APPENDIX D

Noise Impact Analysis

Noise Impact Assessment for the Cactus Avenue and Nason Street Commercial Development Project

Moreno Valley, California

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LIST OF ACRONYMS AND ABBREVIATIONS

CalEEMod	California Emissions Estimator Model
Caltrans	California Department of Transportation
CNEL	Community Noise Equivalent Level
City	Moreno Valley
dB	Decibel
dBA	Decibel is A-weighted
FHWA	Federal Highway Administration
FICON	Federal Interagency Committee on Noise
FTA	Federal Transit Administration
HMMH	Harris Miller, Miller & Hanson Inc
Hz	Hertz
L_{dn}	Day-night average sound level
L_{eq}	Measure of ambient noise
L_{max}	The maximum A-weighted noise level during the measurement period.
L_{min}	The minimum A-weighted noise level during the measurement period.
NIOSH	National Institute for Occupational Safety and Health
OPR	Office of Planning and Research
OSHA	Federal Occupational Safety and Health Administration
PPV	Peak particle velocity
Project	Cactus Avenue and Nason Street Commercial Development Project
RCNM	Roadway Construction Noise Model
RMS	Root mean square
STC	Sound Transmission Class
Square foot	sf
VdB	Vibration Velocity Level
WEAL	Western Electro-Acoustic Laboratory, Inc.

1.0 INTRODUCTION

This report documents the results of a Noise Impact Assessment completed for the Cactus and Nason Street Commercial Office and Retail Development Project (Project), which includes the construction of an 89,745-square-foot (sf) commercial/retail development in the City of Moreno Valley, Riverside County. This report was prepared as a comparison of predicted Project noise levels to noise standards promulgated by the City of Moreno Valley General Plan Noise Element and Municipal Code. The purpose of this report is to estimate Project-generated noise and to determine the level of impact the Project would have on the environment.

1.1 Project Location and Description

The 8.4-acre Project Site is located within the City of Moreno Valley in northwest Riverside County (Figure 1-1. *Project Vicinity* and Figure 1-2. *Project Location*), specifically on the northeast corner of Nason Street and Cactus Avenue, east of the Riverside University Health System Medical Center and approximately two miles south of State Route 60 and five miles east of Interstate 215. The Project is depicted on the U.S. Geological Survey Sunnymead 7.5-minute topographic quadrangle. The elevation at the Project Site is approximately 1,550 feet above mean sea level. Currently vacant, the Project Site is bounded by more vacant land to the north, residential land uses to the east and south, and medical offices to the west.

The Project proposes to construct a total of seven buildings on the 8.4-acre site, consisting of three mixed use medical/ office buildings, two drive-thru food service buildings, one retail/ restaurant building, and one convenience store building associated with a gasoline station with 12 fueling positions. The Project's expected gasoline throughput is 1,200,000 gallons per year. Each building would include associated parking. A breakdown of building type, square footage, and parking provided is shown in Table 1-1 below.

Table 1-1. Project Summary

Building Number	Land Use Type	Building Square Footage	Parking Provided
1	Fast Food Restaurant with Drive-Thru	3,500 sf	36 stalls
2	Retail/ Restaurant	8,000 sf (4,500 sf Retail & 3,500 sf Restaurant)	50 stalls
3	Fast Food/Specialty Restaurant with Drive-Thru	2,100 sf	25 stalls
4	Convenience Store with 12-Fueling Position Gas Station	3,995 sf	20 stalls
5	Medical Office Building #1 (2-Story)	16,000 sf	153 stalls
6	Medical Office Building #2 (2-Story)	16,000 sf	
7	Medical Office Building #3 (3-Story)	40,000 sf	164 stalls
	Total:	**89,745 sf**	**448 stalls**

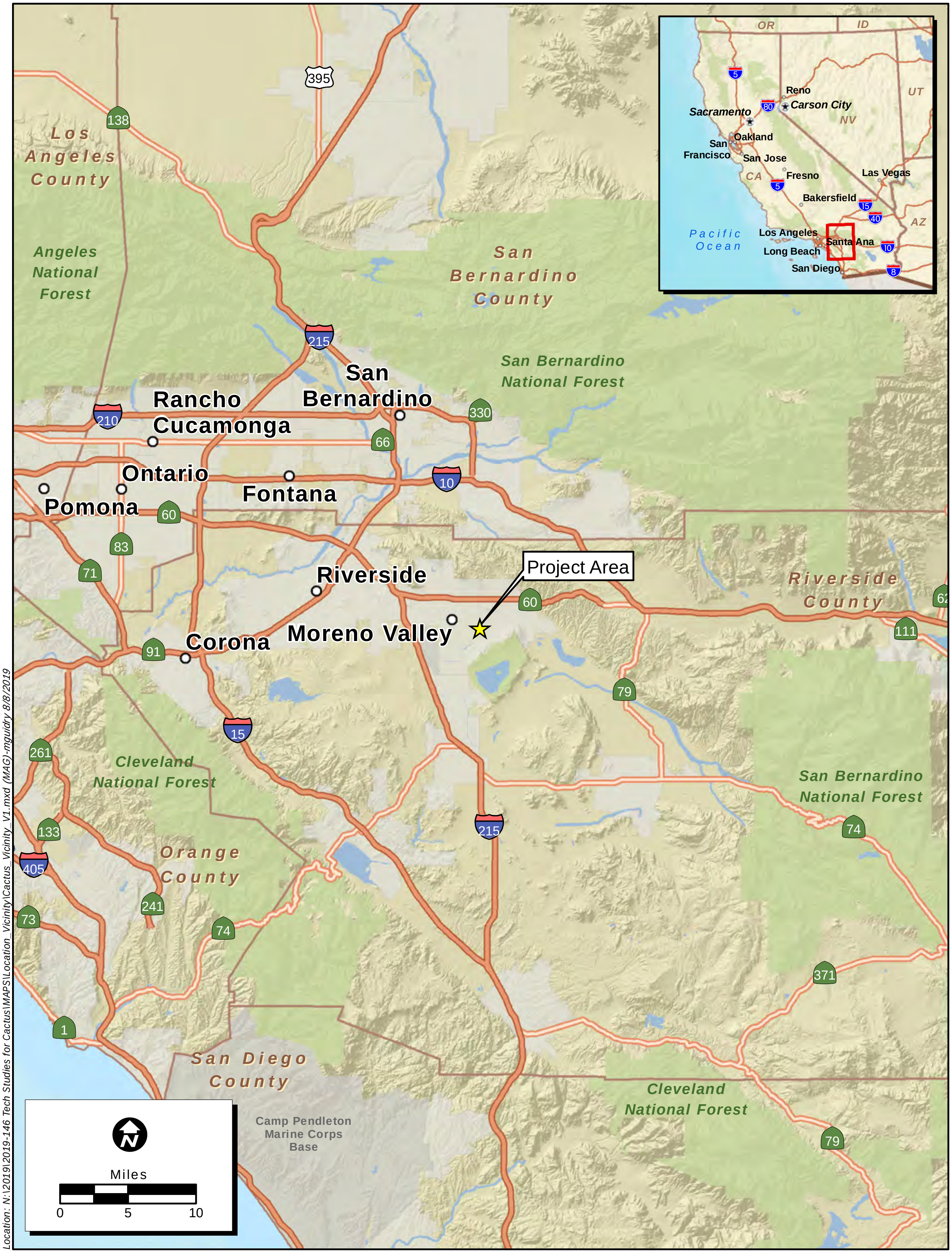
The Proposed Project would include two entry/exit driveways along Cactus Avenue, a single entry/exit driveway along Nason Street, and one more along the private street along the northern boundary of the Project Site. The Proposed Project would also include four water retention areas, two located between Buildings 5 and 6, and the other two located between Buildings 6 and 7.

