3.11 NOISE

This section includes a summary of applicable regulations related to noise and vibration, a description of ambient-noise conditions, and an analysis of potential short-term construction and long-term operational source noise impacts associated with the Project. Mitigation measures are recommended as necessary to reduce significant noise impacts. Additional data are provided in ***Appendix I: Acoustical Assessment***, dated November 2020, prepared by Kimley-Horn.

3.11.1 ENVIRONMENTAL SETTING

EXISTING CONDITIONS

Existing Noise Sources

The City of Beaumont (City) is impacted by various noise sources. Mobile sources of noise, especially cars, trucks, and trains are the most common and significant sources of noise. Other noise in the City is generated from stationary sources from land uses (i.e., residential, commercial, institutional, and recreational and parks activities).

Mobile Sources

The Project Site is not currently accessible by public roads. Potrero Boulevard is being extended along the eastern edge of the Project Site while 4th Street is being extended to the south. Both roads however are closed while under construction. The existing mobile noise sources in the Project area are generated by motor vehicles traveling along State Route 60 (SR-60), located approximately 200 feet north of the Project boundary.

Stationary Sources

The nearest source of stationary noise in the Project vicinity would come from existing industrial buildings located approximately 3,000 feet to the east of the Project Site. The noise associated with these sources may represent a single-event noise occurrence or short-term noise. Other noises include roadway construction along Potrero Boulevard and 4th Street.

Noise Measurements

The Project Site is currently vacant and unoccupied. To quantify existing ambient noise levels in the Project area, Kimley-Horn conducted three short-term noise measurements on February 19, 2020; see Appendix A, of ***Appendix I*** of the EIR. The noise measurement sites were representative of typical existing noise exposure within and immediately adjacent to the Project Site. The 10-minute measurements were taken between 10:57 a.m. and 11:58 a.m. Short-term L_{eq} measurements are considered representative of the noise levels throughout the day. The average noise levels and sources of noise measured at each location are listed in ***Table 3.11-1: Existing Noise Measurements*** and shown on ***Exhibit 3.11-1: Noise Measurement Locations***.

Table 3.11-1: Existing Noise Measurements

Site #	Location	L_{eq} (dBA)	L_{min} (dBA)	L_{max} (dBA)	Time
1	Potrero Boulevard, Beaumont	54.3	37.9	71.6	11:07 a.m.
2	Prosperity Way, Beaumont	72.4	36.8	58.0	11:42 a.m.
3	West 4th Street, Beaumont	52.9	34.2	71.7	11:58 a.m.
Source: Noise measurements taken by Kimley-Horn, February 19, 2020. See Appendix A of EIR ***Appendix I*** for noise measurement results.					

Sensitive Receptors

Noise exposure goals for various types of land uses reflect the varying noise sensitivities associated with those uses. Noise sensitive uses typically include residences, hospitals, schools, childcare facilities, and places of assembly. Vibration sensitive receivers are generally similar to noise sensitive receivers but may also include businesses, such as research facilities and laboratories that use vibration-sensitive equipment. There are currently no sensitive receptors near the Project Site. The immediately surrounding area consists of open space and industrial development. Directly to the south of the Project Site is an extension of 4th Street that is being constructed from east to west. Directly to the north of the Project is SR-60, and north of SR-60 is a residential community currently under construction. Although the residential community to the north is not occupied, this is the location of the nearest sensitive receptors in the near term. The nearest future residential property located within this community would be approximately 550 feet north of the Project boundary.

ACOUSTIC FUNDAMENTALS

Sound and Environmental Noise

Acoustics is the science of sound. Sound can be described as the mechanical energy of a vibrating object transmitted by pressure waves through a medium (e.g., air) to human (or animal) ear. If the pressure variations occur frequently enough (at least 20 times per second), they can be heard and are called sound. The number of pressure variations per second is called the frequency of sound and is expressed as cycles per second, or hertz (Hz).

Noise is defined as loud, unexpected, or annoying sound. In acoustics, the fundamental model consists of a noise source, a receptor, and the propagation path between the two. The loudness of the noise source, obstructions, or atmospheric factors affecting the propagation path, determine the perceived sound level and noise characteristics at the receptor. Acoustics deal primarily with the propagation and control of sound. 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. These sources can vary from an occasional aircraft or train passing by to continuous noise from traffic on a major highway. Perceptions of sound and noise are highly subjective from person to person.

Measuring sound directly in terms of pressure would require a wide range of numbers. To avoid this, the decibel (dB) scale was devised. The dB scale uses the hearing threshold of 20 micropascals (µPa) as a point of reference, defined as 0 dB. Other sound pressures are then compared to this reference pressure, and the logarithm is used to keep the numbers in a practical range. The dB scale allows a million-fold increase in pressure to be expressed as 120 dB, and changes in levels correspond closely to human perception of relative loudness. ***Table 3.11-2: Typical Noise Levels*** provides typical noise levels.

Exhibit 3.11-1: Noise Measurement Locations

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Table 3.11-2: Typical Noise Levels

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

Source: California Department of Transportation, *Technical Noise Supplement to the Traffic Noise Analysis Protocol*, September 2013. https://dot.ca.gov/-/media/dot-media/programs/environmental-analysis/documents/env/tens-sep2013-a11y.pdf (accessed November 2021).

NOISE DESCRIPTIONS

The dB scale alone does not adequately characterize how humans perceive noise. The dominant frequencies of a sound have a substantial effect on the human response to that sound. Several rating scales have been developed to analyze the adverse effect of community noise on people. Because environmental noise fluctuates over time, these scales consider that the effect of noise on people is largely dependent on the total acoustical energy content of the noise, as well as the time of day when the noise occurs. The equivalent noise level (L_{eq}) is the average noise level averaged over the measurement period, while the day-night noise level (L_{dn}) and Community Equivalent Noise Level (CNEL) are measures of energy average during a 24-hour period, with dB weighted sound levels from 7:00 p.m. to 7:00 a.m. Most commonly, environmental sounds are described in terms of L_{eq} that has the same acoustical energy as the summation of all the time-varying events. Each is applicable to this analysis and defined in ***Table 3.11-3: Definitions of Acoustical Terms***.

