Noise & Vibration Study
First Industrial Warehouse II at Wilson Avenue
City of Perris

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1.0 INTRODUCTION

First Industrial Warehouse II at Wilson Avenue (project) is being proposed within the Perris Valley Commerce Center Specific Plan (PVCCSP) planning area in the City of Perris. The project has the potential to generate changes in the existing noise environment. Under the California Environmental Quality Act (CEQA), projects of this type must undergo an environmental review to assess potential impacts. The following noise analysis has been prepared to support the Mitigated Negative Declaration (MND) for the project and to demonstrate consistency with all applicable federal, state, and local noise regulations.

The following noise study describes the project, provides information regarding noise fundamentals, describes the applicable federal, state, and local noise guidelines, characterizes the existing noise environment, provides the study methods and procedures used to perform the traffic noise analysis, and evaluates off-site traffic noise impacts, presents stationary-related noise impacts from loading and unloading activities and construction noise impacts near sensitive residential communities. The project must incorporate the recommended noise mitigation measures presented in the Perris Valley Commerce Center Specific Plan Environmental Impact Report (PVCC SP EIR, July 2011).

1.1 Project Location and Site Description

The project site is located on an approximate 9.7-acre partially developed parcel located along the eastern side of Wilson Avenue, south of East Rider Street, north of Placentia Avenue, and bordered by the Perris Valley Storm Drain (PVSD) channel to the east in in the City of Perris, Riverside County, California. **Figure 1** depicts the project area in a regional context, while **Figure 2** presents the project site. The site is accessible by two driveway entrances along Wilson Avenue. Existing structures that currently exist at the project site will be demolished. **Figure 3** provides the proposed site plan of the warehouse.

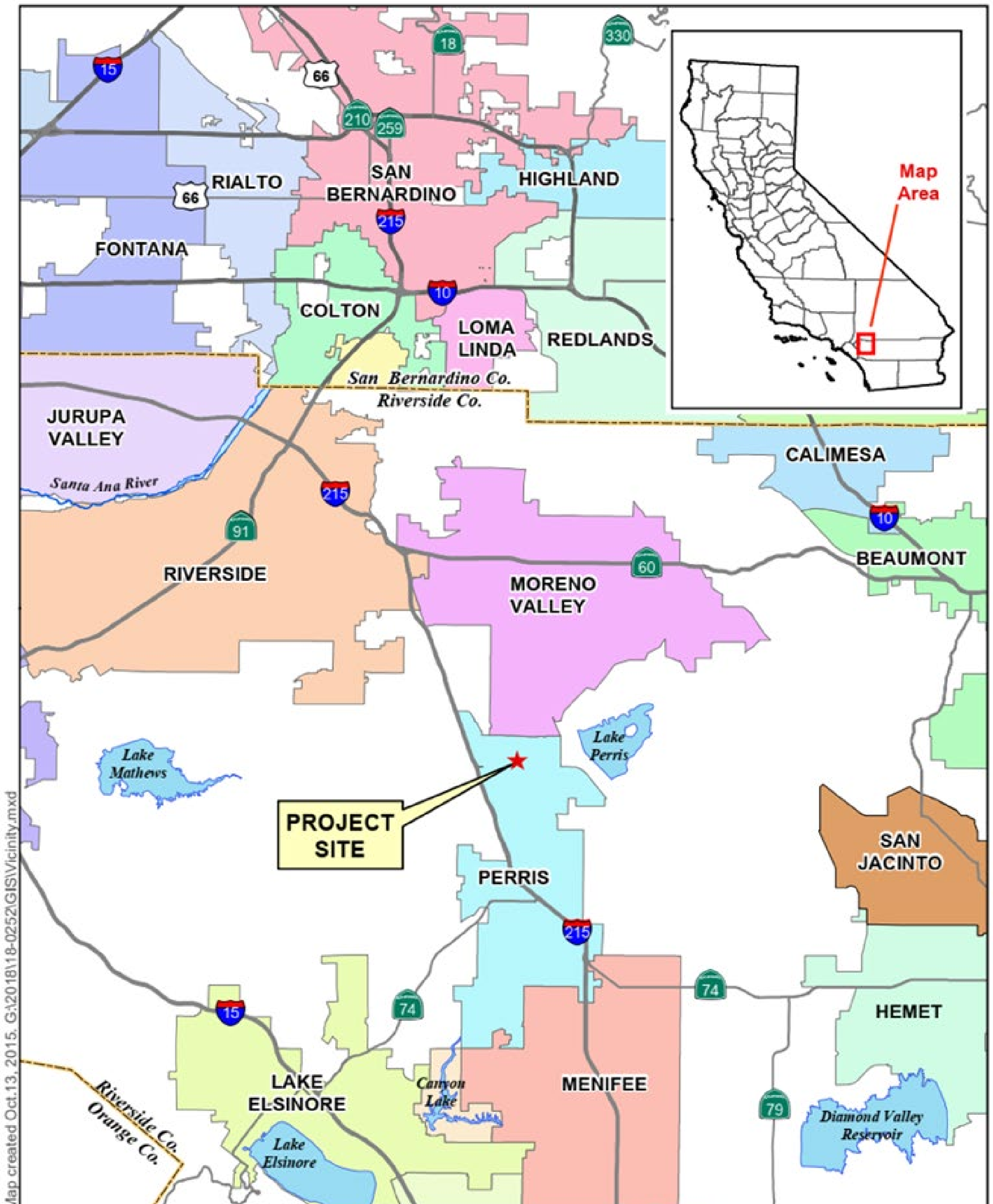
1.2 Project Description

The project site is located within the Perris Valley Commerce Center Specific Plan (PVCCSP) planning area of the City of Perris. The PVCCSP was adopted in 2012. The project applicant proposes the development of an approximate 154,558 square foot (sf) industrial non-refrigerated warehouse distribution facility use, 4,000 sf of mezzanine space, water quality basin and relocation of existing water appurtenances and an existing streetlight. Existing power poles located on the west side of Wilson Avenue will be protected in place. Approximately 1.4 acres along the eastern portion of the site would be reserved for future expansion of the PVSD channel.

The eastern portion of the Project site is vacant and consists of fallow land. The western portion of the site, however, is comprised of an existing commercial warehouse/production facility that produces and distributes straw wattle and other erosion control products. The warehouse facility is constructed of steel and is sited on concrete foundation, with a portable office building and concrete paving. These existing structures and pavement will demolished along with portions of existing curb in Wilson Avenue as part of the proposed Project.

The proposed Project has been designed to comply with the applicable Standards and Guidelines outlined in the PVCCSP. Landscaping, walls, and fences will be provided on site as required for screening, privacy, and security. The Project is designed to include a 10-foot-high tubular steel fence along the north, east, and south side of the Project site boundary. A total of 23 truck loading docks and truck parking will be located on the southern side of the Project site and will be enclosed on the east and west side by 14-foot-high concrete tilt-up screen walls. Access to the truck yard will be through two 8-foot-high wrought iron rolling gates placed at the east and west side of the truck yard. Vehicle parking located on the west side of the project site. Access to the Project site will be from Wilson Avenue via two driveways; the south most driveway has direct access to the truck yard.

The speculative warehouse/distribution use is assumed to operate 24 hours a day 7 days a week.



Source: County of Riverside GIS, 2018.

Figure 1 – Vicinity Map

First Industrial Warehouse at Wilson Ave.

0 2 4 6 Miles

ALBERT A. WEBB ASSOCIATES

Sources: Riverside Co. GIS, 2021;
RCIT, 2019.