In addition to Project Site development, the Project proposes several offsite improvements to vicinity traffic facilities. These improvements include:

- Construction of a right-in-right-out driveway on Nason Street and a “right in, right out” (RIRO) driveway on Cactus Avenue. “RIGHT TURN ONLY” signs (R3-5R) should be posted at both driveways.
- Modification of the traffic signal at Hospital Road and Nason Street to accommodate the proposed east approach of the intersection to provide one lane in each direction.
- Widening of Cactus Avenue to its ultimate width along the Project frontage to provide one westbound left-turn lane and two through lanes.
- Installation of a traffic signal at the four- way intersection of Cactus Avenue and Lynn Lee Lane/Driveway "B". (Traffic signal is warranted).

- Potential extension of the westbound left-turn lane on Cactus Avenue at Nason Street to provide 300 feet of storage length.
- Potential extension of the northbound left-turn lane on Nason Street at Cactus Avenue to provide 300 feet of storage length.
- Potential construction of an ADA-compliant access ramp at each of the proposed driveways.
- The potential installation of a new bus stop and turn-out on Nason Street north of Cactus Avenue.

Construction of the Proposed Project is anticipated to occur in three phases and take approximately eighteen months. Construction staging areas would be located within the Project Site.



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Map Date: 8/8/2019
Service Layer Credits: Sources: Esri, USGS, NOAA

Figure 1. Project Vicinity

2019-146 Cactus Avenue and Nason Street Commercial Development Project

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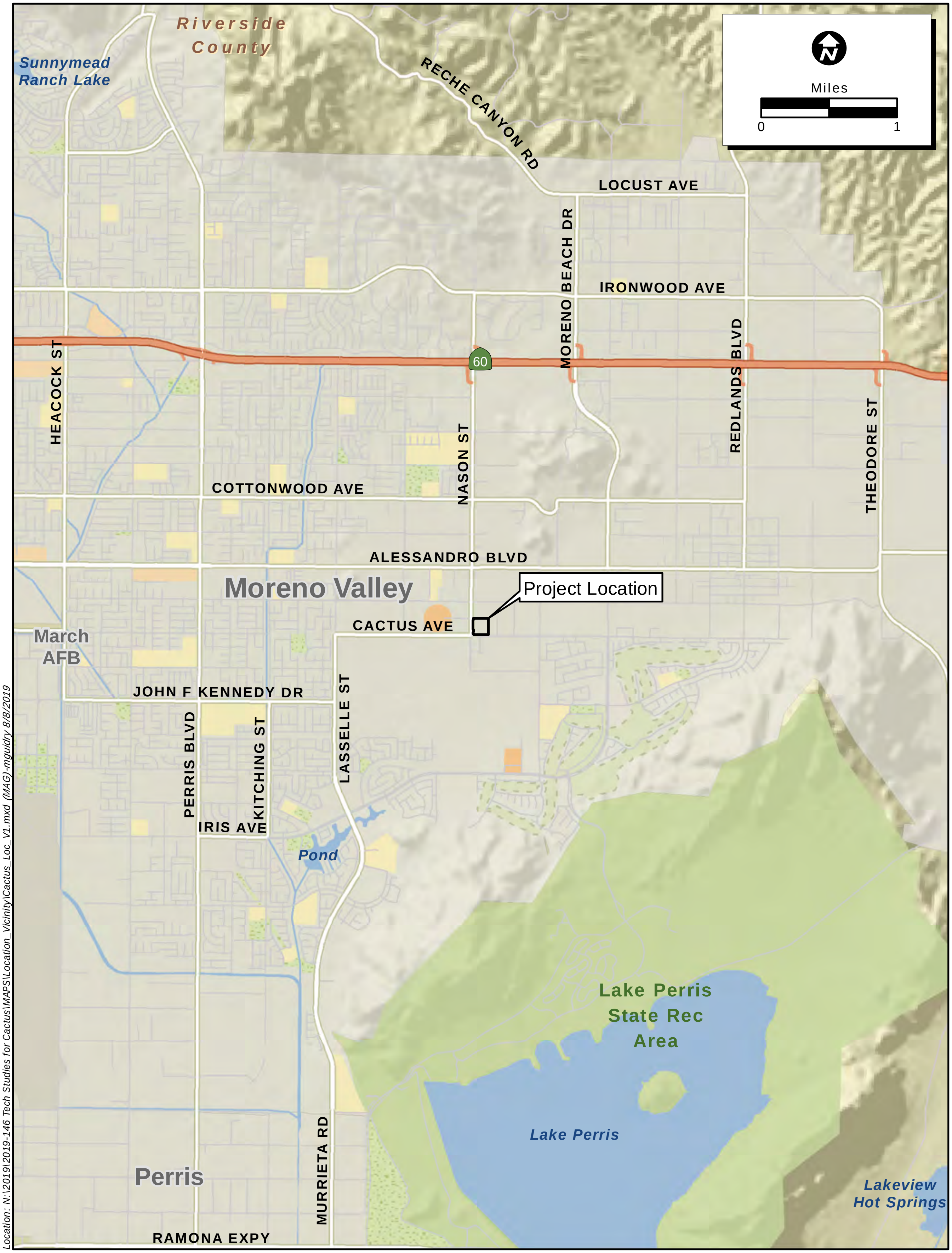