The A-weighted decibel (dBA) sound level scale gives greater weight to the frequencies of sound to which the human ear is most sensitive. Because sound levels can vary markedly over a short period of time, a method for describing either the average character of the sound or the statistical behavior of the variations must be utilized. Most commonly, environmental sounds are described in terms of an average level that has the same acoustical energy as the summation of all the time-varying events.

Table 3.11-3: Definitions of Acoustical Terms

Term	Definitions
Decibel (dB)	A unit describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure. The reference pressure for air is 20.
Sound Pressure Level	Sound pressure is the sound force per unit area, usually expressed in µPa (or 20 micronewtons per square meter), where 1 pascals is the pressure resulting from a force of 1 newton exerted over an area of 1 square meter. The sound pressure level is expressed in dB as 20 times the logarithm to the base 10 of the ratio between the pressures exerted by the sound to a reference sound pressure (e.g., 20 µPa). Sound pressure level is the quantity that is directly measured by a sound level meter.
Frequency (Hz)	The number of complete pressure fluctuations per second above and below atmospheric pressure. Normal human hearing is between 20 Hz and 20,000 Hz. Infrasonic sound are below 20 Hz and ultrasonic sounds are above 20,000 Hz.
A-Weighted Sound Level (dBA)	The sound pressure level in dB as measured on a sound level meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise.
Equivalent Noise Level (L_{eq})	The average acoustic energy content of noise for a stated period of time. Thus, the L_{eq} of a time-varying noise and that of a steady noise are the same if they deliver the same acoustic energy to the ear during exposure. For evaluating community impacts, this rating scale does not vary, regardless of whether the noise occurs during the day or the night.
Maximum Noise Level (L_{max}) Minimum Noise Level (L_{min})	The maximum and minimum dBA during the measurement period.
Exceeded Noise Levels (L_{01}, L_{10}, L_{50}, L_{90})	The dBA values that are exceeded 1%, 10%, 50%, and 90% of the time during the measurement period.
Day-Night Noise Level (L_{dn})	A 24-hour average L_{eq} with a 10 dBA weighting added to noise during the hours of 10:00 p.m. to 7:00 a.m. to account for noise sensitivity at nighttime. The logarithmic effect of these additions is that a 60 dBA 24-hour L_{eq} would result in a measurement of 66.4 dBA L_{dn}.
Community Noise Equivalent Level (CNEL)	A 24-hour average L_{eq} with a 5 dBA weighting during the hours of 7:00 a.m. to 10:00 a.m. and a 10 dBA weighting added to noise during the hours of 10:00 p.m. to 7:00 a.m. to account for noise sensitivity in the evening and nighttime, respectively. The logarithmic effect of these additions is that a 60 dBA 24-hour L_{eq} would result in a measurement of 66.7 dBA CNEL.
Ambient Noise Level	The composite of noise from all sources near and far. The normal or existing level of environmental noise at a given location.
Intrusive	That noise which intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends on its amplitude, duration, frequency, and time of occurrence and tonal or informational content as well as the prevailing ambient noise level.

The scientific instrument used to measure noise is the sound level meter. Sound level meters can accurately measure environmental noise levels to within about plus or minus 1 dBA. Various computer models are used to predict environmental noise levels from sources, such as roadways and airports. The accuracy of the predicted models depends on the distance between the receptor and the noise source.

A-Weighted Decibels

The perceived loudness of sounds is dependent on many factors, including sound pressure level and frequency content. However, within the usual range of environmental noise levels, perception of loudness is relatively predictable and can be approximated by dBA values. There is a strong correlation between dBA and the way the human ear perceives sound. For this reason, the dBA has become the standard tool of environmental noise assessment. All noise levels reported in this document are in terms of dBA, but are expressed as dB, unless otherwise noted.

Addition of Decibels

The dB scale is logarithmic, not linear, and therefore sound levels cannot be added or subtracted through ordinary arithmetic. Two sound levels 10 dB apart differ in acoustic energy by a factor of 10. When the standard logarithmic dB is A-weighted, an increase of 10 dBA is generally perceived as a doubling in loudness. For example, a 70-dBA sound is half as loud as an 80-dBA sound and twice as loud as a 60-dBA sound. When two identical sources are each producing sound of the same loudness, the resulting sound level at a given distance would be 3 dBA higher than one source under the same conditions. Under the dB scale, three sources of equal loudness together would produce an increase of 5 dBA.

Sound Propagation and Attenuation

Sound spreads (propagates) uniformly outward in a spherical pattern, and the sound level decreases (attenuates) at a rate of approximately 6 dB for each doubling of distance from a stationary or point source. Sound from a line source, such as a highway, propagates outward in a cylindrical pattern. Sound levels attenuate at a rate of approximately 3 dB for each doubling of distance from a line source, such as a roadway, depending on ground surface characteristics. No excess attenuation is assumed for hard surfaces like a parking lot or a body of water. Soft surfaces, such as soft dirt or grass, can absorb sound, so an excess ground-attenuation value of 1.5 dB per doubling of distance is normally assumed. For line sources, an overall attenuation rate of 3 dB per doubling of distance is assumed.

Noise levels may also be reduced by intervening structures; generally, a single row of buildings between the receptor and the noise source reduces the noise level by about 5 dBA, while a solid wall or berm reduces noise levels by 5 to 10 dBA. The way older homes in California were constructed generally provides a reduction of exterior-to-interior noise levels of about 20 to 25 dBA with closed windows. The exterior-to-interior reduction of newer residential units is generally 30 dBA or more.

Human Response to Noise

The human response to environmental noise is subjective and varies considerably from individual to individual. Noise in the community has often been cited as a health problem, not in terms of actual physiological damage, such as hearing impairment, but in terms of inhibiting general well-being and contributing to undue stress and annoyance. The health effects of noise in the community arise from interference with human activities, including sleep, speech, recreation, and tasks that demand concentration or coordination. Hearing loss can occur at the highest noise intensity levels.

