e. not structural) damage to normal buildings
0.20	Vibrations annoying to people in buildings	Threshold at which there is a risk to “architectural” damage to normal dwelling – houses with plastered walls and ceilings
0.4–0.6	Vibrations considered unpleasant by people subjected to continuous vibrations and unacceptable to some people walking on bridges	Vibrations at a greater level than normally expected from traffic, but would cause “architectural” damage and possibly minor structural damage

Source: Caltrans 2004.

Human response to ground vibration has been correlated best with the velocity of the ground, typically expressed in terms of the vibration decibel or VdB.[2] The US Federal Transit Administration (FTA) has developed rational vibration limits that can be used to evaluate human annoyance to groundborne vibration. These criteria are primarily based on experience with rapid transit and commuter rail systems (FTA 2008). Railroad and transit operations are potential sources of substantial ground vibration depending on distance, the type and the speed of trains, and the type of track. Trains generate substantial vibration due to their engines, steel wheels, heavy loads, and wheel-rail interactions.

Physical Effects of Vibration

Similarly, construction operations generally include a wide range of activities that can generate groundborne vibration, which varies in intensity. In general, blasting and demolition as well as pile driving and vibratory compaction equipment generate the highest vibrations. Because of the impulsive nature of such activities, PPV is used to measure and assess groundborne vibration and assess the potential of vibration to induce structural damage and annoyance for humans. Vibratory compactors or rollers, pile drivers, and pavement breakers can generate perceptible amounts of vibration at up to 200 feet. Heavy trucks can also generate

2 The reference velocity is 1 x 10-6 in/sec RMS, which equals 0 VdB, and 1 in/sec equals 120 VdB.

groundborne vibrations, which can vary, depending on vehicle type, weight, and pavement conditions. Potholes, pavement joints, discontinuities, differential settlement of pavement, all increase the vibration levels from vehicles passing over a road surface. Construction vibration is normally of greater concern than vibration from normal traffic flows on streets and freeways with smooth pavement conditions (Caltrans 2004).

5.5.1.3 NOISE- AND VIBRATION-SENSITIVE RECEPTORS

Certain land uses are particularly sensitive to noise and vibration, including residential, school, and open space/recreation areas where quiet environments are necessary for enjoyment, public health, and safety. Sensitive receptors within the school district include residences, senior housing, schools, places of worship, and recreational areas. These uses are regarded as sensitive because they are where citizens most frequently engage in activities which are likely to be disturbed by noise, such as reading, studying, sleeping, resting, or otherwise engaging in quiet or passive recreation. Commercial and industrial uses are not considered noise- and vibration-sensitive receptors for the purposes of this analysis, since noise- and vibration-sensitive activities are less likely to be undertaken in these areas, and because these uses often themselves generate noise in excess of what they receive from other uses.

5.5.1.4 REGULATORY FRAMEWORK

To limit population exposure to physically and/or psychologically damaging as well as intrusive noise levels, the federal government, the State of California, various county governments, and most municipalities in the state have established standards and ordinances to control noise.

Federal Regulations

US Federal Transit Administration (FTA)

The FTA provides criteria for acceptable levels of ground-borne vibration for various types of special buildings that are sensitive to vibration and these guidelines are often used to evaluate vibration impacts during construction. The construction-focused guidelines identify that an impact would occur if construction activities generate vibration that is strong enough to (a) physically damage buildings or (b) cause undue annoyance at sensitive receptors.

Vibration-Related Human Annoyance

The human reaction to various levels of vibration is highly subjective and varies from person to person. Table 5.5-4 shows the FTA's vibration criteria to evaluate vibration-related annoyance due to resonances of the structural components of a building. These criteria are based on extensive research that suggests humans are sensitive to vibration velocities in the range of 8 to 80 Hz. For construction activities—presumed to occur only during daytime hours—the threshold would be 78 VdB at residential land uses.

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Table 5.5-4 Groundborne Vibration Criteria: Human Annoyance

Land Use Category	Maximum Vibration Level (VdB)	Description
Workshop	90	Distinctly felt vibration. Appropriate to workshops and non-sensitive areas
Office	84	Felt vibration. Appropriate to offices and non-sensitive areas.
Residential – Daytime	78	Barely felt vibration. Adequate for computer equipment.
Residential – Nighttime	72	Vibration not felt, but groundborne noise may be audible inside quiet rooms.

Source: FTA 2006.
Note: Maximum Vibration Level (in VdB) is the RMS velocity level in decibels, as measured in 1/3-octave bands of frequency over the frequency ranges of 8 to 80 Hz. RMS is the abbreviation for root-mean-square.

Vibration-Related Architectural Damage

The level at which groundborne vibration is strong enough to cause architectural damage has not been determined conclusively. However, structures amplify groundborne vibration, and wood-frame buildings such as typical residential structures are more affected by ground vibration than heavier buildings. The most conservative estimates are reflected in the FTA standards, shown in Table 5.5-5. The Peak Particle Velocity (PPV) threshold of 0.2 inches/second will be applied to typical residential structures surrounding the Project site.

Table 5.5-5 Groundborne Vibration Criteria: Architectural Damage

Building Category	PPV (in/sec)	VdB
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

Source: FTA 2006.
Note: Lv (VdB): Lv is the velocity level in decibels, as measured in 1/3-octave bands of frequency over the frequency ranges of 8 to 80 Hz.

State Regulations

California Building Code (CBC)

The California Green Building Standards Code (CALGreen) has requirements for insulation that affect exterior-interior noise transmission for non-residential structures. Pursuant to CALGreen Section 5.507.4.1, *Exterior Noise Transmission*, wall and roof-ceiling assemblies exposed to the noise source making up the building or addition envelope or altered envelope shall meet a composite sound transmission class (STC) rating of at least 50 or a composite outdoor-indoor transmission class (OITC) rating of no less than 40 with exterior windows of a minimum STC of 40 or OITC of 30 within a 65 dBA CNEL or L_{dn} noise contour of an airport. Where noise contours are not readily available, buildings exposed to a noise level of 65 dBA $L_{eq\text{-}1\text{-}hour}$ during any hour of operation shall have building, addition or alteration exterior wall and roof-ceiling assemblies exposed to the noise source meeting a composite STC rating of at least 45 (or OITC 35), with exterior windows of a minimum of STC 40 (or OITC 30).

Additionally, state law requires that each county and city adopt a General Plan that includes a Noise Element which is to be prepared according to guidelines adopted by the Governor's Office of Planning and Research. The purpose of the Noise Element is to "limit the exposure of the community to excessive noise levels" (OPR 2003).

Local Regulations

Huntington Beach Noise Element

The Huntington Beach General Plan Noise Element describes how the city considers noise control in the planning process, identifies noise-sensitive land uses and noise sources, evaluates existing noise issues, defines potential noise impact areas, and advocates creative methods to protect the community from excessive noise. The City applies a Land Use Noise Compatibility Matrix, recreated in Table 5.5-6, that assesses the compatibility of new development with ambient noise. The land use noise compatibility matrix of the noise element identifies 'normally acceptable', 'conditionally acceptable', and 'normally unacceptable' exterior noise levels and acceptable interior noise levels for various land uses. In no case would it be desirable for any land use to have noise exceeding the highest normally unacceptable noise level shown in Table 5.5-6.