Map Date: 8/8/2019
Source: ESRI

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Figure 2. Project Location

2019-146 Cactus Avenue and Nason Street Commercial Development Project

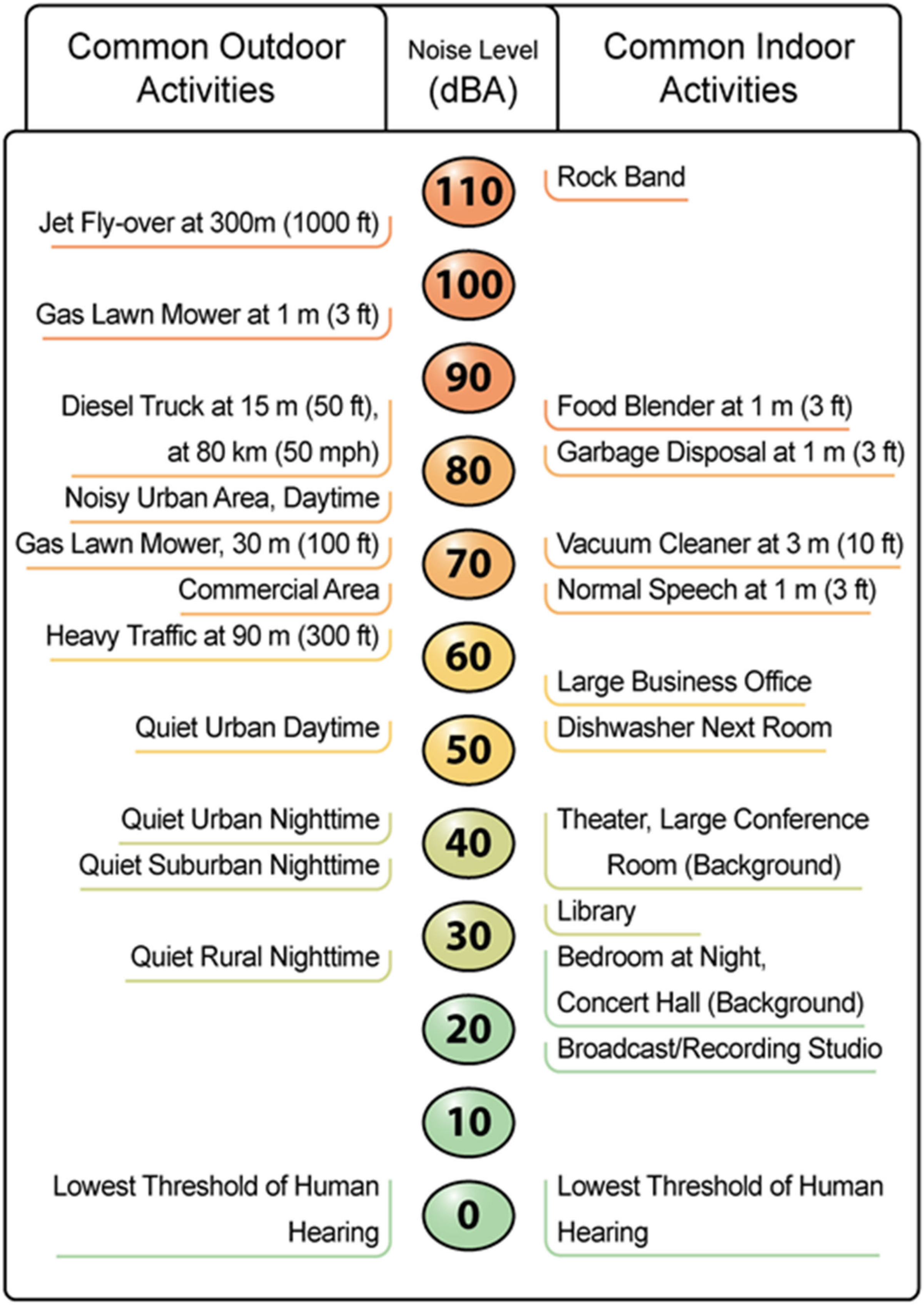
2.0 ENVIRONMENTAL NOISE AND GROUNDBORNE VIBRATION ANALYSIS

2.1 Fundamentals of Noise and Environmental Sound

2.1.1 Addition of Decibels

The decibel (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 decibel is A-weighted (dBA), 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 three dB higher than one source under the same conditions (Federal Transit Administration [FTA] 2018). For example, a 65-dB source of sound, such as a truck, when joined by another 65 dB source results in a sound amplitude of 68 dB, not 130 dB (i.e., doubling the source strength increases the sound pressure by three dB). Under the decibel scale, three sources of equal loudness together would produce an increase of five dB.

Typical noise levels associated with common noise sources are depicted in Figure 2-1.



Source: California Department of Transportation (Caltrans) 2020a

Figure 2-1. Common Noise Levels

2.1.2 Sound Propagation and Attenuation

Noise can be generated by a number of sources, including mobile sources such as automobiles, trucks and airplanes, and stationary sources such as construction sites, machinery, and industrial operations. Sound spreads (propagates) uniformly outward in a spherical pattern, and the sound level decreases (attenuates) at a rate of approximately 6 dB (dBA) for each doubling of distance from a stationary or point source (FHWA 2017). Sound from a line source, such as a highway, propagates outward in a cylindrical pattern, often referred to as cylindrical spreading. Sound levels attenuate at a rate of approximately 3 dBA for each doubling of distance from a line source, such as a roadway, depending on ground surface characteristics (Federal Highway Administration [FHWA] 2017). 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 dBA per doubling of distance is normally assumed. For line sources, an overall attenuation rate of three dB per doubling of distance is assumed (FHWA 2011).

Noise levels may also be reduced by intervening structures; generally, a single row of detached buildings between the receptor and the noise source reduces the noise level by about five dBA (FHWA 2006), while a solid wall or berm generally reduces noise levels by 10 to 20 dBA (FHWA 2011). However, noise barriers or enclosures specifically designed to reduce site-specific construction noise can provide a sound reduction 35 dBA or greater (Western Electro-Acoustic Laboratory, Inc. [WEAL] 2000). To achieve the most potent noise-reducing effect, a noise enclosure/barrier must physically fit in the available space, must completely break the “line of sight” between the noise source and the receptors, must be free of degrading holes or gaps, and must not be flanked by nearby reflective surfaces. Noise barriers must be sizable enough to cover the entire noise source and extend lengthwise and vertically as far as feasibly possible to be most effective. The limiting factor for a noise barrier is not the component of noise transmitted through the material, but rather the amount of noise flanking around and over the barrier. In general, barriers contribute to decreasing noise levels only when the structure breaks the "line of sight" between the source and the receiver.

The manner in which 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 (Caltrans 2002). The exterior-to-interior reduction of newer residential units is generally 30 dBA or more (Harris Miller, Miller & Hanson Inc. [HMMH] 2006). Generally, in exterior noise environments ranging from 60 dBA Community Noise Equivalent Level (CNEL) to 65 dBA CNEL, interior noise levels can typically be maintained below 45 dBA, a typical residential interior noise standard, with the incorporation of an adequate forced air mechanical ventilation system in each residential building, and standard thermal-pane residential windows/doors with a minimum rating of Sound Transmission Class (STC) 28. (STC is an integer rating of how well a building partition attenuates airborne sound. In the U.S., it is widely used to rate interior partitions, ceilings, floors, doors, windows, and exterior wall configurations). In exterior noise environments of 65 dBA CNEL or greater, a combination of forced-air mechanical ventilation and sound-rated construction methods is often required to meet the interior noise level limit. Attaining the necessary noise reduction from exterior to interior spaces is readily achievable in noise environments less than 75 dBA CNEL with proper wall construction techniques following California Building Code methods, the selections of proper windows and doors, and the incorporation of forced-air mechanical ventilation systems.

2.1.3 Noise Descriptors

The decibel 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 noise descriptors most often encountered when dealing with traffic, community, and environmental noise include the average hourly noise level (in L_{eq}) and the average daily noise levels/community noise equivalent level (in L_{dn}/CNEL). The L_{eq} is a measure of ambient noise, while the L_{dn} and CNEL are measures of community noise. Each is applicable to this analysis and defined as follows:

- **Equivalent Noise Level (L_{eq})** is 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.
- **Day-Night Average (L_{dn})** is a 24-hour average L_{eq} with a 10-dBA "weighting" added to noise during the hours of 10:00 pm to 7:00 am to account for noise sensitivity in the 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)** is a 24-hour average L_{eq} with a 5-dBA weighting during the hours of 7:00 pm to 10:00 pm and a 10-dBA weighting added to noise during the hours of 10:00 pm to 7:00 am to account for noise sensitivity in the evening and nighttime, respectively.

Table 2-1 provides a list of other common acoustical descriptors.