Noise environments and consequences of human activities are usually well represented by median noise levels during the day or night or over a 24-hour period. Environmental noise levels are generally considered low when the CNEL is below 60 dBA, moderate in the 60 to 70 dBA range, and high above 70 dBA. Examples of low daytime levels are isolated, natural settings with noise levels as low as 20 dBA and quiet, suburban, residential streets with noise levels around 40 dBA. Noise levels above 45 dBA at night can disrupt sleep. Examples of moderate-level noise environments are urban residential or semi-commercial areas (typically 55 to 60 dBA) and commercial locations (typically 60 dBA). People may consider louder environments adverse, but most will accept the higher levels associated with noisier urban residential or residential-commercial areas (60 to 75 dBA) or dense urban or industrial areas (65 to 80 dBA). Regarding increases in dBA, the following relationships should be noted:

- Except in carefully controlled laboratory experiments, a 1-dBA change cannot be perceived by humans.
- Outside of the laboratory, a 3-dBA change is considered a just-perceivable difference.
- A minimum 5-dBA change is required before any noticeable change in community response would be expected. A 5-dBA increase is typically considered substantial.
- A 10-dBA change is subjectively heard as an approximate doubling in loudness and would almost certainly cause an adverse change in community response.

Effects of Noise on People

Hearing Loss

While physical damage to the ear from an intense noise impulse is rare, a degradation of auditory acuity can occur even within a community noise environment. Hearing loss occurs mainly due to chronic exposure to excessive noise but may be due to a single event such as an explosion. Natural hearing loss associated with aging may also be accelerated from chronic exposure to loud noise. The Occupational Safety and Health Administration has a noise exposure standard that is set at the noise threshold where hearing loss may occur from long-term exposures. The maximum allowable level is 90 dBA averaged over 8 hours. If the noise is above 90 dBA, the allowable exposure time is correspondingly shorter.

Annoyance

Attitude surveys are used for measuring the annoyance felt in a community for noises intruding into homes or affecting outdoor activity areas. In these surveys, it was determined that causes for annoyance include interference with speech, radio and television, house vibrations, and interference with sleep and rest. The L_{dn} as a measure of noise has been found to provide a valid correlation of noise level and the percentage of people annoyed. People have been asked to judge the annoyance caused by aircraft noise and ground transportation noise. There continues to be disagreement about the relative annoyance of these different sources. A noise level of about 55 dBA L_{dn} is the threshold at which a substantial percentage of people begin to report annoyance.[1]

GROUNDBORNE VIBRATION

Sources of groundborne vibrations include natural phenomena (earthquakes, volcanic eruptions, sea waves, landslides, etc.) or man-made causes (explosions, machinery, traffic, trains, construction equipment, etc.). Vibration sources may be continuous (e.g., factory machinery) or transient (e.g., explosions). Ground vibration consists of rapidly fluctuating motions or waves with an average motion of zero. Several different methods are typically used to quantify vibration amplitude. One is the peak particle velocity (PPV); another is the root mean square (RMS) velocity. The PPV is defined as the maximum instantaneous positive or negative peak of the vibration wave. The RMS velocity is defined as

[1] Federal Interagency Committee on Noise, *Federal Agency Review of Selected Airport Noise Analysis Issues*, August 1992. https://fican1.files.wordpress.com/2015/10/reports_noise_analysis.pdf (accessed November 2021).

the average of the squared amplitude of the signal. The PPV and RMS vibration velocity amplitudes are used to evaluate human response to vibration.

Table 3.11-4: Human Reaction and Damage to Buildings for Continuous or Frequent Intermittent Vibrations, displays the reactions of people and the effects on buildings produced by continuous vibration levels. The annoyance levels shown in the table should be interpreted with care since vibration may be found to be annoying at much lower levels than those listed, depending on the level of activity or the sensitivity of the individual. To sensitive individuals, vibrations approaching the threshold of perception can be annoying. Low-level vibrations frequently cause irritating secondary vibration, such as a slight rattling of windows, doors, or stacked dishes. The rattling sound can give rise to exaggerated vibration complaints, even though there is very little risk of actual structural damage. In high noise environments, which are more prevalent where groundborne vibration approaches perceptible levels, this rattling phenomenon may also be produced by loud airborne environmental noise causing induced vibration in exterior doors and windows.

Table 3.11-4: Human Reaction and Damage to Buildings for Continuous or Frequent Intermittent Vibrations

Peak Particle Velocity (in/sec)	Approximate Vibration Velocity Level (VdB)	Human Reaction	Effect on Buildings
0.006-0.019	64-74	Range of threshold of perception	Vibrations unlikely to cause damage of any type
0.08	87	Vibrations readily perceptible	Recommended upper level to which ruins and ancient monuments should be subjected
0.1	92	Level at which continuous vibrations may begin to annoy people, particularly those involved in vibration sensitive activities	Virtually no risk of architectural damage to normal buildings
0.2	94	Vibrations may begin to annoy people in buildings	Threshold at which there is a risk of architectural damage to normal dwellings
0.4-0.6	98-104	Vibrations considered unpleasant by people subjected to continuous vibrations and unacceptable to some people walking on bridges	Architectural damage and possibly minor structural damage

Source: California Department of Transportation, *Transportation and Construction Vibration Guidance Manual*, 2013.

Ground vibration can be a concern in instances where buildings shake, and substantial rumblings occur. However, it is unusual for vibration from typical urban sources such as buses and heavy trucks to be perceptible. Common sources for groundborne vibration are planes, trains, and construction activities such as earth-moving which requires the use of heavy-duty earth moving equipment. For the purposes of this analysis, a PPV descriptor with units of inches per second (in/sec) is used to evaluate construction-generated vibration for building damage and human complaints.

3.11.2 REGULATORY SETTING

FEDERAL

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

Federal Transit Administration Noise and Vibration Guidance

The Federal Transit Administration (FTA) has published the Transit Noise and Vibration Impact Assessment report to provide guidance on procedures for assessing impacts at different stages of transit project development. The report covers both construction and operational noise impacts and describes a range of measures for controlling excessive noise and vibration. The specified noise criteria are an earlier version of the criteria provided by the Federal Railroad Administration's High-Speed Ground Transportation Noise and Vibration Impact Assessment. In general, the primary concern regarding vibration relates to potential damage from construction. The guidance document establishes criteria for evaluating the potential for damage for various structural categories from vibration.