Table 5.5-6 Land Use-Noise Compatibility

General Plan Land Use Designation	Proposed Uses	CNEL (dBA)			
		Exterior			Interior
		Normally Acceptable	Conditionally Acceptable	Normally Unacceptable	Acceptable
Residential- Low Density	Single-family, mobile homes, senior housing	Up to 60	61-65	≥66	45
Residential- Medium, Medium-High, High Density	Attached single-family, duplex, townhomes, multi-family, condominiums, apartments	Up to 65	66-70	≥71	45
Mixed-Use	Combination of commercial and residential uses	Up to 70	71-75	≥76	45
Neighborhood Commercial, General Commercial	Retail, professional office, health services, restaurant, government offices, hotel/motel	Up to 70	71-75	≥76	45
Visitor Commercial	Hotel/motel, timeshares, recreational commercial, cultural facilities	Up to 65	66-75	≥75	45
Semi-public	School	Up to 60	61-65	≥66	45
Semi-public	Hospitals, churches, cultural facilities	Up to 65	66-70	≥71	45

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Table 5.5-6 Land Use-Noise Compatibility

General Plan Land Use Designation	Proposed Uses	CNEL (dBA)			
		Exterior			Interior
		Normally Acceptable	Conditionally Acceptable	Normally Unacceptable	Acceptable
Park	Public park	Up to 65	65-75	≥76	N/A
Recreation	Golf courses, recreational water bodies	Up to 65	65-75	≥76	N/A

Source: Huntington Beach General Plan Noise Element, Table N-2
Notes:
1. Normally acceptable means that land uses may be established in areas with the stated ambient noise level, absent any unique noise circumstances.
2. Conditionally acceptable means that land uses should be established in areas with the stated ambient noise level only when exterior areas are omitted from the project or noise levels in exterior areas can be mitigated to the normally acceptable level. Where the location of outdoor activity areas is unknown, the exterior noise level standard shall be applied to the property line of the receiving land use. Where it is not practical to mitigate exterior noise levels at patio or balconies of apartment complexes, a common area such as a pool or recreation area may be designated as the outdoor activity area.
3. Normally unacceptable means that land uses should generally not be established in areas with the stated ambient noise level. If the benefits of a project in addressing other General Plan goals and policies outweigh concerns about noise, the use should be established only where exterior areas are omitted from a project or where exterior areas are located and shielded from noise sources to mitigate noise to the maximum extent feasible. Where the location of outdoor activity areas is unknown, the exterior noise level standard shall be applied to the property line of the receiving land use. Where it is not practical to mitigate exterior noise levels at patio or balconies of apartment complexes, a common area such as a pool or recreation area may be designated as the outdoor activity area.
4. Interior acceptable means that the building must be constructed so that interior noise levels do not exceed the stated maximum, regardless of the exterior noise level. Stated maximums are as determined for a typical worst-case hour during periods of use.

Huntington Beach Municipal Code

The most effective method to control community noise impacts from non-transportation, stationary noise sources (such as air conditioning units, basketball courts, and swimming pools) is through a noise control ordinance. The stationary source noise impacts associated with the Proposed Project are evaluated against standards established under the Huntington Beach Municipal Code.

Exterior Noise Limits

Chapter 8.40, Noise Control, of the municipal code provides regulations to control unnecessary, excessive, and annoying sounds emanating from incorporated areas. Exterior noise limits for land uses in the city are shown in Table 5.5-7, *Exterior Noise Limits*. No person shall create any noise which causes the noise level at the receiving property to exceed these noise standards.

Table 5.5-7 Exterior Noise Limits

Noise Zone	Type of Land Use	Allowable Exterior Noise Level (dBA)	
		7:00 AM–10:00 PM	10:00 PM–7:00 AM
1	Residential	55	50
2	Professional Office/Public Institutional	55	55
3	All other Commercial[1]	60	60
4	Industrial	70	70

Source: Huntington Beach Municipal Code, Section 8.40.050, Exterior Noise Standards.
[1] Does not include Professional Office.

Per Section 8.40.060, the following adjustments are applicable to the exterior standards in Table 5.5-7:

Noise levels at receiving properties may not exceed exterior noise standards:

- for a cumulative period of more than thirty minutes in any hour;
- plus 5 dB for a cumulative period of more than fifteen minutes in any hour;
- plus 10 dB for a cumulative period of more than five minutes in any hour;
- plus 15 dB for a cumulative period of more than one minute in any hour; or
- plus 20 dB for any period of time.

If the ambient noise level exceeds any of the first four noise limit categories above, the cumulative period applicable to said category shall be increased to reflect said ambient noise level. If the ambient noise level exceeds the fifth noise limit category, the maximum allowable noise level under said category shall be increased to reflect the maximum ambient noise level.

Exemptions

Section 8.40.090 of the municipal code exempts certain activities from the noise ordinance. Noise sources associated school events (including school bands, school athletics, and school entertainment events) are exempt, provided such events are conducted on school property or authorized by special permit from the City.

Construction Noise Standards

The City realizes that the control of construction noise is difficult and therefore provides an exemption for construction activities during specific hours of the day. Per Section 8.40.090, noise sources associated with construction, repair, remodeling, or grading of any real property are exempt from the noise ordinance provided such activities do not take place between the hours of 8:00 pm and 7:00 am, Monday through Saturday, or at any time on Sundays or federal holidays.

Huntington Beach Vibration Standards

The City of Huntington Beach does not have specific limits or thresholds for vibration. In lieu of numerical limits, the vibration perception thresholds for significant impacts in this assessment will use vibration guidelines provided by the FTA (see Tables 5.5-4 and 5.5-5, above).

City of Westminster Noise Standards

Chapter 8.28, Noise Control, of the Westminster Municipal Code regulates noise at its source (except transportation sources), protects noise-sensitive land uses, regulates vibration levels, and specifies permitted periods for construction and grading. The City regulates noise levels based on two noise zones. The entire city is designated Noise Zone 1, except multifamily properties, which are designated Noise Zone 2. These zones protect noise-sensitive areas (residential) without excessively inhibiting nonsensitive areas (industrial). Chapter 8.28 also defines how noise is measured as well as special uses that are exempt from the City's noise regulations.

Construction Noise Exemption

Per Section 8.28.060, noise sources associated with construction, repair, remodeling, or grading of any real property are exempt from the noise ordinance provided such activities do not take place between the hours of 8:00 pm and 7:00 am, Monday through Saturday, or at any time on Sundays or federal holidays.

City of Fountain Valley Noise Standards

The City of Fountain Valley General Plan Noise Element discusses the effects of noise exposure on the population and sets goals aimed at protecting its residents from undue noise. The noise element contains noise compatibility guidelines for developments adjacent to mobile or transportation noise sources and thresholds for stationary noise sources. The City applies the state's community noise and land use compatibility standards to assess the compatibility of new development with existing noise sources, such as vehicles and trains.

City of Fountain Valley Municipal Code

The City applies the noise control ordinance standards to nontransportation, stationary noise sources (Fountain Valley Municipal Code Chapter 6.28). These standards do not gauge the compatibility of developments in the noise environment, but provide restrictions on the amount and duration of noise generated at a property, as measured at the property line of the noise receptor. These noise standards do not apply to noise generated by vehicle traffic, because the state, counties, and cities are preempted from controlling vehicle noise under federal law. The City's noise ordinance is designed to protect people from objectionable nontransportation noise sources such as music, machinery, pumps, and air conditioners.