Table 2-1. Common Acoustical Descriptors	
Descriptor	**Definition**
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 micropascals (or 20 micronewtons per square meter), where 1 pascal 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 decibels 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 micropascals). Sound pressure level is the quantity that is directly measured by a sound level meter.
Frequency, Hertz (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 sounds are below 20 Hz and ultrasonic sounds are above 20,000 Hz.
A-Weighted Sound Level, dBA	The sound pressure level in decibels 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.
L_{max}, L_{min}	The maximum and minimum A-weighted noise level during the measurement period.
L_{01}, L_{10}, L_{50}, L_{90}	The A-weighted noise levels that are exceeded 1%, 10%, 50%, and 90% of the time during the measurement period.
Day/Night Noise Level, L_{dn} or DNL	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 in the 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 p.m. to 10:00 p.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.
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.

The A-weighted decibel 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.

The scientific instrument used to measure noise is the sound level meter. Sound level meters can accurately measure environmental noise levels to within about ±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. Close to the noise source, the models are accurate to within about ±1 to 2 dBA.

2.1.4 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 or L_{dn} 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 A-weighted noise levels (dBA), the following relationships should be noted in understanding this analysis:

- Except in carefully controlled laboratory experiments, a change of 1 dBA cannot be perceived by humans.
- Outside of the laboratory, a 3-dBA change is considered a just-perceivable difference.
- A change in level of at least 5 dBA is required before any noticeable change in community response would be expected. An increase of 5 dBA 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.

2.1.5 Effects of Noise on People

2.1.5.1 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 (OSHA) 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 eight hours. If the noise is above 90 dBA, the allowable exposure time is correspondingly shorter.

2.1.5.2 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.

2.2 Fundamentals of Environmental Groundborne Vibration

2.2.1 Vibration Sources and Characteristics

Sources of earthborne vibrations include natural phenomena (e.g., earthquakes, volcanic eruptions, sea waves, landslides) or manmade 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 the average of the squared amplitude of the signal. The PPV and RMS vibration velocity amplitudes are used to evaluate human response to vibration.

PPV is generally accepted as the most appropriate descriptor for evaluating the potential for building damage. For human response, however, an average vibration amplitude is more appropriate because it takes time for the human body to respond to the excitation (the human body responds to an average vibration amplitude, not a peak amplitude). Because the average particle velocity over time is zero, the RMS amplitude is typically used to assess human response. The RMS value is the average of the amplitude squared over time, typically a 1- sec. period (FTA 2018).

Table 2-2 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.

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. For instance, heavy-duty trucks generally generate groundborne vibration velocity levels of 0.006 PPV at 50 feet under typical circumstances, which as identified in Table 2-2 is considered very unlikely to cause damage to buildings of any type. 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.

Table 2-2. Human Reaction and Damage to Buildings for Continuous or Frequent Intermittent Vibration Levels

Peak Particle Velocity (inches/second)	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	Threshold at which there is a risk of architectural damage to extremely fragile historic buildings, ruins, ancient monuments
0.1	92	Level at which continuous vibrations may begin to annoy people, particularly those involved in vibration sensitive activities	Threshold at which there is a risk of architectural damage to fragile buildings. Virtually no risk of architectural damage to normal buildings
0.25	94	Vibrations may begin to annoy people in buildings	Threshold at which there is a risk of architectural damage to historic and some old buildings
0.3	96	Vibrations may begin to feel severe to people in buildings	Threshold at which there is a risk of architectural damage to older residential structures
0.5	103	Vibrations considered unpleasant by people subjected to continuous vibrations	Threshold at which there is a risk of architectural damage to new residential structures and Modern industrial/commercial buildings

Source: Caltrans 2020b

3.0 EXISTING ENVIRONMENTAL NOISE SETTING

3.1 Noise Sensitive Land Uses

Noise-sensitive land uses are generally considered to include those uses where noise exposure could result in health-related risks to individuals, as well as places where quiet is an essential element of their intended purpose. Residential dwellings are of primary concern because of the potential for increased and prolonged exposure of individuals to both interior and exterior noise levels. Additional land uses such as hospitals, historic sites, cemeteries, and certain recreation areas are considered sensitive to increases in exterior noise levels. Schools, churches, hotels, libraries, and other places where low interior noise levels are essential are also considered noise-sensitive land uses.

The Project is proposing onsite construction and offsite improvements in the areas adjacent to the Project Site. The nearest noise-sensitive land uses that will be impacted by onsite activities consist of single-family residences located adjacent to the eastern site boundary. The nearest noise-sensitive land uses that would be impacted by offsite construction improvements (widening Cactus Avenue and installing traffic signal at the intersection of Cactus and Lynn Lee Lane) consist of a single-family residential neighborhood south of the Project Site across Cactus Avenue.

3.1.1 Existing Ambient Noise Environment

The noise environment in the Project Area is impacted by various noise sources. Mobile sources of noise, especially cars and trucks traveling on area roadways, are the most common and significant sources of noise in the Project Area. Other sources of noise are the various land uses (i.e., residential, commercial and institutional) throughout the area that generate stationary-source noise. The Project Site is located outside of any airport land use plan. Furthermore, the Project Site is located beyond two miles from any airport. The March Air Reserve Base is the nearest airport to the Project Site, located approximately 3.6 miles to the southwest.

3.1.2 Existing Ambient Noise Measurements

The Project Site can be characterized by flat and undeveloped land. It is surrounded by a mix of residential and medical land uses as well as undeveloped land. In order to quantify existing ambient noise levels in the Project Area, ECORP Consulting, Inc. conducted four short-term (10-minute) noise measurements on August 28, 2019. The noise measurement sites were representative of typical existing noise exposure within and immediately adjacent to the Project Site (see Attachment A). The 10-minute measurements were taken between 11:25 a.m. and 12:25 p.m. Short-term (L_{eq}) measurements are considered representative of the noise levels throughout the daytime. It is noted that while the noise measurements were conducted nearly 2 ½ years previous to the preparation of this Assessment, the urban environment is largely unchanged since 2019 and therefore still representative of the ambient noise environment. The average noise levels and sources of noise measured at each location are listed in Table 3-1.

Table 3-1. Existing (Baseline) Noise Measurements					
Location Number	**Location**	**L_{eq} dBA**	**L_{min} dBA**	**L_{max} dBA**	**Time**
1	On the Project Site.	**47.4**	40.5	58.8	11:25a.m.-11:35 a.m.
2	At the upper northern corner of the Project site adjacent to residence fence.	**41.7**	36.8	49.3	11:42a.m.-11:52a.m.
3	On sidewalk oat Lynn Lee Lane facing Cactus Avenue.	**46.5**	45.8	46.2	11:00a.m.-11:1-a.m.
4	On the sidewalk adjacent to Nason Street approximately 300 feet from Project Site.	**64.2**	44.9	78.6	12:15a.m.-12:25a.m.

Source: Measurements were taken by ECORP with a Larson Davis SoundExpert LxT precision sound level meter, which satisfies the American National Standards Institute for general environmental noise measurement instrumentation. Prior to the measurements, the SoundExpert LxT sound level meter was calibrated according to manufacturer specifications with a Larson Davis CAL200 Class I Calibrator. See Attachment A for noise measurement outputs.

Notes: L_{eq} is 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. L_{min} is the minimum noise level during the measurement period and L_{max} is the maximum noise level during the measurement period.

As shown in Table 3-1, the ambient recorded noise levels range from 41.7 to 64.2 dBA L_{eq} near the Project Site and 47.4 dBA L_{eq} on the Project Site. The most common noise in the Project vicinity is produced by automotive vehicles (e.g., cars, trucks, buses, motorcycles) on area roadways.