STATE

California Government Code

California Government Code § 65302(f) mandates that the legislative body of each county and city adopt a noise element as part of its comprehensive general plan. The local noise element must recognize the land use compatibility guidelines established by the State Department of Health Services. The guidelines rank noise land use compatibility in terms of "normally acceptable," "conditionally acceptable," "normally unacceptable," and "clearly unacceptable" noise levels for various land use types. Single-family homes are "normally acceptable" in exterior noise environments up to 60 CNEL and "conditionally acceptable" up to 70 CNEL. Multiple-family residential uses are "normally acceptable" up to 65 CNEL and "conditionally acceptable" up to 70 CNEL. Schools, libraries, and churches are "normally acceptable" up to 70 CNEL, as are office buildings and business, commercial, and professional uses.

Title 24 – Building Code

The State's noise insulation standards are codified in the California Code of Regulations (CCR), Title 24: Part 1, Building Standards Administrative Code, and Part 2, California Building Code. These noise standards are applied to new construction in California for interior noise compatibility from exterior noise sources. The regulations specify that acoustical studies must be prepared when noise-sensitive structures, such as residential buildings, schools, or hospitals, are located near major transportation noise sources, and where such noise sources create an exterior noise level of 65 dBA CNEL or higher. Acoustical studies that accompany building plans must demonstrate that the structure has been designed to limit interior noise in habitable rooms to acceptable noise levels. For new multi-family residential buildings, the acceptable interior noise limit for new construction is 45 dBA CNEL.

LOCAL

City of Beaumont General Plan

Noise Element

The Noise Element establishes goals and policies to minimize residents' exposure to excessive noise. This Element complies with the State requirements for a Noise Element. The Project's consistency with these goals and policies is discussed in ***Table 3.10-3: Beaumont General Plan Consistency Analysis*** of this EIR. The following goals and policies are applicable to noise:

Goal 10.1: A City where noise exposure is minimized for those living and working in the community.

Policy 10.1.1: Protect public health and welfare by eliminating existing noise problems and by preventing significant degradation of the future acoustic environment.

Policy 10.1.3: Protect noise-sensitive uses, such as residences, schools, health care facilities, hotels, libraries, parks and places of worship, from excessive noise levels through land use adjacency, building design, and noise ordinance enforcement.

Policy 10.1.5: Require projects involving new development or modifications to existing development to implement measures, where necessary, to reduce noise levels to at least the normally compatible range. Design measures should focus on architectural features and building design and construction, rather than site design features, such as excessive setbacks, berms, and sound walls, to maintain compatibility with adjacent and surrounding uses.

Policy 10.1.6 Encourage reduction of stationary noise impacts from commercial and industrial land uses, activities, events, and businesses on noise-sensitive land uses.

Goal 10.2 A City with minimal mobile source-generated noise levels.

Policy 10.2.3 Prohibit truck routes through neighborhoods with sensitive receptors, where feasible.

Policy 10.2.4 Reduce the impacts of roadway noise on noise-sensitive receptors where roadway noise exceeds the normally compatible range.

City of Beaumont Municipal Code

The Beaumont Municipal Code establishes the following provisions for noise relative to the Project:

Section 9.02.050 – Special Provisions

All ambient noise measurements shall commence at the base ambient noise levels in decibels within the respective times and zones as follows:

Table 3.11-6*:* Base Ambient Noise Level

Decibels	Time	Zone Use
45 dBA	10:00 p.m. – 7:00 a.m.	Residential
55 dBA	7:00 a.m. – 10: p.m.	Residential
50 dBA	10:00 p.m. – 7:00 a.m.	Industrial and Commercial
75 dBA	7:00 a.m. – 10: p.m.	Industrial and Commercial

Source: City of Beaumont, City of Beaumont Municipal Code, 2019

Actual decibel measurements exceeding the levels set forth above at the times and within the zones corresponding thereto shall be employed as the "base ambient noise level." Otherwise, no ambient noise shall be deemed to be than the above specified levels.

Section 9.02.110 – Special Provisions

F. Construction, Landscape. Maintenance or Repair

1. It shall be unlawful for any person to engage in or permit the generation of noise related to landscape maintenance, construction including erection, excavation, demolition, alteration or repair of any structure or improvement, at such sound levels, as measured at the property line of the nearest adjacent occupied property, as to be in excess of the sound levels permitted under this Chapter, at other times than between the hours of 7:00 a.m. and 6:00 p.m. The person engaged in such activity is hereby permitted to exceed sound levels otherwise set forth in this Chapter for the duration of the activity during the above described hours for purposes of construction. However, nothing contained herein shall permit any person to cause sound levels to at any time exceed 55 dB(A) for intervals of more than 15 minutes per hour as measured in the interior of the nearest occupied residence or school.
2. Whenever a construction site is within one-quarter of a mile of an occupied residence or residences, no construction activities shall be undertaken between the hours of 6:00 p.m. and 6:00 a.m. during the months of June through September and between the hours of 6:00 p.m. and 7:00 a.m. during the months of October through May. Exceptions to these standards shall be allowed only with the written consent of the building official.