Construction Hours

The City prohibits noise associated with the construction, repair, remodeling, or grading of any real property unless that these activities take place between the hours of 7:00 am and 8:00 pm Monday through Friday, 9:00 am through 8:00 pm on Saturday, and at no time on Sunday or any legal holiday (Chapter 6.28.070 [5], Special Provisions).

5.5.1.5 EXISTING CONDITIONS

The Ocean View School District (OVSD or District) proposes to modernize 11 campuses and provide interim housing for 10 of the 11 schools during construction at two schools.[3] Each school modernization would last approximately one year. During this time, students would be transferred to either Sun View Elementary School (ES) or Pleasant View/Ocean View Preparatory School (OVPP) while their home school is being modernized. All school modernizations, except for Westmont ES and College ES, would consist of mostly interior renovations and safety feature improvements, and therefore would not affect the exterior noise environment around the school. As shown in Figure 3-4, *Site Plan, Westmont Elementary School*, and Figure 3-6, *Site Plan, College View Elementary School*, an expanded parking lot and additional bus drop-off would be provided at these two schools in addition to the interior renovations and safety improvements. Sun View ES, Pleasant View/OVPP, and College View ES are in Huntington Beach, and Westmont ES is in Westminster.

[3] Harbour View Elementary School will not need to transfer students off campus during construction.

The other nine modernization schools—without parking lot reconfiguration and access modification—are in Huntington Beach, Fountain Valley, and Westminster and the unincorporated Midway City.

Transportation Noise

Both Sun View ES and Pleasant View/OVPP are generally surrounded by major roadways, which are the primary sources of ambient noise around both school campuses. Peak-hour intersection turning movements provided by the traffic impact analysis for the Proposed Project were used to derive daily segment volumes along study area roadways (PlaceWorks 2018).[4] Based on the Federal Highway Administration's FHWA-RD77-108 roadway noise calculation methodologies, the estimated daily segment volumes were used to estimate average daily roadway noise within the Project study area. The FHWA noise model predicts roadway noise levels through a series of adjustments to a reference sound level. These adjustments account for segment volumes, speed, truck mix, and distances from the roadway. Vehicle speeds on each roadway were assumed to be the posted speed limit; roadways used for drop-off operations at the interim housing sites were estimated to be 15 mph, and no reduction in speed was used to account for congested traffic flows. Roadway noise levels and distances to the 60, 65, and 70 dBA CNEL contours are shown in Table 5.5-8 and can be used to estimate the ambient noise environment at surrounding receptors.

Table 5.5-8 Existing Roadway Noise Levels and Distances to Contour Lines, AM Peak Hour

Roadway	Segment	CNEL (dBA) at 50 feet	Distance to Noise Contours (feet)		
			70 dBA CNEL	65 dBA CNEL	60 dBA CNEL
Edinger Ave	between Goldenwest St and Gothard Ave	69.7	48	103	221
Edinger Ave	between Gothard St and Center Dr	69.5	46	99	214
Gothard Avenue	between Heil Ave and Warner Ave	67.3	33	71	153
Heil Avenue	between Goldenwest St and Gothard Ave	68.9	43	92	197
Heil Avenue	between Gothard St and Rhone Ln	68.9	42	91	196
Gothard Avenue	between Warner Ave and Slater Ave	67.8	36	77	165
Warner Avenue	between Goldenwest St and Gothard Ave	72.6	75	161	348
Warner Avenue	between Gothard St and Nichols Ln	72.2	70	152	327
Heil Avenue	between Rhone Ln and Silver Ln	68.6	40	87	187
Edinger Avenue	between Center Dr and Sher Ln	69.3	45	96	207
Edinger Avenue	between Sher Ln and Parkside Ln	69.4	46	99	213
Heil Avenue	between Silver Ln and Rhine Dr	68.8	42	90	193
Beach Boulevard	between Center Ave and Edinger Ave	73.8	90	194	418
Beach Boulevard	between Edinger Ave and Stark Dr	73.2	82	177	381
Edinger Avenue	between Parkside Ln and Beach Blvd	69.7	48	104	223
Edinger Avenue	between Beach Blvd and I-405 on-ramp	70.4	53	114	247
Beach Boulevard	between Stark Dr and Glencoe Dr	73.2	81	175	378
Beach Boulevard	between Glencoe Dr and Heil Ave	73.1	81	174	376
Beach Boulevard	between Heil Ave and Terry Dr	73.1	81	174	375
Heil Avenue	between Rhine Dr and Beach Blvd	68.9	42	91	197

[4] Average daily segment volumes are estimated to be 8 times the AM peak hour segment volume

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Table 5.5-8 Existing Roadway Noise Levels and Distances to Contour Lines, AM Peak Hour

Heil Avenue	between Beach Blvd and Monroe Ln	67.4	33	72	155
Beach Boulevard	between Terry Dr and Warner Ave	73.0	79	171	367
Beach Boulevard	between Warner Ave and Slater Ave	72.7	75	162	350
Warner Avenue	between Nichols Ln and Beach Blvd	71.8	66	143	308
Warner Avenue	between Beach Blvd and Rotterdam Ln	72.0	68	147	316
Newland Street	between Carnegie Ave and Edinger Ave	67.5	34	73	158
Newland Street	between Edinger Ave and Heil Ave	67.7	35	76	163
Edinger Avenue	between I-405 on-ramp and Newland St	70.3	52	112	241
Edinger Ave	between Newland St and Quartz St	70.9	57	124	267
Newland Street	between Arnett Dr and Warner Ave	68.2	38	82	177
Newland Street	between Warner Ave and Friesland Dr	68.0	37	79	170
Warner Avenue	between Rotterdam Ln and Newland St	72.0	68	148	318
Warner Avenue	between Newland St and Ross St	72.7	75	162	350
Warner Avenue	between Ross Ln and Magnolia St	72.8	77	166	358
Magnolia St	between I-405 off-ramp and Warner Ave	71.1	59	127	274
Warner Avenue	between Magnolia and I-405 on-ramp	73.3	83	179	385

Notes: Input information from PlaceWorks 2018.
Calculated using FHWA RD-77-108 calculation method for roadway noise.
Average daily segment volumes are estimated to be 8 times the AM peak hour segment volume.

Pleasant View/OVPP

Pleasant View/OVPP is in a predominantly residential area and is subject to high levels of noise from traffic flows on I-405, which borders the east side of the campus. Since the I-405 freeway is the dominant noise source affecting the Pleasant View/OVPP, a roadway noise analysis was performed along the nearest segment of I-405 to estimate the ambient noise environment around the school campus. Since freeway noise is a 24-hour concern, the classic FHWA roadway noise calculation method was used to evaluate the existing freeway noise conditions near the campus in terms of the CNEL noise metric, as presented in Table 5.5-9.

Table 5.5-9 Existing I-405 Freeway Noise Levels and Distances to Contour Lines

Roadway	Segment	Daily Traffic Volumes (ADT)	Noise Level at 50 Feet (dBA CNEL)	Distance to Noise Contour (feet)		
				70 dBA CNEL	65 dBA CNEL	60 dBA CNEL
I-405	Between Magnolia St. and Edinger Ave	287,628	88.1	804	1,733	3,733

Source: FHWA Highway Traffic Noise Prediction Model based on traffic volumes provided by Caltrans (2015). Calculations included in the Appendix.