0 400 800 Feet

Figure 2 - Aerial Map
First Industrial Warehouse 2 at Wilson Avenue

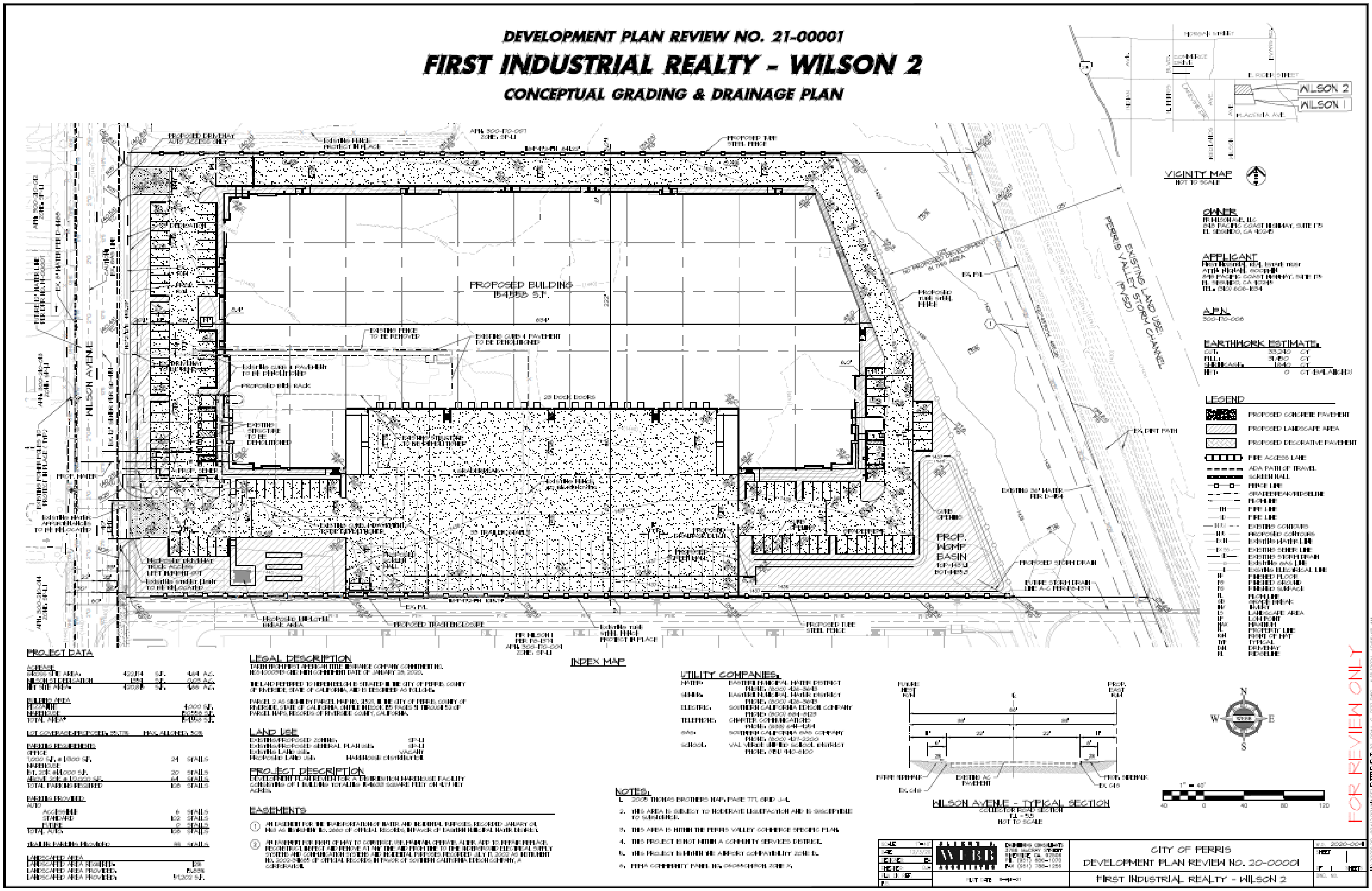


Figure 3. Site Plan

2.0 FUNDAMENTALS OF SOUND

Sound is mechanical energy transmitted by pressure waves in a compressible medium such as air. Noise is generally defined as unwanted or excessive sound, which can vary in intensity by over one million times within the range of human hearing; therefore, a logarithmic scale, known as the decibel scale (dB), is used to quantify sound intensity. Community noise varies continuously over a period of time with respect to the contributing sound sources of the community noise environment. Community noise is primarily the product of many distant noise sources, which constitute a relatively stable background noise exposure, with the individual contributors unidentifiable. As such, background noise level changes throughout a typical day, corresponding with the addition and subtraction of distant noise sources such as traffic and single-event noise sources (e.g., aircraft flyovers, motor vehicles, sirens), which are readily identifiable to the individual.

Because the noise environment is continually changing, average noise over a period of time is generally used to describe the community noise environment, which requires the measurement of noise over a period of time to accurately characterize a community noise environment. This time-varying characteristic of environmental noise is described using various noise descriptors, which are defined below:

L_{eq}: The L_{eq}, or equivalent sound level, is used to describe noise over a specified period of time in terms of a single numerical value; the L_{eq} of a time-varying signal and that of a steady signal are the same if they deliver the same acoustic energy over a given time. The L_{eq} may also be referred to as the average sound level.

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

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

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

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

CNEL: CNEL, or Community Noise Equivalent Level, is the average A-weighted noise level during a 24-hour day that is obtained after the addition of 5 dBA to measured noise levels between the hours of 7:00 pm to 10:00 pm and after the addition of 10 dBA to noise levels between the hours of 10:00 pm to 7:00 am to account for noise sensitivity in the evening and nighttime, respectively.

In addition, the sound is characterized by both its amplitude and frequency (or pitch). The human ear does not hear all frequencies equally. In particular, the ear deemphasizes low and very high frequencies. To approximate the sensitivity of human hearing, the A-weighted decibel scale (dBA) is used. On this scale, the human range of hearing extends from approximately 3 dBA to around 140 dBA. **Table 2-1** includes examples of A-weighted noise levels from common indoor and outdoor activities.

Table 2-1. Typical A-Weighted Noise Levels

Common Outdoor Noise	Noise Level (dBA)	Common Indoor Noise
	— 110 —	Rock band (noise to some, music to others)
Jet fly-over at 1000 feet		
	— 100 —	
Gas lawn mower at 3 feet		
	— 90 —	
Diesel truck at 50 feet at 50 mph		Food blender at 3 feet
	— 80 —	Garbage disposal at 3 feet
Noisy urban area, daytime		
Gas lawn mower, 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 a neighboring room
Quiet urban nighttime	— 40 —	Theater, large conference room (background)
Quiet suburban nighttime		
	— 30 —	Library
Quiet rural nighttime		Bedroom at night
	— 20 —	
		Broadcast/recording studio
	— 10 —	
Lowest threshold of human hearing	— 0 —	Lowest threshold of human hearing
SOURCE: Caltrans, 1998.		

Using the decibel scale, sound levels from two or more sources cannot be directly added together to determine the overall sound level. Rather, the combination of two sounds at the same level yields an increase of 3 dBA. The smallest recognizable change in sound levels is approximately 1 dBA. A 3-dBA increase is generally considered perceptible, whereas a 5-dBA increase is readily perceptible. Most people judge a 10-dBA increase as an approximate doubling of the sound loudness.

Two of the primary factors that reduce levels of environmental sounds are increasing the distance between the sound source to the receiver and having intervening obstacles such as walls, buildings, or terrain features between the sound source and the receiver. Factors that act to increase the loudness of environmental sounds include moving the sound source closer to the receiver, sound enhancements caused by reflections, and focusing caused by various meteorological conditions.

2.1. Effects of Noise on People

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

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

Although exposure to high noise levels has been demonstrated to cause physical and physiological effects, the principal human responses to typical environmental noise exposure are related to subjective effects and interference with activities. Interference effects refer to interruption of daily activities and include interference with human communication activities, such as normal conversations, watching television, telephone conversations, and interference with sleep. Sleep interference effects can consist of both awakening and arousal to a lesser state of sleep. With regard to the subjective effects, the responses of individuals to similar noise events are diverse. They are influenced by many factors, including the type of noise, the perceived importance of the noise, the appropriateness of the noise to the setting, the duration of the noise, the time of day, and the type of activity during which the noise occurs, and individual noise sensitivity.

Overall, a wide variation of tolerance to noise exists, based on an individual's past experiences with sound. Thus, an important way of predicting a human reaction to a new noise environment is the way it compares to the existing environment to which one has adapted (i.e., comparison to the ambient noise environment). In general, the more a new noise level exceeds the previously existing ambient noise level, the less acceptable the new noise level will be judged by those hearing it. With regard to increases in A-weighted noise level, the following relationships generally occur:

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

These relationships occur in part because of the logarithmic nature of sound and the decibel system. The human ear perceives sound in a non-linear fashion; hence the decibel scale was developed.

Because the decibel scale is based on logarithms, two noise sources do not combine in a simple additive fashion but rather logarithmically. For example, if two identical noise sources produce noise levels of 50 dBA, the combined sound level would be 53 dBA, not 100 dBA.

2.2. Noise Attenuation

Stationary point sources of noise, including stationary, mobile sources such as idling vehicles, attenuate (lessen) at a rate between 6 dBA for hard sites and 7.5 dBA for soft sites for each doubling of distance from the reference measurement. Hard sites are those with a reflective surface between the source and the receiver, such as asphalt or concrete surfaces or smooth bodies of water. No excess ground attenuation is assumed for hard sites, and the changes in noise levels with distance (drop-off rate) are simply the geometric spreading of the noise from the source. Soft sites have an absorptive ground surface such as soft dirt, grass, or scattered bushes and trees. In addition to geometric spreading, an excess ground attenuation value of 1.5 dBA (per doubling distance) is normally assumed for soft sites. Noise from line sources (such as traffic noise from vehicles) attenuates at a rate between 3 dBA for hard sites and 4.5 dBA for soft sites for each doubling of distance from the reference measurement (Caltrans 2013).

Physical barriers between the noise source and the receiving property are also useful in reducing noise levels. Effective noise barriers can lower noise levels by 10 to 15dBA. A noise barrier is more effective when it's placed closest to the noise source or receiver, depending upon site geometry. However, there is a limitation on the effectiveness of a noise barrier. Noise barriers must block the line of sight between the receiving property and the noise source. When this occurs, a noise barrier can achieve a 5-dBA noise level reduction. This may require the noise barrier to be sufficiently long and high enough to block the view of a road to reduce traffic noise.

2.3. Fundamentals of Vibration

Vibration is energy transmitted in waves through the ground or man-made structures. These energy waves generally dissipate with distance from the vibration source. Familiar sources of ground-borne vibration are trains, buses on rough roads, and construction activities such as blasting, pile-driving, and operation of heavy earth-moving equipment. As described in the Federal Transit Administration's (FTA) Transit Noise and Vibration Impact Assessment (FTA 2006), ground-borne vibration can be a serious concern for nearby neighbors of a transit system route or maintenance facility causing buildings to shake and rumbling sounds to be heard.

Several different methods are used to quantify vibration. The peak particle velocity (PPV) is defined as the maximum instantaneous peak of the vibration signal. The PPV is most frequently used to describe vibration impacts to buildings. The root mean square (RMS) amplitude is most frequently used to describe the effect of vibration on the human body. The RMS amplitude is defined as the average of the squared amplitude of the signal. Decibel notation (VdB) is commonly used to measure RMS. The relationship of PPV to RMS velocity is expressed in terms of the "crest factor," defined as the ratio of the PPV amplitude to the RMS amplitude. Peak particle velocity is typically a factor of 1.7 to 6 times greater than RMS vibration velocity (FTA 2006). The decibel notation acts to compress the range of numbers required to describe vibration. Typically, ground-borne vibration generated by man-made activities attenuates rapidly with distance from the source of the vibration. Sensitive receptors for vibration include structures (especially older masonry structures), people (especially residents, the elderly, and sick), and vibration-sensitive equipment.