County of Riverside General Plan

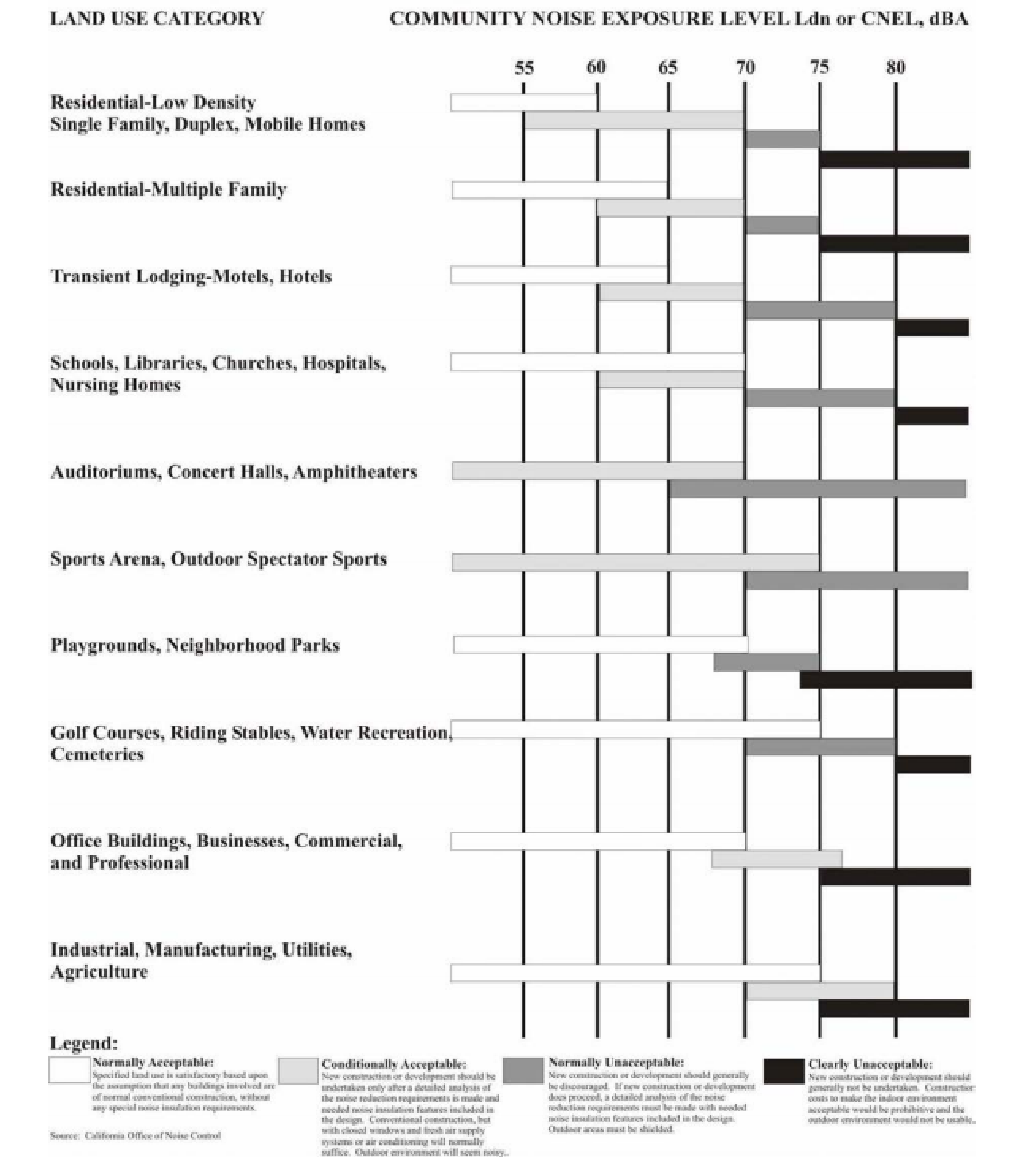
The County of Riverside General Plan contains the following policies addressing noise as part of the Noise Element:

Policy N 1.1 Protect noise-sensitive land uses from high levels of noise by restricting noise-producing land uses from these areas. If the noise-producing land use cannot be relocated, then noise buffers such as setbacks, landscaping, or blockwalls shall be used.

Policy N 1.5 Prevent and mitigate the adverse impacts of excessive noise exposure on the residents, employees, visitors, and noise-sensitive uses of Riverside County.

Policy N 1.6 Minimize noise spillover or encroachment from commercial and industrial land uses into adjoining residential neighborhoods or noise-sensitive uses.

Table 3.11-7*:* Land Use Compatibility for Community Noise Exposure



Source: County of Riverside, County of Riverside General Plan, 2015. https://planning.rctlma.org/Portals/14/genplan/general_Plan_2017/elements/OCT17/Ch07_Noise_120815.pdf?ver=2017-10-11-102104-080 (accessed November 2021).

County of Riverside Code of Ordinances

The Riverside County Code of Ordinances establishes noise provisions that are relevant to the Project and are discussed below:

Section 9.52.040 – General Sound Level Standards

No person shall create any sound, or allow the creation of any sound, on any property that causes the exterior sound level on any other occupied property to exceed the sound level standards set forth in ***Table 3.11-8: Sound Level Standards***.

Table 3.11-8: Sound Level Standards

General Plan Foundation Component	General Plan Land Use Designation	General Plan Land Use Designation Name	Density	Maximum Decibel Level	
				7 am—10 pm	10 pm—7 am
Community Development	EDR	Estate Density Residential	2 AC	55	45
	VLDR	Very Low Density Residential	1 AC	55	45
	LDR	Low Density Residential	1/2 AC	55	45
	MDR	Medium Density Residential	2—5	55	45
	MHDR	Medium High Density Residential	5—8	55	45
	HDR	High Density Residential	8—14	55	45
	HDR	Very High Density Residential	14—20	55	45
	H'TDR	Highest Density Residential	20+	55	45
	CR	Retail Commercial		65	55
	CO	Office Commercial		65	55
	CT	Tourist Commercial		65	55
	CC	Community Center		65	55
	LI	Light Industrial		75	55
	HI	Heavy Industrial		75	75
	BP	Business Park		65	45
	PF	Public Facility		65	45

Source: County of Riverside, Code of Ordinances, 2019.

3.11.3 STANDARDS OF SIGNIFICANCE

CEQA THRESHOLDS

Appendix G of the California Environmental Quality Act (CEQA) Guidelines contains analysis guidelines related to noise impacts. These guidelines have been used by the City to develop thresholds of significance for this analysis. A project would create a significant environmental impact if it would:

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

b) Generate excessive groundborne vibration or groundborne noise levels; and

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

Methodology

This analysis of the existing and with noise environments is based on noise prediction modeling and empirical observations. Construction noise levels were based on typical noise levels generated by construction equipment published by the FTA. Reference noise levels are used to estimate operational noise levels at nearby sensitive receptors based on a standard noise attenuation rate of 6 dB per doubling of distance (line-of-sight method of sound attenuation for point sources of noise). Noise level estimates do not account for the presence of intervening structures or topography, which may reduce noise levels at receptor locations. Therefore, the noise levels presented herein represent a conservative, reasonable worst-case estimate of actual temporary construction noise.

Operational noise is based on noise prediction modeling and empirical observations. Reference noise level data are used to estimate the Project operational noise impacts. Noise levels are collected from field noise measurements and other published sources from similar types of activities are used to estimate noise levels expected with the Project's stationary sources. Operational noise is evaluated based on the standards within the City's Noise Ordinance and General Plan. Operational noise from traffic noise levels in the Project vicinity were calculated using the Federal Highway Administration (FHWA) Highway Noise Prediction Model (FHWA-RD-77-108).