The Pleasant View/OVPP campus is between 500 and 1,000 feet from the centerline of I-405 (not including Pleasant View Park). According to the modeling results in Table 5.5-9, the noise environment at Pleasant View/OVPP is in the range of 65 to 75 dBA CNEL. Roadway noise from I-405 is expected to dominate the noise environment at Pleasant View/OVPP, and noise from the roadways listed in Table 5.5-8 are *not* expected to notably contribute to the total noise environment. Due to Pleasant View/OVPP's proximity to I-

405, the noise environment is generally louder than what would typically be expected for a medium-density residential area.

Sun View ES

Sun View ES is in a predominantly residential area and is subject to noise from transportation and residential noise sources (property maintenance, light mechanical equipment, people talking, etc.). Though the Sun View campus is outside of the 60 dBA CNEL contours for Heil Avenue, Beach Boulevard, and Edinger Avenue (Table 5.5-8), these major roadways are still expected to cumulatively contribute to the total noise environment. Further, Sun View ES is approximately 2,600 feet southwest of the nearest segment of I-405.[5] According to the freeway noise analysis in Table 5.5-9, Sun View ES is within the 60 dBA CNEL contour of I-405. At this distance from the freeway, and considering the barrier attenuation from intervening structures, I-405 traffic flows would not be the primary influence on the overall community noise environment (as it is at Pleasant View/OVPP), but I-405 traffic would contribute some noise energy to the campus's soundscape. Thus, the cumulative noise from I-405 and other stationary and transportation noise sources is expected to result in a noise environment around Sun View ES in excess of 60 dBA CNEL.

Stationary Source Noise

Stationary sources of noises may occur from all types of land uses. Residential uses would generate noise from landscaping, maintenance activities, and air conditioning systems. Commercial uses would generate noise from heating, ventilation, air conditioning (HVAC) systems; loading docks; and other sources. Noise generated by residential or commercial uses is generally short and intermittent. For the developed land in Huntington Beach, land uses are primarily residential, with retail along major roadways. Though the ambient noise environments around the interim housing campuses are both expected to be controlled by roadway noise, intermittent residential operations may also contribute to the total ambient noise environments at these sites. Noise from stationary sources is regulated through municipal codes.

5.5.2 Thresholds of Significance

According to Appendix G of the CEQA Guidelines, a project would normally have a significant effect on the environment if the project would result in:

N-1 Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.

N-2 Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels.

N-3 A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project.

[5] Note that the average daily trips along the segment applicable to Sun View ES is approximately equal to the average daily trips in Table 5.5-9 for Pleasant View/OVPP. Thus, the associated noise levels would be comparable at the indicated distances.

N-4 A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.

N-5 For a project located within an airport land use plan or where such a plan has not been adopted, within two miles of a public airport or public use airport, expose people residing or working in the project area to excessive noise levels.

N-6 For a project within the vicinity of a private airstrip, expose people residing or working the project area to excessive noise levels.

The Initial Study, included as Appendix A, substantiates that impacts associated with the following thresholds would be less than significant:

- Threshold N-5
- Threshold N-6

These impacts impact will not be addressed in the following analysis.

5.5.3 Environmental Impacts

The following impact analysis addresses thresholds of significance for which the Initial Study disclosed potentially significant impacts. The applicable thresholds are identified in brackets after the impact statement.

Impact 5.5-1: The Proposed Project would not result in significant temporary construction noise increase. [Threshold N-3]

Impact Analysis: Two types of short-term noise impacts could occur during construction: (1) mobile-source noise from transport of workers, material deliveries, and debris and soil haul and (2) stationary-source noise from use of construction equipment. The interim housing improvements would consist of installing temporary prefabricated buildings, installing utilities for these buildings, expanding existing and/or constructing new parking lots, and creating new driveways at Sun View ES and Pleasant View/OVPP. Construction of the interim housing improvements would be concurrent at the two schools during the 2018 and 2019 summer recess periods. Removal of the portable classrooms is anticipated in 2024 or later after all students return to their home schools. Total construction duration would be approximately four to five months. Reconfiguration of the existing parking and site access would also occur at Westmont ES and College View ES, but on a smaller scale than the interim housing improvements. Therefore, noise and vibration impacts at the two interim housing schools were evaluated as the worst-case scenario.

Existing uses surrounding the interim housing improvements and modernizations would be exposed to construction noise. The interim housing improvements would occur during summer recess, and the current Sun View ES and Pleasant View/OVPP students are not expected to be affected by construction activities prior to transferring of students from modernization schools. Additionally, since OVSD is in charge of both construction activities and classroom scheduling, it would manage on-campus receptors to minimize impacts from construction-related noise. Therefore, this analysis will only address construction noise as it affects off-campus receptors.

Pleasant View/OVPP

Construction Vehicle Noise

The transport of workers and equipment to the construction site would incrementally increase noise levels along site access roadways. The primary access routes for construction vehicles to Pleasant View/OVPP would be Royal Drive. Project-related construction worker vehicles, haul trucks, and vendor trucks would pass existing residential uses along this roadway. The asphalt demolition, site preparation, and grading phases would generate the most trips due to asphalt demolition debris and soil haul. However, given the expected level of activity associated with interim housing improvements, the incremental addition of a few construction vehicles (in comparison with normal daily flow rates) would be expected to add much less than 1 dB to the existing traffic-related noise environment. Therefore, increases in traffic flows due to construction vehicles would not contribute significantly to the overall ambient noise level along nearby roadways. Other phases of construction are anticipated to have fewer daily trips (for the aggregate of workers plus vendors plus haul-offs), and these phases would have even less of an incremental difference in noise levels along construction trip routes than the worst-case demolition haul phase.

Individual construction vehicle pass-bys may create momentary noise levels of up to approximately 85 dBA (L_{max}) at 50 feet from the vehicle, but these occurrences would generally be infrequent, would last for only a few seconds at a time, and would occur during the least sensitive hours of the day (when many people are typically out of their residences). Sensitivity to noise is based on the location of the equipment relative to sensitive receptors, the time of day, and the duration of the noise-generating activities. Because these construction vehicle pass-by noise level increases would be sporadic, short-term, and during weekday daytime hours, noise impacts from construction-related truck traffic would be less than significant at noise-sensitive receptors along construction routes.

Construction Equipment Noise

Construction activities associated with the interim housing improvements are split among three phases (see Table 3-2). Stage 1 in Phase 1 would include construction activities associated with expanding existing and/or constructing new parking lots, expanding existing play courts, and creating new driveways at Pleasant View/OVPP. Stage 2 in Phase 3 would include construction activities associated with the installation of temporary prefabricated buildings and utilities. These two stages would generally occur during the 2018 and 2019 summer recess periods. Portables would be removed in Phase 12, which is anticipated to occur in 2024 or later after completion of modernizations and the return of students to their home schools.

Each stage of construction involves the use of different kinds of construction equipment/processes depending on the work to be accomplished, and therefore has its own distinct noise characteristics. Noise levels from construction activities are typically dominated by the loudest piece of equipment. The prevailing noise source on most construction equipment is typically the engine, although work-piece noise (such as dropping of materials) can also be notable. Noise attenuation due to distance, the number and type of

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equipment, and the load and power requirements to accomplish tasks at each construction phase would result in different construction-related noise levels at any given receptor. Projected noise levels from Project-related construction activities were calculated from the simultaneous use of all applicable construction equipment at spatially averaged distances (i.e., from the center of the applicable construction phase area) to the nearest residential receptor. Although construction may occur across the entire campus, the center of the applicable construction phase area best represents the potential average construction-related noise levels.