The effects of ground-borne vibration include movement of the building floors, rattling of windows, shaking of items on shelves or hanging on walls, and rumbling sounds. In extreme cases, the vibration can cause damage to buildings. Building damage is not a factor for most projects, with the occasional exception of blasting and pile-driving during construction. Annoyance from vibration often occurs when the vibration levels exceed the threshold of perception by only a small margin. A vibration level that causes annoyance will be well below the damage threshold for normal buildings. The FTA measure of the threshold of architectural damage for conventional sensitive structures is 0.2 in/sec PPV (FTA 2006).

In residential areas, the background vibration velocity level is usually around 50 VdB (approximately 0.0013 in/sec PPV). This level is well below the vibration velocity level threshold of perception for humans, which is approximately 65 VdB. A vibration velocity level of 75 VdB is considered to be the approximate dividing line between barely perceptible and distinctly perceptible levels for many people (FTA 2006).

3.0 REGULATORY FRAMEWORK

The project's governing regulatory framework within the City of Perris includes federal, state, and local noise and vibration standards. These standards are summarized below.

3.1 Federal Regulations and Standards

There are no federal noise standards that directly regulate environmental noise related to the construction or operation of the project. With regard to noise exposure and workers, the Office of Safety and Health Administration (OSHA) regulations safeguard the hearing of workers exposed to occupational noise. Federal regulations also establish noise limits for medium and heavy trucks (more than 4.5 tons, gross vehicle weight rating) under 40 Code of Federal Regulations (CFR), Part 205, Subpart B. The federal truck pass-by noise standard is 80 dBA at 15 meters (approximately 50 feet) from the vehicle pathway centerline. These controls are implemented through regulatory restrictions on truck manufacturers.

3.2 Federal Transit Authority Vibration Standards

The City of Perris does not have vibration standards for evaluating building damage. In lieu of specific vibration criteria, FTA vibration criteria will be utilized as a guide. The FTA has adopted vibration standards to evaluate potential building damage impacts related to construction activities. The vibration damage criteria adopted by the FTA are shown in **Table 3-1**.

Table 3-1. Construction Vibration Damage Criteria

Building Category	PPV (in/sec)
I. Reinforced-concrete, steel, or timber (no plaster)	0.5
II. Engineered concrete and masonry (no plaster)	0.3
III. Non-engineered timber and masonry buildings	0.2
IV. Buildings extremely susceptible to vibration damage	0.12
SOURCE: FTA, 2006.	

The FTA has also adopted the following standards for ground-borne vibration impacts related to human annoyance: Vibration Category 1 – High Sensitivity, Vibration Category 2 – Residential, and Vibration Category 3 – Institutional. The FTA defines Category 1 as buildings where vibration would interfere with operations, such as vibration-sensitive research and manufacturing facilities, hospitals with vibration-sensitive equipment, and research operations. Category 2 refers to all residential land uses and any buildings where people sleep, such as hotels and hospitals. Category 3 refers to institutional land uses such as schools, churches, other institutions, and quiet offices that do not have vibration-sensitive equipment but still have the potential for activity interference. The vibration thresholds associated with human annoyance for these three land-use categories are shown in **Table 3-2**. No thresholds have been adopted or recommended for industrial, commercial, and office uses.

Table 3-2. Ground-borne Vibration Impact Criteria for General Assessment

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

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

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

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

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

SOURCE: FTA, 2006

3.2 State Regulations and Standards

Noise Standards

The California Department of Health Services has established guidelines for land use and noise exposure compatibility that are listed in **Table 3-3**. In addition, the California Government Code (Section 65302(g)) requires a noise element to be included in general plans and requires that the noise element: (1) identify and appraise noise problems in the community; (2) recognize Office of Noise Control guidelines; and (3) analyze and quantify current and projected noise levels.

Table 3-3. California Community Noise Exposure (Ldn or CNEL)

Land Use	Normally Acceptable[a]	Conditionally Acceptable[b]	Normally Unacceptable[c]	Clearly Unacceptable[d]
Single-family, Duplex, Mobile Homes	50 - 60	55 – 70	70 - 75	above 75
Multi-Family Homes	50 - 65	60 – 70	70 - 75	above 75
Schools, Libraries, Churches, Hospitals, Nursing Homes	50 - 70	60 – 70	70 - 80	above 80
Transient Lodging – Motels, Hotels	50 - 65	60 – 70	70 - 80	above 75
Auditoriums, Concert Halls, Amphitheaters	---	50 – 70	---	above 70
Sports Arena, Outdoor Spectator Sports	---	50 – 75	---	above 75
Playgrounds, Neighborhood Parks	50 - 70	---	67 - 75	above 75
Golf Courses, Riding Stables, Water Recreation, Cemeteries	50 - 75	---	70 - 80	above 80
Office Buildings, Business, and Professional Commercial	50 - 70	67 – 77	above 75	---
Industrial, Manufacturing, Utilities, Agriculture	50 - 75	70 – 80	above 75	---

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

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

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

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

SOURCE: FTA, 2006.

The State of California has noise limits for vehicles licensed to operate on public roads. For heavy trucks, the state pass-by standard is consistent with the federal limit of 80 dBA. The state pass-by standard for light trucks and passenger cars (less than 4.5 tons, gross vehicle rating) is also 80 dBA at 15 meters (50 feet) from the centerline. These standards are implemented through controls on vehicle manufacturers and by state and local law enforcement officials' legal sanctions.

3.3 Local Regulations and Standards

City of Perris Municipal Code

The City of Perris Municipal Code, Chapter 19.44 (Industrial Zones) Section 19.44.070 b(1) and b(2), outlines performance standards for Industrial uses as follows.

- Noise generated on-site shall be controlled for compatibility with surrounding land uses. Any proposed use that may generate noise during evening hours (7:00 pm to 7:00 am) must submit a detailed noise assessment and plan to address and mitigating potential noise impacts.
- Vibrations generated on-site shall not be detectable off-site. Any proposed use that may generate vibrations detectable off-site must submit a detailed vibration assessment and plan to address and mitigate potential impacts.

The City of Perris Municipal Code, under Chapter 7.34 (Noise Control), provides the local government ordinance relative to community noise level exposure, guidelines, and regulations.

The City of Perris Municipal Code, Chapter 7.34 *Noise Control*, Section 7.34.040, establishes the following permissible noise levels that may intrude into a neighbor's property from the use of sound-amplifying equipment. The maximum permissible noise level shall not exceed 60 dBA during the hours of 10:01 pm to 7:00 am, and 80 dBA between the house or 7:01 am to 10:00 pm at the property line of the affected residential land use

The Municipal Code exterior noise level criteria for residential properties affected by operational noise sources are included in Section 7.34.050 *General Prohibition*, which states that the Section 7.34.040 sound-amplifying equipment noise standards shall apply.

Construction Noise Levels Pursuant to Section 7.34.060 (Construction Noise), the construction, demolition, excavation, alteration, or repair of any building or structure in such a manner as to create disturbing, excessive, or offensive noise is prohibited between the hours of 7:00 pm, and 7:00 am, on Sundays, and a legal holiday. Construction activity shall not exceed 80 dBA Lmax in residential zones within the city.

City of Perris General Plan

The City of Perris General Plan Noise Element includes Land Use/Noise Compatibility Guidelines, as shown in **Figure 4** (on page 18), which generally establishes acceptable exterior noise levels for specified land uses.

Under Policy V.A, the City of Perris General Plan states that new large-scale commercial or industrial facilities located within 160 feet of sensitive land uses shall mitigate noise impacts to attain an acceptable level as required by the State of California Noise/Land Use Compatibility Criteria. Under this policy, the City of Perris General Plan Noise Element lists Implementation Measure V.A.1. This implementation measure requires an acoustical impact analysis to be prepared for new industrial and large-scale commercial facilities that are constructed within 160 feet of the property line of any existing noise-sensitive land use. This analysis shall document the nature of the commercial or industrial facility and all interior or exterior facility operations that would generate exterior noise. The analysis shall document the placement of any existing or proposed noise-sensitive land uses situated within the 160-foot distance. The analysis shall determine the potential noise levels that could be received at these sensitive land uses and specify specific measures to be employed by the large-scale commercial or industrial facility to ensure that these levels do not exceed 60 dBA CNEL at the property line of the adjoining sensitive land use. No development permits or approval of land use applications shall be issued until the acoustic analysis is received and approved by the City Staff.

This acoustical impact analysis satisfies Implementation Measure V.A.1 and provides documentation of compliance to all applicable noise standards.