3.1.3 Existing Roadway Noise Levels

Existing roadway noise levels were calculated for the roadway segments in the Project vicinity. This task was accomplished using the FHWA Highway Traffic Noise Prediction Model (FHWA-RD-77-108) (see Attachment B) and traffic volumes from the Project's Focused Traffic Impact Study (K2 Traffic Engineering, Inc. 2020). The model calculates the average noise level at specific locations based on traffic volumes, average speeds, roadway geometry, and site environmental conditions. The average vehicle noise rates (energy rates) used in the FHWA model have been modified to reflect average vehicle noise rates identified for California by Caltrans. The Caltrans data shows that California automobile noise is 0.8 to 1.0 dBA higher than national levels and that medium and heavy truck noise is 0.3 to 3.0 dBA lower than national levels. The average daily noise levels along these roadway segments are presented in Table 3-2.

Table 3-2. Existing (Baseline) Traffic Noise Levels		
Roadway Segment	**Surrounding Uses**	**CNEL at 100 feet from Centerline of Roadway**
Alessandro Boulevard		
East of Nason Street	Residential & Commercial	57.5
West of Nason Street	Residential & Commercial	57.1
Hospital Road		
West of Nason Street	Commercial	49.1
Cactus Avenue		
West of Lasselle Street	Residential	56.3
Between Lasselle Street and Nason Street	Commercial	54.5
Between Nason Street & Lynn Lee Lane	Residential	55.4
Between Lynn Lee Lane & Moreno Beach Drive	Residential & Commercial	55.4
East of Moreno Beach Drive	Residential	54.2
Iris Avenue		
East of Nason Street	Residential & Commercial	60.5
West of Nason Street	Residential & Commercial	62.2
Lasselle Street		
North of Cactus Avenue	Residential	58.9
South of Cactus Avenue	Residential	60.5
Nason Street		
North of Alessandro Boulevard	Residential & Commercial	59.6
Between Alessandro Boulevard & Hospital Road	Residential & Commercial	58.7
Between Hospital Road & Cactus Avenue	Commercial	58.6
Between Cactus Avenue & Iris Avenue	Residential	57.8
South of Iris Avenue	Residential	47.3
Lynn Lee Lane		
South of Cactus Avenue	Residential	36.0
Moreno Beach Drive		
North of Cactus Avenue	Residential	60.3
South of Cactus Avenue	Residential	61.1

Table 3-2. Existing (Baseline) Traffic Noise Levels

Source: Traffic noise levels were calculated by ECORP using the FHWA roadway noise prediction model in conjunction with the trip generation rate identified by K2 Traffic Engineering, Inc. (2020). Refer to Attachment B for traffic noise modeling assumptions and results.

Notes: A total of 7 intersections were analyzed in the Traffic Impact Study; however, only roadway segments that impact sensitive receptors were included for the purposes of this analysis.

As shown, the existing traffic-generated noise level on Project-vicinity roadways currently ranges from 36.0 to 62.2 dBA CNEL. As previously described, CNEL is 24-hour average noise level with a 5 dBA "weighting" during the hours of 7:00 p.m. to 10:00 p.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. It should be noted that the modeled noise levels depicted in Table 3-2 may differ from measured levels in Table 3-1 because the measurements represent noise levels at different locations around the Project site and are also reported in different noise metrics (e.g., noise measurements are the L_{eq} values and traffic noise levels are reported in CNEL).

4.0 REGULATORY FRAMEWORK

4.1 Federal

4.1.1 Occupational Safety and Health Act of 1970

OSHA regulates onsite noise levels and protects workers from occupational noise exposure. To protect hearing, worker noise exposure is limited to 90 decibels with A-weighting (dBA) over an eight-hour work shift (29 Code of Regulations 1910.95). Employers are required to develop a hearing conservation program when employees are exposed to noise levels exceeding 85 dBA. These programs include provision of hearing protection devices and testing employees for hearing loss on a periodic basis.

4.1.2 National Institute of Occupational Safety and Health

A division of the US Department of Health and Human Services, the National Institute for Occupational Safety and Health (NIOSH) has established a construction-related noise level threshold as identified in the Criteria for a Recommended Standard: Occupational Noise Exposure prepared in 1998. NIOSH identifies a noise level threshold based on the duration of exposure to the source. The NIOSH construction-related noise level threshold starts at 85 dBA for more than 8 hours per day; for every 3-dBA increase, the exposure time is cut in half. This reduction results in noise level thresholds of 88 dBA for more than 4 hours per day, 92 dBA for more than 1 hour per day, 96 dBA for more than 30 minutes per day, and up to 100 dBA for more than 15 minutes per day. The intention of these thresholds is to protect people from hearing losses resulting from occupational noise exposure.

4.1.3 Federal Interagency Committee on Noise (FICON)

The FICON thresholds of significance for evaluating the impact of increased traffic noise. The 2000 FICON findings provide guidance as to the significance of changes in ambient noise levels due to transportation noise sources. FICON recommendations are based on studies that relate aircraft and traffic noise levels to the percentage of persons highly annoyed by the noise. FICON's measure of substantial increase for transportation noise exposure is as follows:

- If the existing ambient noise levels at existing and future noise-sensitive land uses (e.g. residential, etc.) are less than 60 dBA CNEL and the Project creates a readily perceptible 5 dBA CNEL or greater noise level increase and the resulting noise level would exceed acceptable exterior noise standards; or
- If the existing noise levels range from 60 to 65 dBA CNEL and the Project creates a barely perceptible 3 dBA CNEL or greater noise level increase and the resulting noise level would exceed acceptable exterior noise standards; or
- If the existing noise levels already exceed 65 dBA CNEL and the Project creates a community noise level increase of greater than 1.5 dBA CNEL.

4.2 State

4.2.1 State of California General Plan Guidelines

The State of California regulates vehicular and freeway noise affecting classrooms, sets standards for sound transmission and occupational noise control, and identifies noise insulation standards and airport noise/land-use compatibility criteria. The State of California General Plan Guidelines (State of California 2003), published by the Governor's Office of Planning and Research (OPR), also provides guidance for the acceptability of projects within specific CNEL/L_{dn} contours. The guidelines also present adjustment factors that may be used in order to arrive at noise acceptability standards that reflect the noise control goals of the community, the particular community's sensitivity to noise, and the community's assessment of the relative importance of noise pollution.

4.2.2 State Office of Planning and Research Noise Element Guidelines

The State OPR *Noise Element Guidelines* include recommended exterior and interior noise level standards for local jurisdictions to identify and prevent the creation of incompatible land uses due to noise. The Noise Element Guidelines contain a Land Use Compatibility table that describes the compatibility of various land uses with a range of environmental noise levels in terms of the CNEL.

4.2.3 California Department of Transportation

In 2020, the California Department of Transportation (Caltrans) published the Transportation and Construction Vibration Manual (Caltrans 2020b). The manual provides general guidance on vibration issues associated with the construction and operation of projects concerning human perception and structural damage. Table 2-2 above presents recommendations for levels of vibration that could result in damage to structures exposed to continuous vibration.

4.3 Local

4.3.1 City of Moreno Valley General Plan Noise Element

The Noise Element of the General Plan provides policy direction for minimizing noise impacts on the community and for coordinating with surround jurisdictions and other entities regarding noise control. By identifying noise-sensitive land uses and establishing compatibility guidelines for land use and noises, noise considerations will influence the general distribution, location, and intensity of future land uses. The result is that effective land use planning and mitigation can alleviate the majority of noise problems.