For the Proposed Project, the asphalt demolition phases are expected to generate the highest levels of noise because they require the largest, most powerful equipment. Short-term noise can be also associated with site preparation, grading, utility trenching, and paving. Construction activities for the Proposed Project would not require blasting or pile driving. Using information provided by OVSD with methodologies and inputs employed in the air quality assessment, the expected construction equipment mix was estimated and categorized by construction activity. The associated, aggregate sound levels for all phases of construction are summarized in Table 5.5-10, grouped by construction activity.

Table 5.5-10 Project-Related Construction Noise Levels, Pleasant View/OVPP

Receiver	Sound Level per Construction Phase, dBA L_{eq}						
Stage 1 in Phase 1							
Receiver	**Asphalt Demolition**	**Site Preparation**	**Rough Grading**	**Utility Trenching**	**Fine Grading**	**Asphalt Paving**	**BLDG Constructio n**
Single-Family Homes to the South (60 feet)	84	75	80	80	81	81	80
Single-Family Homes to the West (400 feet)	70	62	67	67	67	67	67
Stage 2 in Phase 3							
Receiver	**Temporary Portables Installation**			**Site Preparation**		**Fine Grading**	
Single-Family Homes to the South (60 feet)	78			75		75	
Single-Family Homes to the West (400 feet)	65			61		61	
End Phase (Phase 12)							
Receiver	Temporary Buildings Removal						
Single-Family Homes to the South (60 feet)	80						
Single-Family Homes to the West (400 feet)	67						

Notes: Calculations performed with the FHWA's RCNM software and are in Appendix E.
Distances are from the center of the applicable construction area to the nearest single-family home in each direction.
A 3 dB attenuation was applied to the single-family homes to the south due to shielding effects from the existing boundary wall.

The nearest single-family homes are approximately 60 feet to the south of the proposed construction activities. At this distance, composite construction noise would be reduced to a conservatively estimated level of approximately 84 dBA L_{eq} (due to distance attenuation alone) during the loudest period of construction.

Noise levels from construction activities would result in lower noise levels at more-distant receptors due to increasing attenuation with increasing distances away from the sources.

As mentioned above, the noise environment surrounding the Pleasant View/OVPP is projected to be in the range of 65 to 75 dBA CNEL. With such a relatively high noise environment, the contributions of temporary construction activities—while audible and potentially annoying during periods of maximum actions—would generally not add a noteworthy amount of noise to the daytime conditions. Additionally, since construction activities would be limited to relatively small- to medium-sized equipment (i.e., bulldozers, grading tractors, dump trucks, loaders, back hoes, pavers, and a crane), would take place during the daytime hours when many people would be out of their houses, would be temporary and short-term (lasting for approximately four to five months), and would conform to the time-of-day restrictions of the Huntington Beach Municipal Code (i.e., 7:00 am to 8:00 pm), construction noise impacts would be less than significant and no mitigation measures are necessary.

Sun View Elementary School

Construction Vehicles Noise

The transport of workers and equipment to the construction site would incrementally increase noise levels along site access roadways. The primary access routes for construction vehicles to Sun View ES would be Silver Lane and Sher Lane. Project-related construction worker vehicles, haul trucks, and vendor trucks would pass by existing residential uses along these roadways. The asphalt demolition, site preparation, and grading phases would generate the most trips due to asphalt demolition debris and soil haul. However, given the expected level of activity associated with the interim housing improvements, the incremental addition of the relatively few construction vehicles (in comparison with normal daily flow rates) would be expected to add much less than 1 dB to the existing traffic-related noise environment. Therefore, increases in traffic flows due to construction vehicles would not contribute significantly to the overall ambient noise level along nearby roadways. Other phases of construction are anticipated to have fewer daily trips (for the aggregate of workers plus vendors plus haul-offs), and these phases would make even less of an incremental difference in noise levels along construction trip routes than the worst-case demolition haul phase.

Individual construction vehicle pass-bys may create momentary noise levels of up to approximately 85 dBA (L_{max}) at 50 feet from the vehicle, but these occurrences would generally be infrequent, would last for only a few seconds at a time, and would occur during the least sensitive hours of the day (when many people are typically out of their residences). Sensitivity to noise is based on the location of the equipment relative to sensitive receptors, the time of day, and the duration of the noise-generating activities. Because these construction vehicle pass-by noise level increases would be sporadic, short-term and would occur during weekday daytime hours, noise impacts from construction-related truck traffic would be less than significant at noise-sensitive receptors along construction routes.

Construction Equipment Noise

Construction activities associated with the interim housing improvements at Sun View ES are split among three phases (see Table 3-1). Stage 1 in Phase 1 would include construction activities to expand existing and/or construct new parking lots, and create new driveways; Stage 2 in Phase 3 would include construction activities associated with the installation of temporary prefabricated buildings and utilities; and Phase 12 would include removal of the portable classrooms installed in Stages 1 and 2. Stages 1 and 2 would generally occur during the 2018 and 2019 summer recess periods. Phase 12 is anticipated to occur in 2024 or later after students return to their home schools.

Each stage of construction involves the use of different kinds of construction equipment/processes depending on the work to be accomplished, and therefore has its own distinct noise characteristics. Noise levels from construction activities are typically dominated by the loudest piece of equipment. The prevailing noise source on most construction equipment is typically the engine, although work-piece noise (such as dropping of materials) can also be notable. Noise attenuation due to distance, the number and type of equipment, and the load and power requirements to accomplish tasks at each construction phase would result in different construction-related noise levels at any given receptor. Projected noise levels from Project-related construction activities were calculated from the simultaneous use of all applicable construction equipment at spatially averaged distances (i.e., from the center of the applicable construction phase area) to the nearest residential receptor. Although construction may occur across the entire campus, the center of the applicable construction phase area best represents the potential average construction-related noise levels.

For the Proposed Project, the asphalt demolition phases are expected to generate the highest levels of noise because they require the largest, most powerful equipment. Short-term noise can be also associated with site preparation, grading, utility trenching, and paving. Construction activities for the Proposed Project would not require blasting or pile driving. Using information provided by OVSD with methodologies and inputs employed in the air quality assessment, the expected construction equipment mix was estimated and categorized by construction activity. The associated, aggregate sound levels for all phases of construction are summarized in Table 5.5-11, grouped by construction activity.

Table 5.5-11 Project-Related Construction Noise Levels, Sun View Elementary School

Receiver	Sound Level per Construction Phase, dBA L_{eq}						
Phase 1							
Receiver	Asphalt Demolition	Site Preparation	Rough Grading	Utility Trenching	Fine Grading	Building Construction	Asphalt Paving
Single-Family Homes to the West (115 feet)	81	73	78	77	78	77	78
Single-Family Homes to the South (400 feet)	65	67	62	62	62	62	62
Phase 2							
Receiver	Temporary Portables Installation						
Single-Family Homes to the West (115 feet)	76						
Single-Family Homes to the South (400 feet)	60						
Phase 3							
Receiver	Temporary Buildings Removal						
Single-Family Homes to the West (115 feet)	77						
Single-Family Homes to the South (400 feet)	62						

Notes: Calculations performed with the FHWA's RCNM software and are included in Appendix E.
Distances are from the center of the applicable construction area to the nearest single-family home in each direction.
A 5 dB attenuation was applied to the single-family homes to the south due to shielding effects from the existing Sun View ES buildings.