Groundborne vibration levels associated with construction-related activities for the Project were evaluated utilizing typical groundborne vibration levels associated with construction equipment, obtained from FTA published data for construction equipment. Potential groundborne vibration impacts related to structural damage and human annoyance were evaluated, considering the distance from construction activities to nearby land uses and typically applied criteria for structural damage and human annoyance.

3.11.4 PROJECT IMPACTS AND MITIGATION

Impact 3.11-1: ***Would the Project generate a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?***

Level of Significance: Less than Significant Impact

CONSTRUCTION

Construction noise typically occurs intermittently and varies depending on the nature or phase of construction (e.g., land clearing, grading, excavation, paving). Noise generated by construction equipment, including earth movers, material handlers, and portable generators, can reach high levels. During construction, exterior noise levels could affect the residential neighborhoods surrounding the construction site. However, it is acknowledged that construction activities would occur throughout the Project Site and would not be concentrated at a single point near sensitive receptors.

Construction activities would include site preparation, grading, building construction, paving, and architectural coating. Such activities would require graders, scrapers, and tractors during site preparation; graders, dozers, and tractors during grading; cranes, forklifts, generators, tractors, and welders during building construction; pavers, rollers, mixers, tractors, and paving equipment during paving; and air compressors during architectural coating. Typical operating cycles for these types of construction equipment may involve 1 or 2 minutes of full power operation followed by 3 to 4 minutes at lower power settings. Other primary sources of acoustical disturbance would be random incidents, which would last less than one minute (such as dropping large pieces of equipment or the hydraulic movement of machinery lifts). Typical noise levels associated with individual construction equipment are listed in ***Table 3.11-9: Typical Construction Noise Levels***.

Table 3.11-9 Typical Construction Noise Levels

Equipment	Typical Noise Level (dBA) at 50 feet from Source	Typical Noise Level (dBA) at 550 feet from Source[1]
Air Compressor	80	59.2
Backhoe	80	59.2
Compactor	82	61.2
Concrete Mixer	85	64.2
Concrete Pump	82	61.2
Concrete vibrator	76	55.2
Crane, Derrick	88	67.2
Crane, Mobile	83	62.2
Dozer	85	64.2
Generator	82	61.2
Grader	85	64.2
Impact Wrench	85	64.2
Jack Hammer	88	67.2
Loader	80	59.2
Paver	85	64.2
Pile-driver (Impact)	101	80.2
Pile-driver (sonic)	95	74.2
Pneumatic Tool	85	64.2
Pump	77	56.2
Roller	85	64.2
Saw	76	55.2
Scraper	85	64.2
Shovel	82	61.2
Truck	84	63.2

1 Calculated using the inverse square law formula for sound attenuation: $dBA_2=dBA_1+20Log(d_1/d_2)$; Where: dbA_2 = estimated noise level at receptor, dbA_1 = reference noise level; d_1 = reference distance; d_2 = receptor location distance.
Source: Federal Transit Administration, Transit Noise and Vibration Impact Assessment Manual, September 2018. https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/research-innovation/118131/transit-noise-and-vibration-impact-assessment-manual-fta-report-no-0123_0.pdf (accessed November 2021).

As shown in ***Table 3.11-9***, based strictly on distance attenuation, exterior noise levels could affect the nearest existing sensitive receptors in the vicinity. Sensitive uses in the Project Site vicinity include residential properties to the north which are currently under construction Using FTA's General Assessment methodology, the two noisiest pieces of construction equipment for each phase would generate 85 dBA at 50 feet. Therefore, when measured at the nearest sensitive receptor, each piece of equipment would generate 64 dBA of noise. When the two noise levels are added together, they combine to 67 dBA because noise levels are measured on a logarithmic scale. The combined noise level of the construction equipment, 67 dBA, is below FTA's exterior construction noise threshold of 90 dBA (1-hour Leq) during daytime hours and 80 dbA (1-hour Leq) during nighttime hours for residential uses.

The City's Municipal Code states that at no time is any person to cause sound levels to exceed 55 dB(A) for intervals of more than 15 minutes per hour as measured in the interior of the nearest occupied residence or school. Although the homes north of the Warehouse Site and north of freeway are currently under construction, these residential units are identified as the nearest sensitive receptors. When measuring noise from the interior of a building, the U.S. Environmental Protection Agency (U.S. EPA) states that buildings built for warm climates would reduce exterior noise by 12 dB with windows open and 24 dB with windows closed. Therefore, exterior construction noise levels of 67 dBA would be reduced to at least 55 dBA and would not exceed the City's 55 dBA threshold. However, due to the proximity of the houses to SR-60, the properties nearest the freeway are surrounded by a masonry wall which would further reduce noise levels by 5 to 8 dBA.

Therefore, after taking into account the masonry wall, exterior construction noise levels of 67 dBA would be reduced to at least 50 dBA when measured in the interior of the nearest residence. In addition, construction equipment would operate throughout the Warehouse Site and the associated noise levels would not occur at a fixed location for extended periods of time. Although sensitive uses may be exposed to noise levels above ambient conditions during Project construction, construction noise would be acoustically dispersed throughout the Warehouse Site and not concentrated in one area near surrounding sensitive uses. As construction noise levels would not exceed City or FTA standards, impacts would be less than significant.

OPERATIONS

Implementation of the Project would create new sources of noise in the Project vicinity. The major noise sources associated with the Project would include stationary noise equipment (i.e., trash compactors, air conditioners, etc.); truck and loading dock (i.e., slow moving truck on the site, maneuvering and idling trucks, equipment noise); parking areas (i.e., car door slamming, car radios, engine start-up, and car pass-by); and off-site traffic noise.

Mechanical Equipment

The Project Site is surrounded by vacant land and industrial uses. The nearest sensitive receptors to the Project Site would be the future residences 550 feet north of the Project Site on the opposite site of SR-60. Potential stationary noise sources related to long-term operation of the Warehouse Site would include mechanical equipment. Mechanical equipment (e.g., heating ventilation and air conditioning [HVAC] equipment) typically generates noise levels of approximately 50 to 60 dBA at 50 feet. As noise levels would be below the City's 65 dBA acceptable noise performance standard, noise impacts associated with HVAC equipment would be less than significant. Operation of mechanical equipment would not increase ambient noise levels beyond the acceptable compatible land use noise levels. Therefore, the Project would result in a less than significant impact related to stationary noise levels. Further, the warehouse would be required to comply with the General Plan and Municipal Code noise standards.