The most basic planning strategy to minimize adverse impacts on new land uses due to noise is to avoid designating certain land uses at locations within the City of Moreno Valley that would negatively affect noise sensitive land users. Users such as schools, hospitals, childcare, senior care, congregate care, churches, and all types of residential use should be located outside of any area anticipated to exceed acceptable noise levels as defined by the Land Use Compatibility Guidelines or should be protected from noise through sound attenuation measures such as site and architectural design and sound walls. The City has adopted guidelines as a basis for planning decisions based on noise considerations set by the State of California OPR. These guidelines are shown in Table 4-1. In a case where the noise levels identified at a proposed project site fall within levels considered normally acceptable, the project is considered compatible with the existing noise environment.

Table 4-1. Community Noise Compatibility Matrix

Land Use Category	Community Noise Exposure (CNEL)			
	Normally Acceptable	Conditionally Acceptable	Normally Unacceptable	Clearly Unacceptable
Residential – Low Density Single Family, Duplex, Mobile Homes	<65	65-70	70-75	75<
Residential – Multiple Family	<65	65-70	70-75	75<
Transient Lodging: Hotels and Motels	<65	65-70	70-80	80<
Schools, Libraries, Churches, Hospitals, Nursing Homes	<70	--	70-80	80<
Auditoriums, Concert Halls, Amphitheaters	--	<70	70<	--
Sports Arena, Outdoor Spectator Sports	--	<75	75<	--
Playground, Neighborhood Parks	<70	70-75	70<	--
Golf Courses, Riding Stables, Water Recreation, Cemeteries	<75	--	75-80	80<
Office Buildings, Businesses, Commercial and Professional	<70	70-76	77<	--
Industrial, Manufacturing, Utilities, Agricultural	<75	75-80	80<	--

Source: City of Moreno Valley General Plan 2021

Notes: CNEL = community noise equivalent level

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

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

Table 4-1. Community Noise Compatibility Matrix

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

Additionally, the Noise Element contains goals and policies to minimize unwanted noise in the community and promote a pleasant, healthy noise environment. The goals and policies that pertain to the Project are as follows:

Goal N-1: Design for a pleasant, healthy sound environment conducive to living and working.

Policy N.1-1: Protect occupants of existing and new buildings from exposure to excessive noise, particularly adjacent to freeways, major roadways, the railroad, and within areas of aircraft overflight.

Policy N.1-2: Guide the location and design of transportation facilities, industrial uses, and other potential noise generators to minimize the effects of noise on adjacent land uses.

Policy N.1-3: Apply the community noise compatibility standards (Table 4-1) to all new development and major redevelopment projects outside the noise and safety compatibility zones established in the March Air Reserve Base/ Inland Port Airport Land Use Compatibility Plan in order to protect against the adverse effects of noise exposure. Projects within the noise and safety compatibility zones are subject to the standards contained in the Airport Land Use Compatibility Plan.

Policy N.1-4: Require a noise study and/or mitigation measures if applicable for all projects that would expose people to noise levels greater than the "normally acceptable" standard and for any other projects that are likely to generate noise in excess of these standards.

Policy N.1-5: Noise impacts should be controlled at the noise source where feasible, as opposed to at receptor end with measures to buffer, dampen, or actively cancel noise sources. Site design, building orientation, building design, hours of operation, and other techniques, for new developments deemed to be noise generators shall be used to control noise sources.

Policy N.1-7: Developers shall reduce the noise impacts on new development through appropriate means (e.g. double-paned or soundproof windows, setbacks, berming, and screening). Noise attenuation methods should avoid the use of visible sound walls where possible.

Goal N-2: Ensure that noise does not have a substantial, adverse effect on the quality of life in the community.

Policy N.2-1: Use the development review process to proactively identify and address potential noise compatibility issues.

Policy N.2-3: Limit the potential noise impacts of construction activities on surrounding land uses through noise regulations in the Municipal Code that address allowed days and hours of construction, types of work, construction equipment, and sound attenuation devices.

4.3.2 City of Moreno Valley Municipal Code

The City of Moreno Valley's regulations with respect to noise are included in Title 11 Chapter 11.80 of the Municipal Code, also known as the Noise Regulations. The Noise Regulations provide noise standards within the City. Section 11.80.030 outlines residential and commercial noise standards which are displayed in Table 4-2.

Table 4-2. Maximum Sound Level for Source Land Uses

Land Use	Maximum Allowable (dBA)	
	10:00 p.m. to 7:00 a.m.	7:00 a.m. to 10:00 p.m.
Residential	55	60
Commercial	60	65

Source: City of Moreno Valley 2021

Additionally, Section 11.80 prohibits construction and demolition between the hours of 8:00 p.m. and 7:00 a.m.

5.0 Impact Assessment

5.1 Thresholds of Significance

The impact analysis provided below is based on the following California Environmental Quality Act Guidelines Appendix G thresholds of significance. The Project would result in a significant noise-related impact if it would result in the:

1) 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.

2) Generation of excessive groundborne vibration or groundborne noise levels.

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.

For purposes of this analysis, Project construction noise is compared to City noise standards and the NIOSH standard of 85 dBA for more than 8 hours per day, since construction work for the Proposed Project is anticipated to span a typical workday of 8 hours daily. The increase in transportation-related noise is compared against the FICON recommendation for evaluating the impact of increased traffic noise. Onsite noise generated as a result of Project operations is compared to City noise standards (see Table 4-2).

5.2 Methodology

This analysis of the existing and future noise environments is based on empirical observations and noise prediction modeling. Predicted construction noise levels were calculated utilizing the FHWA's Roadway Construction Noise Model (2006). Groundborne vibration levels associated with construction-related activities for the Project have been evaluated utilizing typical groundborne vibration levels associated with construction equipment. Potential groundborne vibration impacts related to structural damage and human annoyance were evaluated, taking into account the distance from construction activities to nearby structures and typically applied criteria for structural damage and human annoyance.

Onsite stationary source noise levels associated with the Project have been calculated with the SoundPLAN 3D noise model, which predicts noise propagation from a noise source based on the location, noise level, and frequency spectra of the noise sources as well as the geometry and reflective properties of the local terrain, buildings and barriers. Transportation-source noise levels associated with the Project were calculated using the FHWA Traffic Noise Prediction Model (FHWA-RD-77-108) with trip generation rates provided by K2 Traffic Engineering Inc. (2020).

5.3 Impact Analysis

5.3.1 Would the Project Result in Short-Term Construction-Generated Noise in Excess of City Standards?

Onsite Construction Noise

Construction noise associated with the Proposed Project would be temporary and would vary depending on the specific nature of the activities being performed. Noise generated would primarily be associated with the operation of off-road equipment for onsite construction activities as well as construction vehicle traffic on area roadways. Construction noise typically occurs intermittently and varies depending on the nature or phase of construction (e.g., site preparation, excavation, paving). Noise generated by construction equipment, including earth movers, pile drivers, and portable generators, can reach high levels. Typical operating cycles for these types of construction equipment may involve one or two minutes of full power operation followed by three to four 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). During construction, exterior noise levels could negatively affect sensitive land uses in the vicinity of the construction site.