The nearest single-family homes are approximately 115 feet to the west of the proposed construction activities. At this distance, composite construction noise would be reduced to a conservatively estimated level of approximately 81 dBA L_{eq} (due to distance attenuation alone) during the loudest period of construction. Noise levels from construction activities would result in lower noise levels at more-distant receptors due to increasing attenuation with increasing distances away from the sources.

The contributions of temporary construction activities—while audible and potentially annoying during periods of maximum actions—would generally not add a noteworthy amount of noise to the daytime conditions. Additionally, since construction activities would be limited to relatively small- to medium-sized equipment (i.e., bulldozers, grading tractors, dump trucks, loaders, back hoes, pavers, and a crane), would take place during the daytime hours when many people would be out of their houses, would be temporary and short-term (lasting for approximately four to five months), and would conform to the time-of-day restrictions of the Huntington Beach Municipal Code (i.e., 7:00 am to 8:00 pm), construction noise impacts would be less than significant and no mitigation measures are necessary.

Westmont ES

Westmont ES is in the City of Westminster, and the City of Westminster Municipal Code (Section 8.28.060) exempts noise sources associated with construction provided that construction activities do not take place between the hours of 8:00 pm and 7:00 am on weekdays and Saturday, or at any time on Sunday or a federal holiday. In consideration of these factors, construction noise impacts would be less than significant and no mitigation measures are necessary.

Impact 5.5-2 Project implementation would result in long-term operation-related noise that would not exceed local standards. [Thresholds N-1 and N-3]

Impact Analysis: The Proposed Project includes the installation and use of portable buildings and expansion of existing parking facilities at Pleasant View/OVPP and Sun View ES. The noise analysis assumed that construction of temporary portable buildings and supporting facilities would be constructed at the interim housing schools in Phase 1 and Phase 3 of the phasing plan, and students would be transferred to either Sun View ES or Pleasant View/OVPP while their home school is modernized. The modernizations would consist of mostly interior renovations and minor exterior improvements, and therefore would not affect the exterior noise environment around the schools. Although additional parking lot and driveway improvements are proposed for Westmont ES and College View ES, no increase in student capacity would occur, and significant long-term noise operational-related noise is not anticipated.

The total Project duration could take five to eight years, and Project-related operations are treated as long-term noise impact. Noise impacts related to the operation of the Proposed Project would primarily result from increases in Project-generated traffic along study area roadways. Stationary noise sources, such as HVAC units and other mechanical equipment, may also have the potential to generate noise impacts. This impact analysis discusses long-term effects on off-site uses from Project-related traffic and operations.

Operational Noise Impacts

Implementation of the Proposed Project would result in a significant impact if it exceeds the Huntington Beach Municipal Code noise standards, or if it results in a substantial permanent increase in existing ambient noise levels. The former would apply to stationary, ongoing sources (such as mechanical equipment), and the latter would apply to Project-induced traffic noise increases.

Project-Related Stationary Noise

As described previously, the Huntington Beach exterior noise standards are in terms of the level exceeded over some fraction of a given measurement period (municipal code section 8.40.050). It is noted that the noise sources associated with implementation of the Proposed Project (i.e., roadway noise, HVAC/mechanical system noise) are continuous and would generally remain steady-state over any given measurement period. Thus, the following exterior noise analysis will refer to the baseline noise limit category shown in Table 5.5-7, as opposed to the fractional noise limit categories.

It is also important to note that Section 8.40.090 of the municipal code exempts noise sources associated with school events (including school bands, school athletics, and school entertainment events) from the provisions of the municipal code, provided such events are conducted on school property or authorized by special permit from the City.

Student Noise

The Pleasant View/OVPP and Sun View ES campuses would generate noise from students during outdoor recess, physical education, or other scheduled outdoor events. The Proposed Project would add new students to each of the interim housing schools over the next five years (see Chapter 3 for additional details and time frames). During this time, Project-related outdoor student noise is expected to increase around the interim housing schools.

As mentioned above, the existing ambient noise environment around Pleasant View/OVPP is expected to be between 65 and 75 dBA CNEL; the existing ambient noise environment around Sun View ES is expected to be in excess of 60 dBA CNEL. Though Project-related outdoor student noise is expected to increase around these schools, total Project-related student noise is expected to be well below the existing ambient noise environment at both schools. Additionally, sounds from outdoor student activities (talking, yelling, physical education, etc.) would be comparable in nature to the durations and characteristics of the existing soundscape at and around the schools. Also, all outdoor student noise would generally occur on weekdays during the daytime, when the surrounding residents are expected to be out of the home. Thus, Project-related student noise would be less than significant and no mitigation measures are necessary.

Mechanical Equipment Noise

For the temporary portable buildings, each individual portable would make use of an HVAC system and other minor mechanical equipment. In general, such equipment would be much smaller than the same-function equipment for the permanent buildings. Given the distances to the nearest residential receptors (approximately 60 feet from Pleasant View/OVPP; approximately 115 feet from Sun View ES) and barrier attenuation due to existing campus buildings and/or boundary walls, noise from the HVAC systems is expected to be attenuated below the existing ambient noise environment (described above in Section 5.5.1.4). Project-related mechanical equipment noise would be less than significant, and no mitigation measures are needed.

Project-Related Stationary Noise Summary

In summary, noise generated by normal operations would not be notably different than existing conditions around the proposed area of improvements and is not expected to exceed the City's exterior noise standards (as adjusted for the relatively high ambient conditions at each campus). Therefore, no significant permanent noise increases due to Project-related stationary sources would occur and no mitigation measures are necessary.

Project-Related Roadway Noise

Changes in noise levels between 1 to 3 dB are detectable under quiet, controlled conditions, and changes of less than 1 dB are usually not discernible (even under ideal conditions). A 3 dB change in noise levels is considered the minimum change that is detectable by human hearing in outside environments. A change of 5 dB is readily discernible to most people in an exterior environment, and a 10 dB change is perceived as a doubling (or halving) of the sound (Bies and Hansen 2009).

The Proposed Project would not introduce new noise sources, but is expected to increase noise generation from existing sources. A substantial Project-related increase in noise levels would be:

- A 5 dB increase if, after the increase, the Project-related noise level remains below the Noise Element standard for compatible land uses.

  OR

- A 3 dB increase if, after the increase, the Project-related noise level exceeds the Noise Element standard for compatible land uses.

Note that in both cases, the applicable land uses around Pleasant View/OVPP and Sun View ES are single-family residential, which has a compatibility standard of up to 60 dBA CNEL. Also note that in both cases, the existing community noise environments are already at (for Sun View ES) or well above (for Pleasant View/OVPP) the "normally acceptable" guideline.[6]

The traffic impact analysis for the Proposed Project included cumulative traffic increases at both interim housing schools (PlaceWorks 2018). The daily AM peak hour intersection volumes provided by the traffic impact analysis represent the worst-case traffic increases over the entire Project buildout period. Peak-hour intersection turning movements were used to derive daily segment volumes along study area roadways.[7] Based on the FHWA roadway noise calculation methodologies, average daily traffic volumes along study area roadways were used to estimate average daily roadway noise within the Project study area.

Table 5.5-12 shows the calculated noise levels for existing traffic conditions, total buildout conditions,[8] and Project contribution at segments of roadways surrounding the interim housing schools. The site access road for Pleasant View/OVPP is Royal Drive; the site access roads for Sun View ES are Silver Lane and Sher Lane.