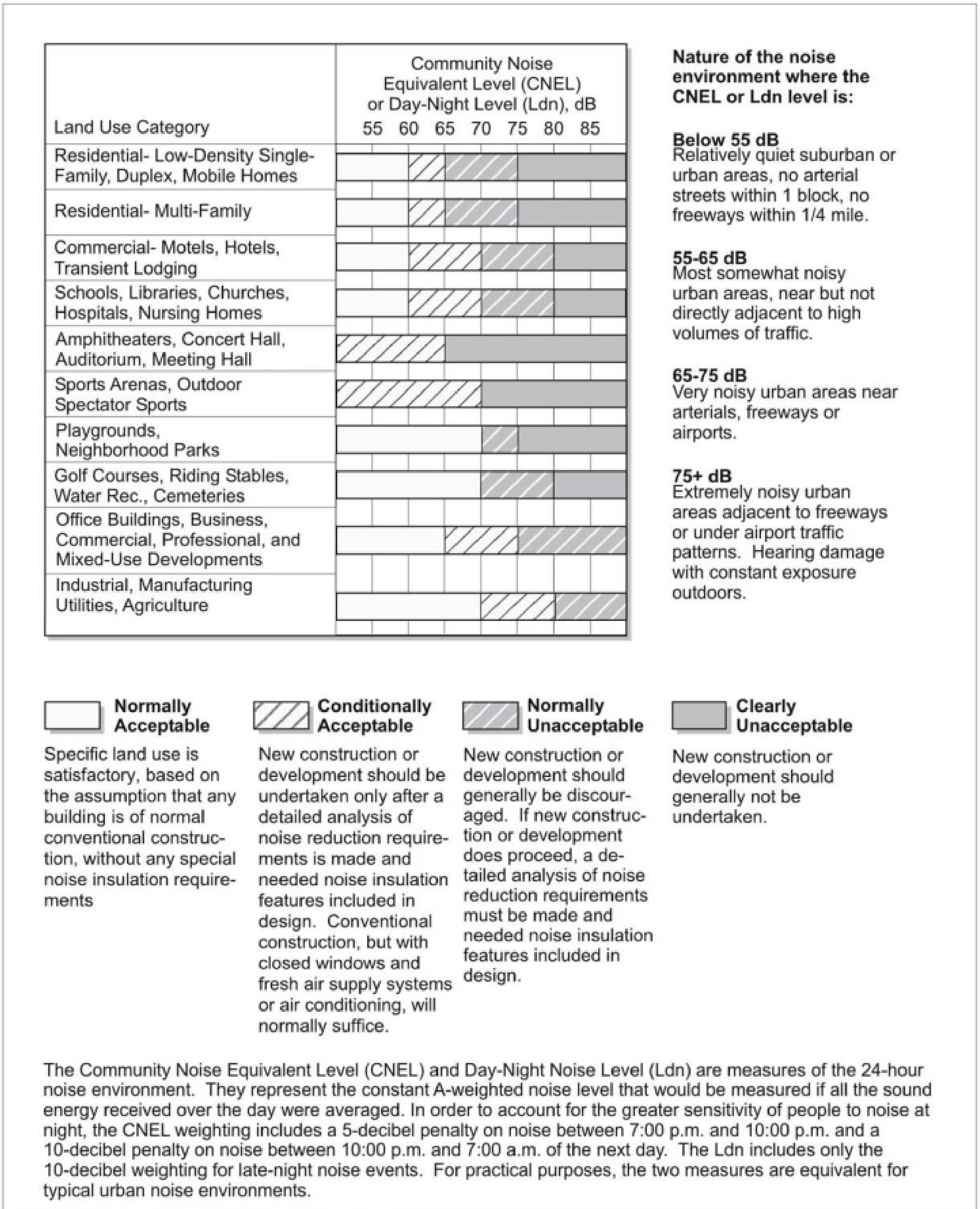


Figure 4. City of Perris Land Use Compatibility Guidelines

4.0 THRESHOLDS OF SIGNIFICANCE

Appendix G of the 2020 California Environmental Quality Act (CEQA) Guidelines states that a project could have a noise impact if any of the following would occur:

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

b) Generation of excessive ground-borne vibration or ground-borne noise levels?

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

4.1. Perris Valley Commerce Center Specific Plan Thresholds

While the CEQA Guidelines and the City of Perris General Plan Guidelines provide direction on noise compatibility and establish noise standards by land-use type, CEQA thresholds are not defined for the levels at which increases are considered substantial. However, according to the PVCC SP Environmental Impact Report (EIR), *there is no official "industry standard" of determining the significance of noise impacts. However, typically, a jurisdiction will identify either 3 dBA or 5 dBA increase as being the threshold because these levels represent varying levels of perceived noise increases* (page 4.9-20, PVCC SP EIR, July 2011).

The PVCC SP EIR indicates that a 5-dBA noise level increase is considered *discernable to most people in an exterior environment* when the existing noise levels are below 60 dBA. Further, it identifies a 3-dBA increase threshold when the existing ambient noise levels already exceed 60 dBA (page 4.9-20, PVCC SP EIR, July 2011).

4.2. Operational and Construction Thresholds

Noise levels exceed CEQA thresholds if any of the following occur as a direct result of the due to the proposed development.

OFF-SITE TRAFFIC NOISE

Traffic noise impacts exceed the CEQA thresholds when the resulting noise levels at noise-sensitive land uses (e.g., residential, etc.):

- are less than 60 dBA CNEL and the project creates a 5 dBA CNEL or greater project-related noise level increase (PVCC SP EIR, Page 4.9-20); or
- exceed 60 dBA CNEL, and the project creates a 3 dBA CNEL or greater project-related noise level increase (PVCC SP EIR, Page 4.9-20).

OPERATIONAL NOISE AND VIBRATION

The noise CEQA threshold is exceeded if one of the following occurs:

- Project-related operational noise levels resulting from stationary sources, such as on-site noise such as idling trucks, delivery truck activities, backup alarms, loading and unloading, air conditioning units, and parking lot vehicle movements, exceed the 80 dBA L_{max} daytime or 60 dBA L_{max} nighttime noise level standards at the nearby sensitive receiver locations in the City of Perris (City of Perris Municipal Code, Section 7.34.040); or
- Project-related operational noise levels from industrial or commercial facilities located within 160 feet of the property line of the affected residential land use exceed 60 dBA CNEL: or
- Ambient noise levels at the nearby noise-sensitive receivers near the Project site:
  - are less than 60 dBA L_{eq} and the project creates a 5 dBA L_{eq} or greater project-related noise level increase (PVCC SP EIR, Page 4.9-20); or
  - exceed 60 dBA $L_{eq,}$ and the project creates a 3 dBA Leq or greater project-related noise level increase (PVCC SP EIR, Page 4.9-20).

Although the City of Perris does not have any specified thresholds for vibration, the FTA vibration criteria, as referenced in the PVCC SP EIR pages 4.9-27 and 4.9-28, will be utilized to evaluate vibration impacts. If long-term project generated operational source vibration levels exceed the FTA maximum acceptable vibration standard of 80 vibration decibels (VdB) at noise-sensitive receiver locations, noise levels will exceed the vibration CEQA threshold.

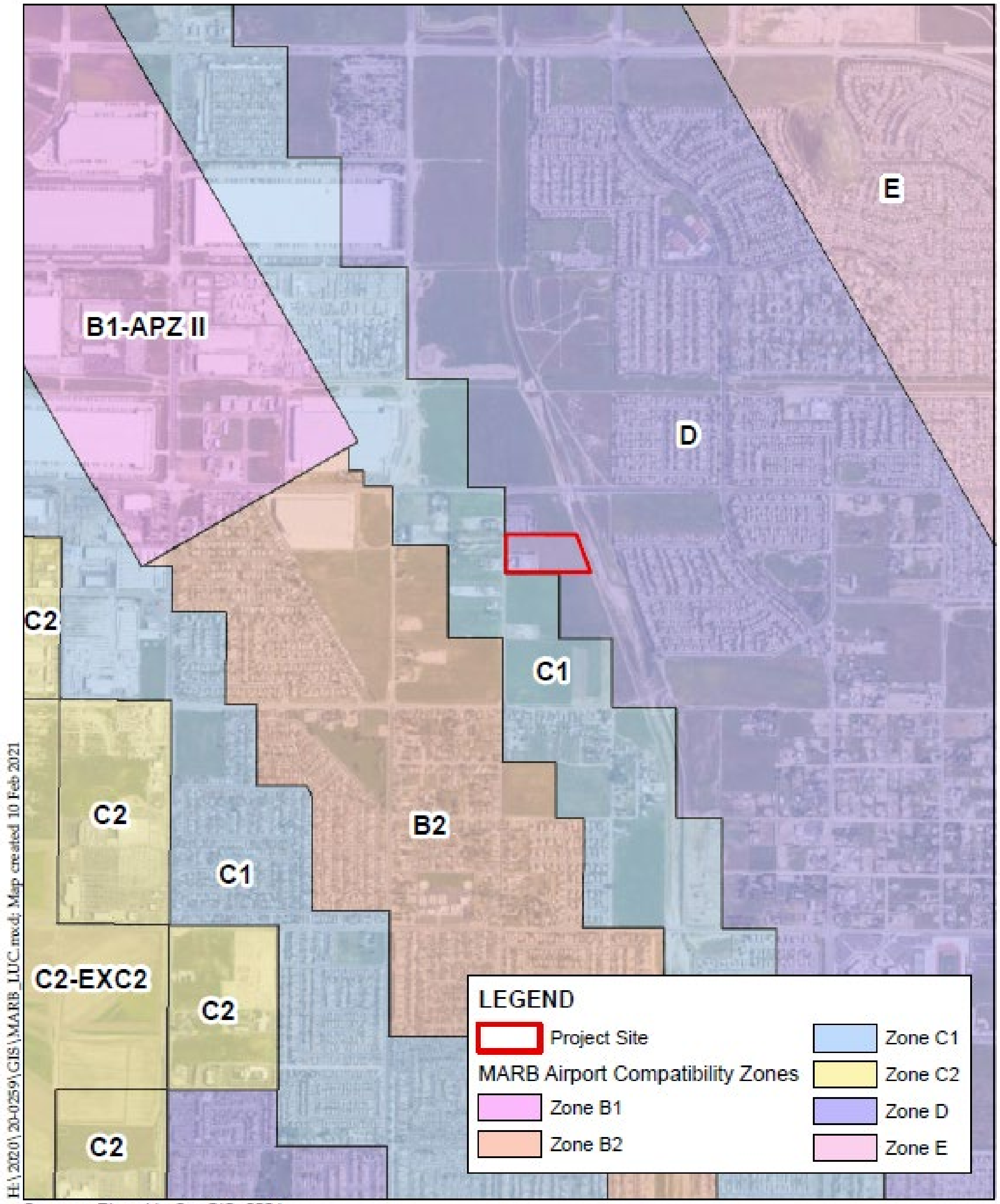
CONSTRUCTION NOISE AND VIBRATION

If project-related construction activities create noise levels at sensitive receiver locations in the City of Perris above the construction noise level limit of 80 dBA L_{eq} (City of Perris Municipal Code7.34.060), noise levels will exceed the noise CEQA threshold.