As previously described, the Project is proposing onsite and offsite improvements. It is assumed that all onsite improvements would take place during Phase 1 and Phase 2 and all offsite improvements will take place during Phase 3. The nearest noise-sensitive land uses that would be impacted by onsite activities consist of single-family residences located adjacent to the eastern site boundary. The nearest noise-sensitive land uses that would be impacted by offsite construction improvements (widening Cactus Avenue and installing a traffic signal at the intersection of Cactus and Lynn Lee Lane) consist of a single-family residential neighborhood south of the Project Site across Cactus Avenue. Chapter 11.80 of the City of Moreno Valley Municipal Code prohibits construction between the hours of 8:00 p.m. and 7:00 a.m. but does not promulgate a numeric threshold pertaining to the noise associated with construction. This is due to the fact that construction noise is temporary, short term, intermittent in nature, and would cease on completion of the Project. Furthermore, the City of Moreno Valley is a developing urban community and construction noise is generally accepted as a reality within the urban environment. Additionally, construction would occur throughout the Project Site and would not be concentrated at one point.

To estimate the worst-case onsite construction noise levels that may occur at the nearest noise-sensitive receptors and in order to evaluate the potential health-related effects (physical damage to the ear) from construction noise, the construction equipment noise levels were calculated using the Federal Highway Administration's Roadway Noise Construction Model and compared against the construction-related noise level threshold established in the Criteria for a Recommended Standard: Occupational Noise Exposure prepared in 1998 by NIOSH. A division of the U.S. Department of Health and Human Services, NIOSH identifies a noise level threshold based on the duration of exposure to the source. The NIOSH construction-related noise level threshold starts at 85 dBA for more than 8 hours per day; for every 3-dBA increase, the exposure time is cut in half. This reduction results in noise level thresholds of 88 dBA for more than 4 hours per day, 92 dBA for more than 1 hour per day, 96 dBA for more than 30 minutes per day, and up to 100 dBA for more than 15 minutes per day. For the purposes of this analysis, the lowest, more conservative threshold of 85 dBA L_{eq} is used as an acceptable threshold for construction noise at the nearby sensitive receptors.

It is acknowledged that the majority of construction equipment is not situated at any one location during construction activities, but rather spread throughout the Project Site and at various distances from sensitive receptors. Therefore, this analysis employs the FTA guidance for calculating construction noise, which recommends measuring construction noise produced by all construction equipment operating simultaneously from the center of the Project Site (FTA 2018), which in this case is approximately 300 feet from onsite construction to the single-family residences located adjacent to the eastern site boundary and approximately 35 feet from offsite construction to the residences south of the Project Site across Cactus Avenue. The anticipated short-term construction noise levels generated for the necessary equipment are presented in Table 5-1.

Table 5-1. Construction Average (dBA) Noise Levels at Nearest Receptors

Construction Phase	Estimated Exterior Construction Noise Level @ Closest Noise Sensitive Receptor (dBA L_{eq})	Construction Noise Standard (dBA L_{eq})	Exceeds Standards?
Onsite Construction			
Phase 1 & 2 Site Preparation	72.1	*85*	**No**
Phase 1 & 2 Grading	71.7	*85*	**No**
Phase 1 Building Construction, Paving & Architectural Coating	73.6	*85*	**No**
Phase 2 Building Construction, Paving & Architectural Coating	73.6	*85*	**No**
Offsite Construction			
Phase 3 Site Preparation	85.1	*85*	**Yes**
Phase 3 Grading	84.1	*85*	**No**
Phase 3 Building Construction, Paving & Architectural Coating	86.6	*85*	**Yes**

Source: Construction noise levels were calculated by ECORP Consulting using the FHWA Roadway Noise Construction Model (FHWA 2006). Refer to Attachment C for Model Data Outputs.

Notes: Construction equipment used during construction provided using the California Emissions Estimator Model (CalEEMod), version 2022.1. CalEEMod is a statewide land use emissions computer model designed to quantify potential criteria pollutant emissions for land use development projects, based on typical construction requirements. CalEEMod creates the construction assumptions, including construction equipment and duration, used in this analysis. Consistent with FTA recommendations for calculating construction noise, construction noise was measured from the center of the Project Site (FTA 2018), which is approximately 300 feet from onsite construction and approximately 35 feet from offsite construction from the nearest receptor.

L_{eq} = The equivalent energy noise level, is 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.

As shown in Table 5-1, onsite construction activities would not exceed the NIOSH noise threshold of 85 dBA at the nearest sensitive receptors located east of the Project Site. However, offsite construction activities would exceed the NIOSH noise threshold of 85 dBA at the residences south of the Project Site across Cactus Avenue. In order to reduce offsite Project construction noise experienced at the nearby residences it is recommended that the implementation of temporary noise barriers be used during offsite Project construction. Noise barriers or enclosures can provide a sound reduction of 35 dBA or greater (WEAL 2000). To be effective, a noise enclosure/barrier must physically fit in the available space, must completely break the line of sight between the noise source and the receptors, must be free of degrading holes or gaps, and must not be flanked by nearby reflective surfaces. Noise barriers must be sizable enough to cover the entire noise source and extend lengthwise and vertically as far as feasibly possible to be most effective. The limiting factor for a noise barrier is not the component of noise transmitted through the material, but rather the amount of noise flanking around and over the barrier. In the case of offsite Project construction, an enclosure/barrier would only be necessary along the southern side of Cactus Avenue adjacent to the impacted residences. As such the following mitigation is recommended.

Mitigation Measures

NOI-1: The Project improvement and building plans will include the following requirements for construction activities:

- Construction contracts must specify that all construction equipment, fixed or mobile, shall be equipped with properly operating and maintained mufflers and other state-required noise attenuation devices.
- A sign, legible at a distance of 50 feet, shall be posted at the offsite Project construction site providing a contact name and a telephone number where residents can inquire about the construction process and register complaints. This sign shall indicate the dates and duration of construction activities. In conjunction with this required posting, a noise disturbance coordinator will be identified to address construction noise concerns received. The coordinator shall be responsible for responding to any local complaints about construction noise. When a complaint is received, the disturbance coordinator shall notify the City within 24 hours of the complaint and determine the cause of the noise complaint (starting too early, malfunctioning muffler, etc.) and shall implement reasonable measures to resolve the complaint, as deemed acceptable by the City. All signs posted at the construction site shall include the contact name and the telephone number for the noise disturbance coordinator.
- As applicable, all equipment shall be shut off when not in use.
- Equipment staging shall be located in areas that create the greatest distance between construction-related noise/vibration sources and sensitive receptors surrounding offsite construction.
- During offsite construction, stationary construction equipment shall be placed such that emitted noise is directed away from sensitive noise receptors nearest the Project Site.
- Jackhammers, pneumatic equipment, and all other portable stationary noise sources will be directed away from residential receptors. Either one-inch plywood or sound blankets can be utilized for this purpose. They should reach up from the ground and block the line of sight between equipment and the nearest off-site residences. The shielding should be without holes and cracks.
- Per Chapter 11.80 of the City of Moreno Valley Municipal Code, construction is prohibited between the hours of 8:00 p.m. and 7:00 a.m.