Truck and Loading Dock Noise

During loading and unloading activities, noise would be generated by the trucks' diesel engines, exhaust systems, and brakes during low gear shifting' braking activities; backing up toward the docks; dropping down the dock ramps; and maneuvering away from the docks. Loading/unloading activities would occur on the north and south sides of the Warehouse Site. Driveways and access to the site would occur along Potrero Boulevard and 4th Street.

The Project includes dock-high doors for truck loading/unloading and manufacturing/light industrial operations. The dock-high doors are set back a minimum of 130 feet from the northern retaining wall and 185 feet from the southern concrete wall. Loading dock noise is typically 68 dB at 50 feet. At the property line, noise levels would attenuate to approximately 59.7 dBA at the property line. Therefore, noise levels associated with truck maneuvering/parking and loading/unloading would not exceed the City's 75 dBA exterior Industrial and Commercial noise standard during the day and 50 dB during the night. Additionally, based on distance attenuation, noise levels due to loading/unloading would be reduced to 47.2 dBA at the closest residences located 550 feet to the north of the loading areas. These noise levels would also be further attenuated by intervening structures. Furthermore, loading dock doors would also be surrounded with protective aprons, gaskets, or similar improvements that, when a trailer is docked, would serve as a noise barrier between the interior warehouse activities and the exterior loading area. This would attenuate noise emanating from interior activities, and as such, interior loading and associated activities would be permissible during all hours of the day. As described above, noise levels associated with trucks and loading/unloading activities would not exceed the City's standards and impacts would be less than significant.

Parking Noise

The Project provides 314 automobile parking stalls and 106 trailer parking stalls. Parking is located on the western portion of the Warehouse Site, along Potrero Boulevard. Nominal parking noise would occur within the on-site parking facilities. Traffic associated with parking lots is typically not of sufficient volume to exceed community noise standards, which are based on a time-averaged scale such as the CNEL scale. The instantaneous maximum sound levels generated by a car door slamming, engine starting up, and car passbys range from 60 to 63 dBA however there are no adjacent noise-sensitive receptors. Therefore, noise impacts associated with parking would be less than significant.

Off-Site Traffic Noise

Implementation of the Project would result in additional traffic on adjacent roadways, thereby increasing vehicular noise near existing and proposed land uses. Based on the Traffic Impact Analysis, the Project would result in approximately 1,685 daily trips. The Opening Year "2021 Without Project" and "2021 Plus Project" scenarios are compared in ***Table 3.11-10: Opening Year Traffic Noise Levels***.

Table 3.11-10- Opening Year Traffic Noise Levels

Roadway Segment	2021 Without Project		2021 With Project		Change	Significant Impacts
	ADT	dBA CNEL at 100 feet from Roadway Centerline	ADT	dBA CNEL at 100 feet from Roadway Centerline		
Oak Valley Parkway, west of Potrero Blvd.	7,469	66.2	7,782	66.4	0.2	No
Oak Valley Parkway, between Potrero Boulevard and Desert Dawn Drive	10, 356	67.7	10,982	67.9	0.2	No
Potrero Boulevard, south of Oak Valley Parkway	5,656	64.9	6,282	65.3	0.4	No
4th Street, west of Viele Avenue	9,854	67.4	10,198	67.5	0.1	No
4th Street, east of Viele Avenue	4,884	63.3	5,203	63.6	0.3	No
Viele Avenue, between Luis Estrada Road and 4th Street	7,568	65.7	7,592	65.7	00.0	No
Viele Avenue, south of 4th Street	4,398	63.3	4,398	63.3	0.0	No
California Avenue, between Luis Estrada Road and 4th Street	13,990	68.8	14,210	68.8	0.0	No
California Avenue, south of 4th Street	11,586	68.0	11,685	68.0	0.0	No
ADT= average daily traffic; dBA = A weighted decibels; CNEL = Community noise equivalent level.						
Source: Based on traffic data within the Traffic Impact Study, prepared by Kimley-Horn, 2020. Refer to ***Appendix I*** for traffic noise modeling assumptions and results.						

As shown in ***Table 3.11-10***, roadway noise levels, both with and without the Project, would range from 63.3 dBA to 68.8 dBA and Project-generated traffic would result in a maximum increase of 0.4 dBA. In general, a 3-dBA increase in traffic noise is barely perceptible to people, while a 5-dBA increase is readily noticeable. As the noise level increase is below 3.0 dBA, a less than significant impact would occur in this regard. No mitigation is required.

Potential Effects on Wildlife

The Project Site is adjacent to undeveloped areas with native habitat. Various studies address the potential noise effects to wildlife. According to the study, *How and Why Environmental Noise Impacts Animals: An Integrative, Mechanistic Review* (Knight and Swaddle, Ecology Letters, 2011), the health and behavioral effects of noise on animals were found to start occurring at 80 to 90 dB or more. Additionally, according to the Caltrans document, *Technical Guidance for Assessment and Mitigation of the Effects of Traffic and Road Construction Noise on Birds* (2016), continuous noise levels above 110 dBA lasting over 12-24 hours or a single impulsive noise over 140 dBA (125 dB for multiple blasts) can cause hearing loss in birds. Additionally, continuous noise above 93 dBA is the threshold thought to potentially mask important communication signals, and possibly lead to other behavioral and/or physiological effects. The study also notes that birds adapt to short-term loud noises by increasing the level of their vocal output by as much as 10 dB.

Table 3.11-9, above, shows that construction equipment generates noise levels ranging from 76 dBA and 88 dBA. As discussed above, construction noise would be acoustically dispersed throughout the Warehouse Site and not concentrated in one area near surrounding sensitive uses. Additionally, the habitat areas would be 200 feet or more from the Warehouse Site. At this distance, the highest construction equipment noise levels would attenuate to 76 dBA, which is below the levels identified above where effects on wildlife are expected to occur. Additionally, as discussed above, operational noise levels from mechanical equipment, truck and loading dock noise, and parking lot noise would not exceed the City's 75 dBA noise standards. As such, operational noise also would be below the levels where effects on wildlife are expected to occur. Therefore, noise impacts to habitat areas and wildlife would be less than significant.