Although the City of Perris does not have any specified thresholds for vibration, the FTA vibration criteria, as referenced PVCC SP EIR pages 4.9-27 and 4.9-28, will be utilized to evaluate vibration impacts. If short-term project-generated construction source vibration levels exceed the FTA maximum acceptable vibration standard of 80 vibration decibels (VdB) at noise-sensitive receiver locations, noise levels will exceed the vibration CEQA threshold.

AIRPORT NOISE

The nearest airport, which is approximately 2.5 miles northwest of the project site, is March Air Reserve Base/Inland Port Airport. The Riverside County Airport Land Use Commission adopted the March Air Reserve Base/Inland Port Airport Land Use Compatibility Plan. This Plan provides noise contours for this airport to assist in setting policies for establishing new land uses and appropriate mitigation for properties that will continue to be exposed to higher noise levels. As shown in **Figure 5**, the project is located within the March Air Reserve Base land use Compatibility Zones C1 and D. For these zones, the noise contour is 60 and 65 CNEL, respectively. The project is consistent with the type of land use for this compatibility zone. Standard building construction is for the project is presumed to provide adequate sound attenuation where the difference between the exterior noise exposure and the interior standard is 20 dB or less. Compliance with the land use type for this compatibility zone meets the CEQA threshold for airport noise.



Sources: Riverside Co. GIS, 2021;
USDA NAIP, 2018.

0 1,000 2,000 3,000 Feet

Figure 5 - MARB Compatibility Zones
First Industrial Warehouse 2 at Wilson Avenue

5.0 EXISTING NOISE MEASUREMENTS

The existing noise environment was characterized by collecting field noise measurements at sensitive residential properties within the project area. A total of two (2) long-term 24-hour measurement was taken at the project site on November 22 and November 25, 2019. **Table 5-1** presents the CNEL values and hourly day and night noise levels for the project site for the sensitive receivers identified in **Figure 6**. Appendix A includes the field monitoring data for each monitoring location.

5.1 Measurement Procedure and Criteria

Hourly noise levels were measured during typical weekday conditions over 24 hours to describe the existing noise environment, the daytime, nighttime hourly noise levels, and associated 24-hour CNEL. The 24-hour measurements provide the hourly noise levels to calculate the CNEL for the project area. Long-term noise measurements were taken using a Larson Davis Type 1 precision sound level meter. All noise meters were programmed in "slow" mode to record noise levels in the "A" weighted form. The sound level meter and microphone were mounted, five feet above the ground, and equipped with a windscreen during all measurements. The Larson Davis sound level meter was calibrated before the monitoring using a CAL200 calibrator. All noise level measurement equipment meets American National Standards Institute (ANSI) specifications for sound level meters (S1.4-1983 identified in Chapter 19.68.020.AA).

5.2 Noise Measurement Locations

The noise monitoring location was selected based on the proximity to nearby residential property and local roadways. Noise measurement locations Site 1 and Site 2 are shown in **Figure 6**. **Table 5-1** identifies the hourly daytime (7:01 am to 10:00 pm) and nighttime (10:01 pm to 7:00 am) noise levels at each noise level measurement location consistent with the City of Perris Municipal Code. Appendix A provides a summary of the existing hourly ambient noise levels as described below:

Site 1 represents the noise levels adjacent to the northeast portion of the Project site boundary near Rider Street. The noise level measurements collected show an overall 24-hour exterior noise level of 66.4 dBA CNEL. The energy (logarithmic) average daytime noise level was calculated at 60.1 dBA L_{eq} with an average nighttime noise level of 52.4 dBA L_{eq}.

Site 2 represents the noise levels adjacent to the southwest portion of the Project site boundary near Wilson Avenue. The noise level measurements collected show an overall 24-hour exterior noise level of 66.5 dBA CNEL. The energy (logarithmic) average daytime noise level was calculated at 55.5 dBA L_{eq} with an average nighttime noise level of 55.9 dBA L_{eq}.

Table 5-1. Existing (Ambient) Long-Term (24-hour) Noise Level Measurements[1]								
Noise Monitoring Location ID[2,3]	Description	Hourly Noise Levels (1hr-L_{eq})[4]						24-hour Noise Levels (CNEL)
		Daytime Minimum	Daytime Maximum	Average Daytime	Nighttime Minimum	Nighttime Maximum	Average Nighttime	
Site 1	3715 Wilson Avenue (near northeast corner of the project site)	52.5	62.7	60.1	49.5	69.7	52.4	66.4
Site 2	2940 Wilson Avenue (southwest west corner of the project site)	51.6	62.3	55.5	56	63.1	55.9	66.5

[1] Noise measurement taken on November 22,2019 and November 25, 2019. See Appendix A for monitoring data.

[2] See Figure 5 for the location of the monitoring sites.

[3] Taken with Larson Davis Type 1 noise meter

[4] Daytime hours- 7:01am to 10:00pm, Nighttime hours-10:01pm to 7:00am

Sources: Riverside Co. GIS, 2021;
RCIT, 2019.

0 400 800 Feet

Figure 6 - Aerial Map
First Industrial Warehouse 2 at Wilson Avenue

6.0 ANALYSIS METHODS AND PROCEDURES

The following section outlines the analysis methods utilized to predict future noise and vibration levels from the construction and operation of the project.

6.1 Construction

6.1.1 Noise Analysis Methods

The assessment of the construction noise impacts must be relatively general at this phase of the project because many of the decisions affecting noise will be at the discretion of the contractor. However, an assessment based on the type of equipment expected to be used by the contractor can provide a reasonable estimate of potential noise impacts and the need for noise mitigation. A worst-case construction noise scenario was developed to estimate the loudest activities occurring at the project site. Pile driving and blasting activities are not anticipated; therefore, the loudest construction activities are centered around the movement of heavy construction equipment during site preparation, grading operations, and the erection of buildings. Noise levels were estimated based on a worst-case scenario, which assumed all pieces of equipment would be operating simultaneously during each construction phase. The calculated noise level was then compared to the respective local noise regulation to determine if construction would exceed the City of Perris's exterior noise standard of 80 dBA L_{max} at nearby residential land uses. Construction of the project is expected to occur over nine months. Receiver distance to the construction activity along with the construction equipment operating at the maximum load will have the greatest influence on construction noise levels experienced at residential land uses.

6.1.2 Vibration Analysis Methods

Ground-borne vibration levels resulting from construction activities within the project area were estimated using the FTA data in its Transit Noise and Vibration Impact Assessment Manual (FTA, 2018). Predicted construction vibration levels were identified at the nearest off-site residential land use and compared to the FTA damage criteria and the human annoyance criteria, as shown previously in **Table 3-1** and **Table 3-2**, respectively.

6.2 Operational Noise & Vibration Analysis

6.2.1 Operational Traffic Noise Analysis Methods

The project roadway noise impacts from vehicular traffic were predicted using the FHWA-TNM 2.5 Model. The FHWA TNM 2.5 Model arrives at a predicted noise level through several adjustments to the Reference Energy Mean Emission Level (REMEL). Adjustments are then made to the REMEL to account for: roadway classifications (e.g., collector, secondary, major, or arterial), active roadway width (i.e., the distance between the center of the outermost travel lanes on each side of the roadway), traffic volumes, travel speed, percentages of automobiles, medium trucks, and heavy trucks, roadway grade, angle of view (e.g., whether the roadway view is blocked), the site conditions ("hard" or "soft" relates to the adsorption of the ground, pavement, or landscaping).

6.2.2 Operational Traffic Noise Analysis Inputs

The traffic analysis prepared by Webb Associates demonstrated that the project is in a low Vehicle Mile Travel (VMT) generating area. The project is also not considered a local-serving project. Therefore, a qualitative analysis was performed to evaluate the determine whether the project would provide a net increase in vehicle trips compared to existing conditions that would have the ability to increase noise levels to a perceptible level of 3 dBA or greater. If increases are perceptible the Project would have a significant impact.

6.2.3 Operational Traffic Vibration Analysis

As a conservative measure, the vibration vs. distance curve obtained from the Caltrans Transportation and Construction Vibration Guidance Manual will be used to represent worst-case vibration levels from truck traffic at the nearest receiver locations along Wilson Avenue. This curve provides empirical data collected from several freeways and local roadways to determine auto and truck traffic vibration levels. This curve will make a qualitative assessment of anticipated vibration levels at residential land uses along local roadways near the project site. These vibration levels will be compared to the Caltrans and FTA vibration criteria, as shown previously in **Table 3-1 and Table 3-2**. These criteria will be utilized to evaluate the vibration effects of continuous auto and truck traffic.

6.2.4 Stationary Noise Analysis Method

The primary non-transportation noise sources associated with the project are HVAC equipment, on-site parking lot circulation, and the 23-bay loading dock. In order to evaluate these noise sources at the nearest residential noise-sensitive receptors, existing short-term measurements were taken to obtain a reference noise level of similar operational activities. These reference noise levels were used to describe the anticipated operational noise levels generated from idling trucks, delivery truck activities, backup alarms, loading and unloading, air conditioning units, and parking lot vehicle movements. **Table 6.1** provides the reference noise level measurements that were collected from similar existing operational noise sources. The reference noise levels were obtained at a Costco Distribution Center located at 26610 Ynez Rd, Temecula, CA 92591. Measurements were taken at this location of similar stationary source activity of a typical warehouse.