The modeling results indicate that existing daily noise levels along roadway segments range from approximately 47.1 dBA CNEL to 73.8 dBA CNEL, calculated at a distance of 50 feet from the centerline of the road. The future daily noise levels along roadway segments are expected to range from approximately 50.1 dBA CNEL to 74.2 dBA CNEL (50 feet from centerline). The future noise levels in Table 5.5-12 are a result of the combination of expected 2023 traffic conditions (accounting for regional growth) plus the worst-case contribution from the Proposed Project.

According to the roadway noise analysis, two roadway segments would experience a total roadway noise increase over 3 dB—the main site access roadways for Pleasant View/OVPP and Sun View ES, that is, Silver Lane (North of Heil Avenue with a 3.2 dB increase) and Royal Drive (East of Ross Lane with a 4.8 dBA increase). The 2023 buildout conditions for both these access roadways are predicted to be in the low 50s dBA CNEL. Thus, the total future noise level from these roadways is predicted to remain below the 'normally

[6] As discussed above in Section 5.5.1.4, the existing ambient noise environment around Pleasant View/OVPP is expected to be between 65 and 75 dBA CNEL; the existing ambient noise environment around Sun View Elementary School is expected to be in excess of 60 dBA CNEL.
[7] Average daily segment volumes are estimated to be 8 times the AM peak hour segment volume.
[8] Total buildout conditions include Project contribution and regional growth.

acceptable' compatibility standard (i.e., 60 dBA CNEL for single-family residential), and the significant noise increase would be 5 dB. Thus, roadway segments within the Project study area would not experience a significant roadway noise increase due to implementation of the Proposed Project. Project-related traffic noise is less than significant, and no mitigation measures are necessary.

Table 5.5-12 Roadway Noise Levels for Existing and Project Buildout Conditions

		dBA CNEL at 50 feet		dB	
Roadway	Segment	Existing	Future + Project	Project Contribution	Total Increase
Edinger Ave	between Goldenwest St and Gothard Ave	69.7	70.4	0.2	0.8
Edinger Ave	between Gothard St and Center Dr	69.5	70.2	0.2	0.8
Gothard Avenue	between Heil Ave and Warner Ave	67.3	67.8	0.4	0.6
Heil Avenue	between Goldenwest St and Gothard Ave	68.9	69.4	0.3	0.5
Heil Avenue	between Gothard St and Rhone Ln	68.9	69.7	0.7	0.8
Gothard Avenue	between Warner Ave and Slater Ave	67.8	68.2	0.2	0.4
Warner Avenue	between Goldenwest St and Gothard Ave	72.6	73.0	0.2	0.4
Warner Avenue	between Gothard St and Nichols Ln	72.2	72.6	0.1	0.4
Heil Avenue	between Rhone Ln and Silver Ln	68.6	69.4	0.7	0.8
Sher Lane	between Edinger Ave and Volga Dr	55.7	57.7	1.9	2.1
Edinger Avenue	between Center Dr and Sher Ln	69.3	70.1	0.2	0.8
Edinger Avenue	between Sher Ln and Parkside Ln	69.4	70.3	0.3	0.9
Sher Lane	between Volga Dr and Rhone Ln	55.1	57.4	2.2	2.3
Sher Lane	between Rhone Ln and Juliette Low Dr	49.2	52.2	2.8	2.9
Silver Lane	north of Heil Ave	50.2	53.3	**3.1**	3.2
Heil Avenue	between Silver Ln and Rhine Dr	68.8	69.2	0.3	0.4
Beach Boulevard	between Center Ave and Edinger Ave	73.8	74.2	0.1	0.4
Beach Boulevard	between Edinger Ave and Stark Dr	73.2	73.5	0.0	0.3
Edinger Avenue	between Parkside Ln and Beach Blvd	69.7	70.6	0.3	0.8
Edinger Avenue	between Beach Blvd and I-405 on-ramp	70.4	70.8	0.1	0.4
Beach Boulevard	between Stark Dr and Glencoe Dr	73.2	73.4	0.0	0.3
Beach Boulevard	between Glencoe Dr and Heil Ave	73.1	73.4	0.1	0.3
Glencoe Drive	between Silver Ln and Beach Blvd	48.3	50.1	1.7	1.9
Beach Boulevard	between Heil Ave and Terry Dr	73.1	73.4	0.1	0.3
Heil Avenue	between Rhine Dr and Beach Blvd	68.9	69.3	0.2	0.4
Heil Avenue	between Beach Blvd and Monroe Ln	67.4	67.9	0.4	0.5
Beach Boulevard	between Terry Dr and Warner Ave	73.0	73.3	0.1	0.3
Beach Boulevard	between Warner Ave and Slater Ave	72.7	73.1	0.1	0.4
Warner Avenue	between Nichols Ln and Beach Blvd	71.8	72.2	0.1	0.4
Warner Avenue	between Beach Blvd and Rotterdam Ln	72.0	72.6	0.2	0.6
Newland Street	between Carnegie Ave and Edinger Ave	67.5	67.7	0.1	0.2

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Table 5.5-12 Roadway Noise Levels for Existing and Project Buildout Conditions

Roadway	Segment	dBA CNEL at 50 feet		dB	
		Existing	Future + Project	Project Contribution	Total Increase
Newland Street	between Edinger Ave and Heil Ave	67.7	68.1	0.3	0.4
Edinger Avenue	between I-405 on-ramp and Newland St	70.3	70.7	0.2	0.4
Edinger Ave	between Newland St and Quartz St	70.9	71.3	0.1	0.4
Heil Avenue	between Monroe Ln and Newland St	65.3	65.9	0.4	0.6
Heil Avenue	east of Newland St	58.2	61.1	2.8	2.9
Newland Street	between Arnett Dr and Warner Ave	68.2	68.4	0.0	0.1
Newland Street	between Warner Ave and Friesland Dr	68.0	68.2	0.0	0.2
Warner Avenue	between Rotterdam Ln and Newland St	72.0	72.6	0.2	0.6
Warner Avenue	between Newland St and Ross St	72.7	73.2	0.2	0.5
Royal Drive	east of Ross Ln	47.1	51.9	**4.7**	4.8
Warner Avenue	between Ross Ln and Magnolia St	72.8	73.3	0.2	0.5
Magnolia St	between I-405 off-ramp and Warner Ave	71.1	71.3	0.1	0.3
Warner Avenue	between Magnolia and I-405 on-ramp	73.3	73.7	0.1	0.4

Input information from PlaceWorks 2018.
Calculated using FHWA RD-77-108 calculation method for roadway noise.
Bold values indicate Project-related increases of 3 dB or more.
Average daily segment volumes are estimated to be 8 times the AM peak hour segment volume.

Impact 5.5-3: The Project would not create short-term or long-term groundborne vibration and groundborne noise. [Threshold N-2]

Impact Analysis: For potential Project-generated vibration impacts to nearby receptors, the Project would not include long-term equipment that could generate substantial levels of permanent groundborne vibration. Therefore, vibration from onsite sources would not be significant, and only the vibration effects of Project-related construction activities are analyzed here.