Mitigation Measures

No mitigation measures are required.

Impact 4.12-2: Generation of excessive groundborne vibration or groundborne noise levels?

Level of Significance: Less than Significant Impact

Increases in groundborne vibration levels attributable to the Project would be primarily associated with short-term construction-related activities. The FTA has published standard vibration velocities for construction equipment operations in their 2018 *Transit Noise and Vibration Impact Assessment Manual*. The types of construction vibration impacts include human annoyance and building damage.

Human annoyance is evaluated in vibration decibels (VdB) (the vibration velocity level in decibel scale) and occurs when construction vibration rises significantly above the threshold of human perception for extended periods of time. The FTA *Transit Noise and Vibration Impact Assessment Manual* identifies 75 VdB as the approximate threshold for annoyance. Building damage can be cosmetic or structural. Ordinary buildings that are not particularly fragile would not experience cosmetic damage (e.g., plaster cracks) at distances beyond 30 feet. This distance can vary substantially depending on soil composition and underground geological layer between vibration source and receiver. In addition, not all buildings respond similarly to vibration generated by construction equipment. For example, for a building that is constructed with reinforced concrete with no plaster, the FTA guidelines show that a vibration level of up to 0.20 in/sec is considered safe and would not result in any vibration damage.

Table 3.11-11: Typical Construction Equipment Vibration Levels, lists vibration levels at 25 feet and 100 feet for typical construction equipment. Groundborne vibration generated by construction equipment spreads through the ground and diminishes in magnitude with increases in distance. As indicated in ***Table 3.11-11*** based on FTA data, vibration velocities from typical heavy construction equipment operations that would be used during Project construction range from 0.003 to 0.089 in/sec PPV at 25 feet from the source of activity, which is below the FTA's 0.20 PPV threshold. The nearest sensitive receptors are the residential uses located approximately 550 feet to the northeast of the active construction zone.

Table 3.11-11: Typical Construction Equipment Vibration levels

Equipment	Peak Particle Velocity at 25 feet (in/sec)	Peak Particle Velocity at 100 feet (in/sec)[1]	Approximate VdB at 25 Feet	Appropriate VdB at 100 feet[2]
Large Bulldozer	0.089	0.011	87	69
Caisson Drilling	0.089	0.011	87	69
Loaded Trucks	0.076	0.011	86	68
Jackhammer	0.035	0.004	79	61
Small Bulldozers/Tractors	0.003	0.000	58	41

1. Calculated using the following formula: $PPV_{equip} = PPV_{ref} \times (25/D)^{1.5}$, where: PPV_{equip} = the peak particle velocity in in/sec of the equipment adjusted for the distance; PPVref = the reference vibration level in in/sec from Table 7-4 of the Federal Transit Administration, Transit Noise and Vibration Impact Assessment Manual, 2018; D = the distance from the equipment to the receiver.

2. Calculated using the following formula: Lv(D) = Lv(25 feet) - (30 x log10(D/25 feet)) per the FTA Transit Noise and Vibration Impact Assessment Manual (2018).

As shown in ***Table 3.11-11***, construction VdB levels would not exceed 69 VdB at 100 feet (i.e., below the 75 VdB annoyance threshold). It can reasonably be assumed that at 550 feet, the vibration levels would attenuate further. It is also acknowledged that construction activities would occur throughout the Warehouse Site and would not be concentrated at the point closest to the nearest residential structure. Therefore, vibration impacts associated with the Project construction would be less than significant.

Once operational, the Project would not be a significant source of groundborne vibration. Groundborne vibration surrounding the Project currently result from heavy-duty vehicular travel (e.g., refuse trucks, heavy duty trucks, delivery trucks, and transit buses) on the nearby local roadways. Operations of the Project would include truck deliveries. Due to the rapid drop-off rate of ground-borne vibration and the short duration of the associated events, vehicular traffic-induced ground-borne vibration is rarely perceptible beyond the roadway right-of-way, and rarely results in vibration levels that cause damage to buildings in the vicinity. According to the FTA's Transit Noise and Vibration Impact Assessment, trucks rarely create vibration levels that exceed 70 VdB (equivalent to 0.012 inches per second PPV) when they are on roadways. Therefore, trucks operating at the Warehouse Site or along surrounding roadways would not exceed FTA thresholds for building damage or annoyance. Impacts would be less than significant in this regard.

Mitigation Measures

No mitigation measures are required.

Impact 4.12-3: ***For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?***

Level of Significance: Less than Significant Impact

The closest airport to the Project Site is the Banning Municipal Airport located approximately nine miles to the east. The Project is not within two miles of a public airport or within an airport land use plan.

Additionally, there are no private airstrips located within the Project vicinity. Therefore, the Project would not expose people working in the Project area to excessive airport- or airstrip-related noise levels and no mitigation is required.

Mitigation Measures

No mitigation measures are required.

3.11.5 SIGNIFICANT UNAVOIDABLE IMPACTS

The Project would not result in any significant impacts, or impacts that require mitigation. The Project is sufficiently distanced from sensitive receptors and airports such that Project generated noise, as well as noise received at the Project Site would not be significant.

3.11.6 CUMULATIVE IMPACTS

The Project's construction activities would not result in a substantial temporary increase in ambient noise levels. The City permits construction activities between the hours of 7:00 a.m. and 6:00 p.m. and would generate periodic, temporary, noise impacts that would cease upon completion of construction activities. The Project would contribute to other proximate construction project noise impacts if construction activities were conducted concurrently. However, based on the noise analysis above, the Project's construction-related noise impacts would be less than significant following compliance with the General Plan and the Municipal Code. The nearest sensitive receptors would be located approximately 550 feet north of the Project and are separated from the Project by SR-60. Given that noise dissipates as it travels away from its source, operational noise impacts from on-site activities and other stationary sources would be limited to the Warehouse Site and vicinity. Thus, cumulative operational noise impacts from related projects, in conjunction with Project specific noise impacts, would not be cumulatively significant.

3.11.7 REFERENCES

Kimley-Horn Associates. 2020. *Acoustical Assessment*, *Potrero Logistics Center*. November 2020.