Table 6.1 Reference Noise Levels

Noise source[1]	Duration of measurement	Reference Distance from the source (ft)	Noise source height (ft)	L_{eq} @Reference distance	L_{max} @Reference distance	L_{eq}@ 50 feet	Lmax@ 50 feet
unloading/loading[2]	15min	10	8	69.6 dBA	76.1 dBA	55.6 dBA	62.1 dBA
Parking lot circulation[3]	30min	12	5	71.3 dBA	81.2 dBA	58.9 dBA	68.8 dBA
Air conditioning units [4]	30min	5	25	68.6 dBA	87.5dBA	48.6dBA	67.5dBA

[1] Noise measurements were taken at the Temecula Costco Distribution Center on 12/13/2019.
[2] Activities included in this measurement-Backup alarms, unloading a docked truck container.
[3] Activities included in this measurement-cars pulling in and out of spaces, exiting, and entering the parking lot.
[4] Activities included in this measurement- mechanical roof-top air conditioning unit on the roof.

7.0 OFF-SITE TRANSPORTATION NOISE IMPACTS

Roadway Noise

Implementation of the Project would generate increased traffic volumes along nearby roadway segments. According to the Focused Traffic Impact Analysis (TIA) for FIR Wilson 2 Warehouse Development on Wilson Avenue in the City of Perris, California (DPR 21-00001) prepared by Webb Associates (Mayl,2021), the proposed Project would generate 270 daily vehicle trips and a total of 26 AM peak hour vehicle trips and 29 PM peak hour vehicle trips. The Project's increase in traffic would result in noise increases on Project area roadways. In general, a traffic noise increase of 3 dBA is barely perceptible to people, while a 5-dBA increase is readily noticeable. Traffic volumes on Project area roadways would have to approximately double for the resulting traffic noise levels to increase by 3 dBA.

Peak hour traffic counts were taken in 2019 near the Project site and annualized at 3 percent per year for two years to determine current year existing traffic counts. The total 2021 annualized existing AM and PM peak hour traffic counts were provided for three segments, Rider Street east of Wilson Street, Rider Street west of Wilson, Wilson Avenue south of the Project site, as shown in **Table 7.1 – 2021 Existing Peak Hour Traffic**, below. For each segment and peak period (AM and PM) the total amount of traffic counts are provided for each of the following vehicle types, passenger, 2-axle, 3-axle, and 4-axle vehicle types. Further, the total AM and PM peak hour traffic volumes were provided for all vehicle types for each segment. Information from Table 7.1 was used to determine whether the increase in Project related traffic is significant enough to cause a noticeable effect on traffic noise.

Table 7.1 2021 Existing Peak Hour Traffic

Segment	Passenger	2-axle	3-axle	4-axle	Total
AM Peak Hour					
Rider Streat East of Wilson	1,541	27	0	2	1,570
Rider Street West of Wilson	1,258	10	1	6	1,275
Wilson Avenue South of Project Site	477	11	0	0	488
PM Peak Hour					
Rider Street East of Wilson	1,149	18	0	2	1,169
Rider Street West of Wilson	1,061	8	0	6	1,075
Wilson Avenue South of Project Site	323	3	1	0	327

Source: 2021 Focused Traffic Study 2019 peak hour counts annualized at 3 percent per year

The Project's TIA determined the number of trips that would be generated for the Project during the AM and PM Peak Hours and the percentage of traffic expected to travel along the segments near the Project site. The TIA report indicates that 45 percent of the Project's passenger traffic is expected to travel east along Rider Street, 40 percent west along Rider Street, and 15 percent on Wilson Avenue south of the Project site. This percentage of passenger car traffic amounts to only 20 (10 traveling east and 10 traveling west) passenger car trips in the AM peak hour and 21 (11 traveling east and 10 traveling west) cars in the PM peak hour. All non-passenger vehicle trips (large 2-, 3-, and 4-axle vehicles) would travel west along Rider Street before turning north on Redlands Avenue. This would account for only two (2) truck trips in the AM peak hour and four (4) truck trips in the PM peak hour. **Table 7.2 Project AM Peak Hour Traffic** and **Table 7.3- Project PM Peak Hour Traffic** provide a summary of the Project related peak hour traffic distribution by segment and vehicle type.

Table 7.2 Total AM Project Peak Hour Traffic Distribution by Segment

Segment	Percentage of Total Peak Volume	Passenger Cars	2-axle Trucks	3-axle	4-axle	Total Project Peak Hour Volume
Rider Street East of Wilson Avenue	45%	10	0	0	0	11
Rider Street West of Wilson Avenue	40%	10	0	0	2	11
Wilson Avenue South of Project Site	15%	4	0	0	0	4
Total AM Project Peak Hour Traffic	**100%**	**24**	**0**	**0**	**2**	**26**

Source: Webb Associates (2021) Focused Traffic Impact Analysis

Table 7.3 Total PM Project Peak Hour Traffic Distribution by Segment						
Segment	Percentage of Total Peak Volume	Passenger Cars	2-axle Truck s	3-axle	4-axle	Total Project Peak Hour Volume
Rider Street East of Wilson Avenue	45%	11	0	0	0	11
Rider Street West of Wilson Avenue	40%	10	0	1	3	14
Wilson Avenue South of Project Site	15%	4	0	0	0	4
Total PM Project Peak Hour Traffic	100%	25	0	1	3	29
Source: Webb Associates (2021) Focused Traffic Impact Analysis						

Table 7.4- Existing vs. Project Peak Hour Traffic Volumes compares the Project peak hour volume to existing 2021 annualized peak hour traffic. The AM eastbound peak hour total traffic along Rider Street would increase by 11 vehicles and the westbound traffic would increase by 11 total vehicles. The PM westbound peak hour total traffic along Rider Street would increase by 11 vehicles and the PM westbound peak hour traffic would increase by 14 vehicles. The AM southbound peak hour total traffic along Wilson Avenue would increase by 4 vehicles and the PM southbound traffic would increase by 4 vehicles The increase in peak hour Project traffic volume along the Rider Street and Wilson Avenue segments is a negligible increase compared to the existing peak hour traffic . Therefore, the proposed Project would not generate enough traffic that would result in a permanent 3-dBA increase in ambient noise levels and traffic noise would not exceed any local standards.

Table 7.4 Peak Hour Traffic Comparison		
Segment	Existing Peak Hour Traffic Trips	Total Project Peak Hour Traffic Trips
AM Peak Hour		
Rider East of Wilson	1,570	11
Rider West of Wilson	1,169	11
Wilson South of Project Site	488	4
PM Peak Hour		
Rider Street East of Wilson	1,275	11
Rider Street West of Wilson	1,075	14
Wilson South of Project Site	327	4
Source: Webb Associates (2021) Focused Traffic Impact Analysis		

8.0 STATIONARY-RELATED NOISE IMPACTS

The project was evaluated for stationary noise impacts. The City of Perris Municipal Code, Section 7.34.040, requires operational noise levels not to exceed the 80 dBA L_{max} daytime or 60 dBA L_{max} nighttime noise level standards at the nearby sensitive receiver locations in the City of Perris. This noise study evaluates noise levels at residential zones surrounding the project site. There are several non-conforming residential homes located around the project site where impacts were evaluated. The residential noise standards were applied to these locations. Stationary-related noise impacts were evaluated utilizing the maximum noise levels assumptions outlined in section 6.2.4 for the HVAC equipment, on-site parking lot circulation, and the proposed 23-bay loading dock (including backup beeps and air brake releases).

Table 8-1 provides a listing of the sensitive residential receiver locations near the project site. Distances from the sensitive receiver location to the project site were from receivers R1 through R8.

The reference noise levels for various operational noise sources provided in **Table 6.1** were utilized to calculate the predicted operational source noise levels at residential receiving properties, R1 through R8. The noise propagation attenuation formula was used to account for distance attenuation due to geometric spreading when sound from a localized stationary source propagates. Sound attenuates at a rate of 6 dB for each doubling of distance from a point source. This attenuation factor was applied to each reference noise level to obtain the predicted operational noise level. The predicted operational noise levels for each operational source type were combined to obtain the total project-only operational noise level at each nearby sensitive residential receiver location. The combined project operational noise levels at receivers R1 through R8 range from 40.8 to 57.9 dBA L_{max} as shown in Table 8-1. Table 8-2 shows the combined operational CNEL values range from 37 to 54. Therefore, operational noise levels associated with the project will satisfy the City of Perris Municipal Code exterior noise level standards of 80 dBA L_{max} daytime and 60 dBA L_{max} nighttime and the General Plan Standard of 60 CNEL.

Table 8-1. Project Only Operational Noise levels (dBA L_{max})

Receiver Location[1]	Distance	Noise Sources (dBA L_{max})[2]			Combined Project Only Operational Noise Level (dBA L_{max})[3]	Daytime Standard 80 dBA L_{max} Exceeded	Nighttime Standard 65 dBA L_{max} Exceeded
		Unloading /loading	Parking lot Circulation	Air Conditioning units			
R1	1,087	35.4	42.1	40.8	45.0	No	No
R2	693	39.3	46.0	44.7	48.9	No	No
R3	610	40.4	47,1	45.8	50.0	No	No
R4	607	40.4	47.1	45.8	50.0	No	No
R5	1,755	31.2	37.9	36.6	40.8	No	No
R6	244	48.3	55.0	53.7	57.9	No	No
R7	394	44.2	50.9	49.6	53.8	No	No
R8	1,300	33.8	40.5	39.2	43.4	No	No

[1] Figure 6 shows the receiver locations.
[2] Calculated by taking the reference noise levels provided in Table 6-1 and applying the 6dBA doubling of distance propagation attenuation noise formula.
[3] Calculated logarithmically by adding the reference noise levels for each operating source type together to obtain a total noise level.