Construction equipment generates vibrations that spread through the ground and diminish in amplitude with distance from the source. Construction activities can generate varying degrees of ground vibration, depending on the construction procedures, the equipment used, and the proximity to vibration-sensitive uses. The effect on buildings near a construction site varies depending on soil type, ground strata, and receptor building construction. The generation of vibration can range from no perceptible effects at the lowest vibration levels, to low rumbling sounds and perceptible vibrations at moderate levels, to slight damage at the highest levels. Ground vibrations from construction activities rarely reach levels that can damage structures but can reach perceptible levels at buildings close to a construction site (FTA 2006). Rock blasting and impact pile-driving generate the highest levels of vibration. However, construction for this Project would not require impact pile-driving or blasting, or other vibration-intensive equipment such as vibratory rollers or clam shovels.

Vibration is typically noticed nearby when objects in a building generate noise from rattling windows or picture frames. It is typically not perceptible outdoors (FTA 2006) and, therefore, impacts are normally based on the distance to the nearest building. As discussed above, vibration impacts are quantified both in terms of annoyance and architectural damage due to vibration. For vibration annoyance, 78 VdB is considered the maximum vibration level for residential land uses. For architectural damage due to vibration, a Peak Particle Velocity (PPV) of 0.2 is considered the maximum vibration level for non-engineered timber and masonry buildings (typically applied to residential structures). In lieu of local standards or regulations, these FTA guidelines provide the basis for determining the impact significance of potential Project-related vibration impacts.

Construction activities are typically distributed throughout the project site and would only occur for a relatively limited duration. Therefore, to most accurately represent the average vibration level in terms of vibration annoyance, distances to the nearest receptor buildings are measured from the center of the proposed construction activities. Since architectural damage from construction vibration sources can be a one-time event, vibration damage distances are measured from the nearest likely location at the construction site to the façade of the nearest receptor building.

Pleasant View/OVPP

The distance from proposed construction activities to the nearest residential receptors to the south is between 30 and 60 feet (relative to architectural damage or annoyance aspects, respectively). Table 5.5-13 provides the reference vibration levels for equipment items that are expected to be employed at Pleasant View/OVPP, along with the resulting vibration levels (either in VdB or PPV values) calculated at the applicable receptor distances.

Table 5.5-13 Construction-Related Vibration, Pleasant View/OVPP

Equipment Item	Vibration Level (VdB) – [Annoyance][1]	
	At 25 feet from source (reference)	At 60 feet from source
Large Bulldozer	87	76
Small Bulldozer	58	47
Loaded Trucks	86	75
Equipment Item	Vibration Peak Particle Velocity (inches/second) – [Architectural Damage][2]	
	At 25 feet from source (reference)	At 30 feet from source
Large Bulldozer	0.089	0.068
Small Bulldozer	0.003	0.002
Loaded Trucks	0.076	0.058

Source: Vibration Reference Levels- FTA 2006.
RMS vibration velocity level (VdB) referenced to 1 micro-inch/second and maximum instantaneous peak (PPV) values in inches per second (in/sec).
1 For vibration annoyance, distances are from the center of the applicable construction phase area to the nearest single-family home to the south.
2 For damage due to vibration, distances are from the nearest likely location at the construction site to the façade of the nearest receptor building.

As shown in the table, Project-related construction activities would not generate vibration levels that would exceed the FTA's vibration annoyance threshold of 78 VdB at the nearest receptors to the south. Additionally, Project-related construction activities would not generate vibration that would exceed the FTA maximum acceptable PPV vibration standard (i.e., 0.20 in/sec for typical wood-framed buildings) at the nearest receptors to the south. Therefore, the construction activities at Pleasant View/OVPP would not result in vibration impacts at any nearby receptors. Impacts would be less than significant, and no mitigation measures are necessary.

Sun View ES

The distance from proposed construction activities to the nearest residential receptors to the west is between 75 and 115 feet (relative to architectural damage or annoyance aspects, respectively). Table 5.5-14 provides the reference vibration levels for equipment items that are expected to be employed for the interim housing improvements, along with the resulting vibration levels (either in VdB or PPV values) calculated at the applicable receptor distances.

Table 5.5-14 Construction-Related Vibration, Sun View Elementary School

Equipment Item	Vibration Level (VdB) – [Annoyance][1]	
	At 25 feet from source (reference)	At 115 feet from source
Large Bulldozer	87	67
Small Bulldozer	58	38
Loaded Trucks	86	66
Equipment Item	**Vibration Peak Particle Velocity (inches/second) – [Architectural Damage][2]**	
	At 25 feet from source (reference)	**At 75 feet from source**
Large Bulldozer	0.089	0.017
Small Bulldozer	0.003	0.001
Loaded Trucks	0.076	0.015

Source: Vibration Reference Levels- FTA 2006.
RMS vibration velocity level (VdB) referenced to 1 micro-inch/second and maximum instantaneous peak (PPV) values in inches per second (in/sec).
1 For vibration annoyance, distances are from the center of the applicable construction phase area to the nearest single-family home to the west.
2 For damage due to vibration, distances are from the nearest likely location at the construction site to the façade of the nearest receptor building.

As shown in the table, Project-related construction activities would not generate vibration levels that would exceed the FTA's vibration perception threshold of 78 VdB at the nearest receptors to the west. Additionally, Project-related construction activities would not generate vibration that would exceed the FTA maximum acceptable PPV vibration standard (i.e., 0.20 in/sec for typical wood-framed buildings) at the nearest receptors to the west. Therefore, the construction activities at Sun View ES would not result in vibration impacts at any nearby receptors. Impacts would be less than significant, and no mitigation measures are necessary.

5.5.4 Cumulative Impacts

Construction Noise and Vibration

As discussed above, noise from construction activities at each individual campus would be temporary and less than significant.

Cumulative impacts would only occur if other projects were being constructed in the vicinity of the Project at the same time as the Project. Since the adjoining areas are already built out and only residential remodeling would be reasonably foreseeable in these areas, there would be a very low probability of simultaneous and notable construction projects. Thus, the Project impacts would not be individually or cumulatively considerable.

Mobile-Source Noise

The cumulative traffic noise levels would not increase by a noticeable amount (+3 dB) along the roadways that would exceed the Huntington Beach noise element compatibility standards. Therefore, significant cumulative increases in traffic noise levels would not occur, and impacts would be less than cumulatively considerable.

Stationary-Source Noise

Unlike transportation noise sources, whose effects can extend well beyond the limits of a project site, stationary-source noise generated by the Proposed Project is limited to noise impacts to noise-sensitive receptors in relatively close proximity. Cumulative noise levels from new students and mechanical equipment at the interim housing schools would be negligible at the nearest residences. Consequently, stationary noise associated with the daytime use of the school would not be cumulatively considerable and would not result in a significant cumulative noise impact.

5.5.5 Regulatory Requirements

Local

City of Huntington Beach Municipal Code

- Chapter 8.40, Noise Control
- Section 8.40.050, Exterior Noise Standards
- Section 8.40.60, Exterior Noise Levels Prohibited
- Section 8.40.090, Special Provisions
- Section 8.40.111, Prohibited Noises

City of Westminster Municipal Code

- Section 8.28.060, Exemptions

5.5.6 Level of Significance Before Mitigation

Upon implementation of regulatory requirements and standard conditions of approval, the following impacts would be less than significant: 5.5-1, 5.5-2, 5.5-3, and 5.5-4.

5.5.7 Mitigation Measures

No mitigation measures are required.

5.5.8 Level of Significance After Mitigation

The Proposed Project's noise and vibration impacts would be less than significant.

5.5.9 References

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