Table 8-2. Project Only Operational Noise levels (dBA L_{eq}) & CNEL							
Receiver Location[1]	Distance	Noise Sources (dBA L_{eq})[2]			Combined Project Only Operational Noise Level (dBA L_{eq})[3]	CNEL	60 CNEL Standard Exceeded
		Unloading /loading	Parking lot Circulation	Air Conditioning units			
R1	1,087	28.9	32.2	21.9	34.1	41	No
R2	693	32.8	36.1	25.8	38.0	45	No
R3	610	33.9	37.2	26.9	39.1	46	No
R4	607	33.9	37.2	26.9	39.1	46	No
R5	1,755	24.7	28.0	17.7	30.0	37	No
R6	244	41.8	45.1	34.8	47.0	54	No
R7	394	37.7	41.0	30.7	42.9	50	No
R8	1,300	27.3	30.6	20.3	32.5	39	No

[1] Figure 6 shows the receiver locations.
[2] Calculated by taking the reference noise levels provided in Table 6-1 and applying the 6dBA doubling of distance propagation attenuation noise formula.
[3] Calculated logarithmically by adding the reference noise levels for each operating source type together to obtain a total noise level.

As shown in **Tables 8-3 and 8-4**, the combined project only operational noise levels provided in **Table 8.1** were added to the average measured ambient noise level to determine the total combined operational noise level and the increase over existing ambient noise levels.

Table 8-3. Operational Daytime Operational Noise levels (dBA L_{eq})					
Receiver Location[1]	Combined Operational Noise Level (dBA L_{eq})[2]	Measurement Location[3]	Average Measured Ambient Noise Level (dBA L_{eq})[3]	Combined Noise level (dBA L_{eq})[4]	Project Increase
R1	34.1	Site 1	60.1	60.1	0.0
R2	38.0	Site 1	60.1	60.1	0.0
R3	39.1	Site 1	60.2	60.1	0.0
R4	39.1	Site 1	60.1	60.1	0.0
R5	30.0	Site 1	60.1	60.1	0.0
R6	47.0	Site 2	55.5	56.1	0.6
R7	42.9	Site 2	55.5	55.7	0.2
R8	32.5	Site 2	55.5	55.5	0.0

[1] Figure 6 shows the receiver locations.

[2] Combined Noise Level from Table 8-1.

[3] Site 1 average measured daytime noise level was used for receivers closest to Rider St. Site 2 average measured daytime noise level was used for receivers closest to Wilson Avenue.

[4] Calculated logarithmically by adding the average measured daytime ambient noise level listed in Table 5.1 for the nearest respective monitoring site to the combine operational noise level.

Table 8-4. Operational Nighttime Operational Noise levels (dBA L_{eq})					
Receiver Location[1]	Combined Operational Noise Level (dBA L_{eq})[2]	Measurement Location[3]	Measured Ambient Noise Level (dBA L_{eq})[3]	Combined Noise level (dBA L_{eq})[4]	Project Increase
R1	34.1	Site 1	52.4	52.4	0.0
R2	38.0	Site 1	52.4	52.4	0.0
R3	39.1	Site 1	52.4	52.4	0.0
R4	39.1	Site 1	52.4	52.4	0.0
R5	30.0	Site 1	52.4	52.4	0.0
R6	47.0	Site 2	55.9	56.4	0.5
R7	42.9	Site 2	55.9	56.1	0.2
R8	32.5	Site 2	55.9	55.9	0.0

[1] Figure 6 shows the receiver locations.
[2] Combined Noise Level from Table 8-2.
[3] Site 1 average measured nighttime noise level was used for receivers closest to Rider St. Site 2 average measured nighttime noise level was used for receivers closest to Wilson Avenue.
[4] Calculated logarithmically by adding the average measured nighttime ambient noise level listed in Table 5.1 for the nearest respective monitoring site to the combine operational noise level.

The project will contribute a daytime operational noise level increase of up to 0.6 dBA L_{eq} and a nighttime operational noise level increase of up to 0.5 dBA L_{eq} at the nearest sensitive residential receiver locations. The project-related operational noise level contributions would not exceed the CEQA threshold of 5-dBA L_{eq} when the without project noise levels are below 60 dBA or a 3-dBA increase when the project noise levels are above 60 dBA as discussed in Section 4. Therefore, the increases at the sensitive residential receiver locations will not exceed the CEQA threshold.

9.0 OPERATIONAL VIBRATION ANALYSIS

The operation of the project will increase auto and truck traffic within the project area. Per the Caltrans Transportation Noise and Vibration Manual, traffic, auto, and heavy trucks traveling on roadways rarely generate vibration amplitudes high enough to cause structural or cosmetic damage. However, a qualitative analysis was provided in this study to evaluate the likelihood of vibration impacts from the project utilizing the empirical vibration curve developed by Caltrans.

The Caltrans Noise and Vibration Manual provides a collection of measured vibration data for truck pass-bys. This data demonstrates that truck pass-bys can be characterized by a peak in vibration that is considerably higher than those generated by automobiles for a few seconds. Vibration from these trucks drops off dramatically with distance. As truck volumes increases, more peaks will occur but not necessarily higher peaks. Vibration wavefronts emanating from several trucks closely together may either cancel or partially cancel (destructive interference) or reinforce or partially reinforce (constructive interference) each other, depending on their phases and frequencies. Since traffic vibrations can be considered random, the probabilities of total destructive or constructive interference are minimal. Coupled with the fact that two trucks cannot occupy the same space and the rapid drop-off rates, it is understandable that two or more trucks normally do not contribute significantly to each other's peaks.

In order to predict the maximum truck traffic vibrations from the project, the Caltrans empirical curve, as shown in **Figure 7,** was obtained from the Caltrans Noise and Vibration Manual (Caltrans, 2013). This curve was used to predict operational vibration impacts. **Figure 7** shows a graph of measured vibration data collected from truck traffic traveling on freeways and local roadways plotted by truck traffic vibrations vs. distance from the nearest travel lane's centerline. The graph indicates that the highest traffic generated vibrations measured on freeway shoulders (5 m from the centerline of the nearest lane) have never exceeded 2.0 mm/s or (0.08 in/sec) with the worst combinations of heavy trucks. This amplitude coincides with the maximum recommended "safe amplitude" for historical buildings. The graph illustrates the rapid attenuation of vibration amplitudes, which dips below the threshold of perception for most people at about 45 m (150 ft). Caltrans states that sensitive receivers adjacent to local roadways, within 15 m(50 feet) of the nearest travel lane's centerline will have maximum worse-case vibration levels near 0.08 mm/s or (0.0032 in/sec or 70 VdB).

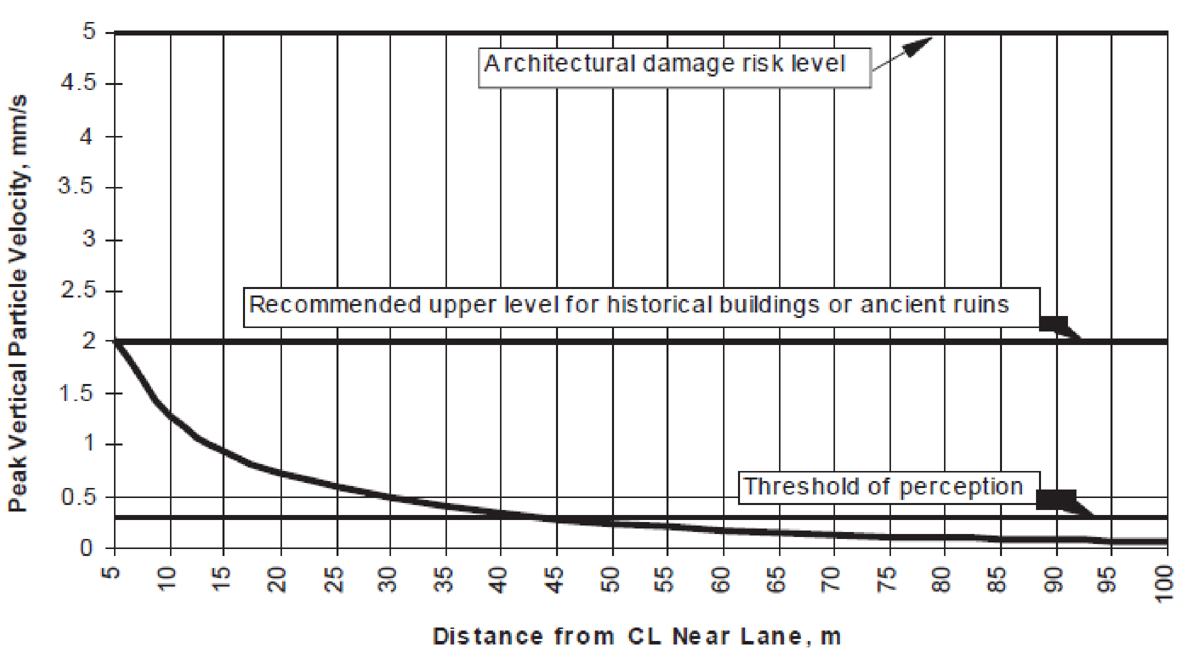


Figure 7. Maximum Truck Traffic Vibration Levels vs. Distance

Caltrans and FTA provide a range of perceptible annoyance levels, and this predicted vibration level falls well below the distinctly perceptible level of 0.08 PPV (in/sec), below the FTA damage criteria of 0.3 PPV (in/sec) and the human annoyance level of 80 VdB. Further, this worst-case vibration level from truck traffic would not exceed the Caltrans threshold of 0.2 PPV (in/sec). It is expected that actual vibration levels within the project area from truck traffic will be lower than this worst-case level when soil type and pavement conditions are considered. On this basis, the potential for the Project to result in the exposure of persons to, or generation of, excessive ground-borne vibration is determined to be below the 80 VdB FTA vibration threshold.

10.0 SHORT-TERM CONSTRUCTION NOISE & VIBRATION IMPACTS

Construction noise represents a temporary impact on ambient noise levels. Construction noise is primarily caused by diesel engines (trucks, dozers, backhoes), impacts (jackhammers, pile drivers, hoe rams), and backup alarms. Construction equipment can be stationary or mobile. Stationary equipment operates in one location for hours or days in a constant mode (generators, compressors) or generates variable noise operations (pile drivers, jackhammers), producing constant noise for a period of time. Mobile equipment moves around the site and is characterized by variations in power and location, resulting in significant variations in noise levels over time. Grading activities and rock blasting typically generate the greatest noise impacts during construction. This section assesses the potential noise impacts to the existing sensitive residential land uses during construction.

10.1 Noise Sensitive Uses and Construction Noise Standards

Pursuant to the City of Perris Municipal Code Section 7.34.060 (Construction Noise), the following construction activities such as demolition, excavation, alteration, or repair of any building or structure are prohibited from creating disturbing, excessive, or offensive noise between the hours of 7:00 pm and 7:00 am, on Sundays, and on a legal holiday. Construction activities within the City of Perris shall not exceed 80 dBA in residential zones within the city. Although the surrounding land uses are not residential zones, several non-conforming residential homes are located around the project site, therefore these standards will be utilized to evaluate construction noise impacts.

10.2 Construction Schedule

The construction schedule for the project is described below.

As shown in **Table 10-1**, the estimated construction period for the project is approximately nine months. Construction is anticipated to begin with grading in April 2021 and end with architectural coatings (painting) starting in December 2023, as shown in **Table 10-1**.

Table 10-1. Construction Schedule

Construction Activity	Start Date	End Date	Total Working Days
Demolition	03/01/2022	03/31/2022	31
Site Preparation	04/01/2021	04/10/2021	10
Grading	04/11/2022	05/11/2022	30
Building Construction	05/11/2022	01/15/2023	225
Paving	12/15/2023	1/15/2023	30
Painting	12/15/2023	1/15/2023	30

Table 10-2 presents the equipment for each construction activity based on engineering estimates and the Applicant.

Table 10-2. Equipment by Construction Activity

Construction Activity	Off-Road Equipment	Unit Amount
Demolition	Concrete/Industrial Saws	1
	Forklifts	3
	Excavators	3
	Rubber Tired Dozers	2
Site Preparation	Tractors/Loaders/Backhoes	4
	Rubber Tired Dozers	3
Grading	Graders	1
	Rubber Tired Dozers	1
	Scrapers	2

Table 10-2. Equipment by Construction Activity		
Construction Activity	Off-Road Equipment	Unit Amount
	Tractors/Loaders/Backhoes	2
	Grader	1
Building Construction	Crane	1
	Forklifts	3
	Generator Sets	1
	Tractors/Loaders/Backhoes	3
	Welders	1
Paving	Cement and Mortar Mixers	2
	Paver	1
	Paving Equipment	1
	Rollers	1
Architectural Coating	Air Compressors	1

10.3 Construction Noise Levels

The RCNM model was used to determine which phase of construction activity for the project would generate the greatest construction noise level. It was assumed that each construction activity would occur within a distance of 244 feet of the nearest residential receiver, R6. The receiver distance was measured from the loading dock to the adjacent property line of the affected residential land use to the west of the project site. **Table 10-3** presents the noise levels in L_{max} for each construction phase. As shown in **Table 10-3**, the highest noise level that would be experienced at R6 is 76 dBA L_{max} during Demolition and Paving activities. This noise level occurs during the demolition and grading phases of the project. This noise level is less than the City of Perris's noise standard of 80 dBA Lmax within residential zones.

Table 10-3. Construction Noise Levels by Construction Phase	
Construction Phases	**Construction dBA, L_{max}[1]**
Demolition	76.0
Site Preparation	67.9
Grading	71.2
Building	71.2
Paving	76.0
Painting	63.9
[1]Worst-case construction noise levels evaluated at the property line of receiver R6, the closest receivers to the project site.	

10.4 Construction Vibration

Ground-borne vibration levels resulting from construction activities occurring within the project site were estimated using the FTA data. Construction activities that would occur within the project site include grading, building construction, paving, and painting. These activities have the potential to generate low levels of ground-borne vibration.

Using the vibration source level of construction equipment provided in Table 7-4 and the FTA's construction vibration assessment methodology, it is possible to estimate the project vibration impacts. **Table 10-4** presents the expected project-related vibration levels at 244 feet at the nearest residential land use. The receiver distance was measured from the loading dock to the adjacent property line of the affected residential land uses to the east of the project site.

Table 10-4. Construction Equipment Vibration Levels				
Noise Receiver	Distance to Property Line[1]	Large Bulldozer Reference Vibration Level PPV_{ref} (VdB) at 25ft	Peak Vibration PPV (VdB) at 185 ft	Exceed Threshold? (Below 80 VdB)
R6	244 feet	87VdB	57VdB	No

[1] Reference noise level obtained from the FTA Noise and Vibration Manual, Table 7-4. (FTA, 2018)

Based on the FTA's reference vibration levels, a large bulldozer represents the peak source of vibration with a reference level of 87 VdB at a distance of 25 feet. At 244 feet, construction vibration levels are expected to approach 57VdB. Using the construction vibration assessment annoyance criteria provided by the FTA for infrequent events, as shown in **Table 3-2**, the construction of the project site will not result in a perceptible human response (annoyance). Impacts at the site of the closest sensitive receptor are unlikely to be sustained during the entire construction period. Moreover, construction at the project site will be restricted to daytime hours, thereby eliminating potential vibration impacts during sensitive nighttime hours. Further, the predicted construction noise level is below the PVCC SP vibration threshold of 80 VdB.

10.5 Construction Mitigation Measures

As discussed previously, the project site is located within the PVCCSP planning area of the City of Perris. Although the project's construction noise and vibration impacts will be below City standards and CEQA thresholds, the project is subject to all applicable mitigation measures from the PVCCSP EIR. The PVCCSP EIR mitigation measures that are applicable to the project are as follows:

- **PVCCSP EIR MM Noise 1**: During all project site excavation and grading on-site, the construction contractors shall equip all construction equipment, fixed or mobile, with properly operating and maintained mufflers, consistent with the manufacturers' standards. The construction contractors shall place all stationary construction equipment, so that emitted noise is directed away from the noise-sensitive receptors nearest the project site.

- **PVCCSP EIR MM Noise 2**: During construction, stationary construction equipment, stockpiling and vehicle staging areas will be placed a minimum of 446 feet away from the closet sensitive receptor.

- **PVCCSP EIR MM Noise 3**: No combustion-powered equipment, such as pumps or generators, shall be allowed to operate within 446 feet of any occupied residence unless the equipment is surrounded by a noise protection barrier.

- **PVCCSP EIR MM Noise 4:** Construction contractors of implementing development projects shall limit haul truck deliveries to the same hours specified for construction equipment. To the extent feasible, haul routes shall not pass sensitive land uses or residential dwellings.

11.0 REFERENCES

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Appendix A Noise Monitoring Data

Site 1 - CNEL Values, November 22, 2019					
Background Leq and Hour Averaging DNL					
Hour	Background L_{eq}	Penalty	L_{eq} DNL (L_{eq} + 10)		L_{eq} DNL (10^(D/10))
0	54.3	10	64.3	DNL	2691534.804
1	53	10	63	DNL	1995262.315
2	49.5	10	59.5	DNL	891250.9381
3	51.6	10	61.6	DNL	1445439.771
4	54.3	10	64.3	DNL	2691534.804
5	55.1	10	65.1	DNL	3235936.569
6	62.5	10	72.5	DNL	17782794.1
7	59.2		59.2		831763.7711
8	53		53		199526.2315
9	55.5		55.5		354813.3892
10	54.5		54.5		281838.2931
11	52.5		52.5		177827.941
12	54.4		54.4		275422.8703
13	54.2		54.2		263026.7992
14	55.5		55.5		354813.3892
15	59.4		59.4		870963.59
16	59.5		59.5		891250.9381
17	57.4		57.4		549540.8739
18	62.7		62.7		1862087.137
19	69.7	5	74.7	CNEL	29512092.27
20	67.3	5	72.3	CNEL	16982436.52
21	65.2	5	70.2	CNEL	10471285.48
22	58.6	10	68.6	DNL	7244359.601
23	55.5	10	65.5	DNL	3548133.892
(Hour 23 is 23:00 to 23:59)				Average=	4391872.345
	10LOG10 of (Average=)				**66.42649708**

Site 2 (Site B) - CNEL Values, November 25, 2019					
Background Leq and Hour Averaging DNL					
Hour	Background L_{eq}	Penalty	L_{eq} DNL (L_{eq} + 10)		L_{eq} DNL (10^(D/10))
0	**59.4**	10	69.4	DNL	8709635.9
1	**56.4**	10	66.4	DNL	4365158.322
2	**57.8**	10	67.8	DNL	6025595.861
3	**59.6**	10	69.6	DNL	9120108.394
4	**57.9**	10	67.9	DNL	6165950.019
5	**63.1**	10	73.1	DNL	20417379.45
6	**59.6**	10	69.6	DNL	9120108.394
7	**58.5**		58.5		707945.7844
8	**54.2**		54.2		263026.7992
9	**55.9**		55.9		389045.145
10	**52.6**		52.6		181970.0859
11	**51.6**		51.6		144543.9771
12	**53.9**		53.9		245470.8916
13	**55**		55		316227.766
14	**62.3**		62.3		1698243.652
15	**62.2**		62.2		1659586.907
16	**56.9**		56.9		489778.8194
17	**58.7**		58.7		741310.2413
18	**56.7**		56.7		467735.1413
19	**56**	5	61	CNEL	1258925.412
20	**56.6**	5	61.6	CNEL	1445439.771
21	**57.2**	5	62.2	CNEL	1659586.907
22	**63**	10	73	DNL	19952623.15
23	**60.2**	10	70.2	DNL	10471285.48
(Hour 23 is 23:00 to 23:59)				Average=	4417361.761
	10LOG10 of (Average=)				**66.45162967**