Implementation of mitigation measure NOI-1 would substantially reduce offsite construction-generated noise levels. As previously described, noise barriers or enclosures such as that required in mitigation measure NOI-1 can provide a sound reduction 35 dBA or greater (WEAL 2000), which would be a reduction robust enough to maintain construction noise levels less than the applicable standard. Temporary noise barriers can consist of a solid plywood fence and/or flexible sound curtains, such as an 18-ounce tarp or a 2-inch-thick fiberglass blanket attached to chain link fencing. Project construction activities would not expose persons to and generate noise levels in excess of City standards with implementation of NOI-1.

Offsite Construction Worker Trips

Project construction would result in additional traffic on adjacent roadways over the period that construction occurs. According to the California Emissions Estimator Model (CalEEMod), which is designed to model emissions for land use development projects based on typical construction requirements and generates construction assumptions, including construction equipment duration and the number of construction-related automotive trips, the maximum number of Project construction trips traveling to and from the Project Site during a single construction phase would not be expected to exceed 75 daily trips in total (61 construction worker trips and 14 vendor trips). According to Caltrans Technical Noise Supplement to the Traffic Noise Analysis Protocol (2013), a doubling of traffic on a roadway is required to result in an increase of 3 dB (outside of the laboratory, a 3-dBA change is considered a just-perceivable difference). The Project Site is accessible from Cactus Avenue and Nason Street. According to the Focused Traffic Impact Study (K2 Traffic Engineering, Inc. 2020), the segment of Cactus Avenue between Lynn Lee Lane and Moreno Beach Drive currently accommodates 3,379 average daily trips. The segment of Nason Street between Hospital Road and Cactus Avenue currently accommodates 5,382 average daily trips. Thus, Project construction would not result in a doubling of traffic, and therefore its contribution to existing traffic noise would not be perceptible. Additionally, it is noted that construction is temporary, and these trips would cease upon completion of the Project.

5.3.2 Would the Project Result in a Substantial Permanent Increase in Ambient Noise Levels in Excess of City Standards During Operations?

As previously described, noise-sensitive land uses are locations where people reside or where the presence of unwanted sound could adversely affect the use of the land. Residences, schools, hospitals, guest lodging, libraries, and some passive recreation areas would each be considered noise-sensitive and may warrant unique measures for protection from intruding noise. The nearest existing noise-sensitive receptors consist of single-family residences located adjacent to the eastern site boundary as well as the single-family residential neighborhood south of the Project Site across Cactus Avenue.

Operational Traffic Noise

Future traffic noise levels throughout the Project vicinity (i.e., vicinity roadway segments that traverse noise-sensitive land uses) for the Proposed Project were modeled based on the traffic volumes identified by K2 Traffic Engineering, Inc. (2020) to determine the noise levels along Project vicinity roadways. Table 5-2 shows the calculated offsite roadway noise levels under existing traffic levels compared to future build-out of the Project. The calculated noise levels as a result of the Project at affected sensitive land uses are compared to the FICON thresholds of significance. The 2000 FICON findings provide guidance as to the significance of changes in ambient noise levels due to transportation noise sources. FICON recommendations are based on studies that relate aircraft and traffic noise levels to the percentage of persons highly annoyed by the noise. FICON's measure of substantial increase for transportation noise exposure is as follows:

- If the existing ambient noise levels at existing and future noise-sensitive land uses (e.g. residential, etc.) are less than 60 dBA CNEL and the Project creates a readily perceptible 5 dBA CNEL or greater noise level increase and the resulting noise level would exceed acceptable exterior noise standards; or
- If the existing noise levels range from 60 to 65 dBA CNEL and the Project creates a barely perceptible 3 dBA CNEL or greater noise level increase and the resulting noise level would exceed acceptable exterior noise standards; or
- If the existing noise levels already exceed 65 dBA CNEL, and the Project creates a community noise level increase of greater than 1.5 dBA CNEL.

Table 5-2. Existing Plus Project Conditions - Predicted Traffic Noise Levels					
Roadway Segment	**Surrounding Uses**	**CNEL at 100 feet from Centerline of Roadway**		**Noise Standard (dBA CNEL)**	**Exceed Standard?**
		Existing Conditions	**Existing + Project Conditions**		
Alessandro Boulevard					
East of Nason Street	Residential & Commercial	57.5	57.6	>5	**No**
West of Nason Street	Residential & Commercial	57.1	57.3	>5	**No**
Hospital Road					
West of Nason Street	Commercial	49.1	50	>5	**No**
Cactus Avenue					
West of Lasselle Street	Residential	56.3	56.5	>5	**No**
Between Lasselle Street and Nason Street	Commercial	54.5	57.1	>5	**No**
Between Nason Street and Lynn Lee Lane	Residential	55.4	56.1	>5	**No**
Between Lynn Lee Lane and Moreno Beach Drive	Residential & Commercial	55.4	55.9	>5	**No**
East of Moreno Beach Drive	Residential	54.2	54.5	>5	**No**
Iris Avenue					
East of Nason Street	Residential & Commercial	60.5	60.6	>3	**No**
West of Nason Street	Residential & Commercial	62.2	62.3	>3	**No**
Lasselle Street					
North of Cactus Avenue	Residential	58.9	59.0	>5	**No**

Table 5-2. Existing Plus Project Conditions - Predicted Traffic Noise Levels					
Roadway Segment	**Surrounding Uses**	**CNEL at 100 feet from Centerline of Roadway**		**Noise Standard (dBA CNEL)**	**Exceed Standard?**
		Existing Conditions	**Existing + Project Conditions**		
South of Cactus Avenue	Residential	60.5	60.5	>3	**No**
Nason Street					
North of Alessandro Boulevard	Residential & Commercial	59.6	59.8	>5	**No**
Between Alessandro Boulevard and Hospital Road	Residential & Commercial	58.7	59.8	>5	**No**
Between Hospital Road and Cactus Avenue	Commercial	58.6	59.0	>5	**No**
Between Cactus Avenue and Iris Avenue	Residential	57.8	58.3	>5	**No**
South of Iris Avenue	Residential	47.3	47.3	>5	**No**
Lynn Lee Lane					
South of Cactus Avenue	Residential	36.0	36.0	>5	**No**
Moreno Beach Drive					
North of Cactus Avenue	Residential	60.3	60.4	>3	**No**
South of Cactus Avenue	Residential	61.1	61.3	>3	**No**

Source: Traffic noise levels were calculated by ECORP Consulting using the FHWA roadway noise prediction model in conjunction with the trip generation rate identified by K2 Traffic Engineering, Inc. (2020). Refer to Attachment B for traffic noise modeling assumptions and results.

Notes: A total of 7 intersections were analyzed in the Traffic Impact Study; however, only roadway segments that impact sensitive receptors were included for the purposes of this analysis

As shown in Table 5-2, no roadway segment would generate an increase of noise beyond the FICON significance standards.

Operational Noise

As previously described, the Project is proposing the construction of three mixed use medical/ office buildings, two drive-thru food service buildings, one retail/ restaurant building, and one convenience store building associated with a gasoline station with 12 fueling positions. On-site noise associated with the Proposed Project has been calculated using the SoundPLAN 3D noise model. The modeling scenario accounts for activities occurring on the Project Site such as parking lot activity, gas station operations, the fast-food restaurant drive-thru facilities and internal circulation. Parking lot activity and gas station operations were modeled as area sources input to encompass the proposed areas per the Project Site Plan. Fast-food restaurant drive-thru activity was modeled as a point source representing the drive-thru loudspeaker at two locations on Pad C and once location on Pad A. Internal circulation was modeled as a line source traversing a majority of the Project Site.

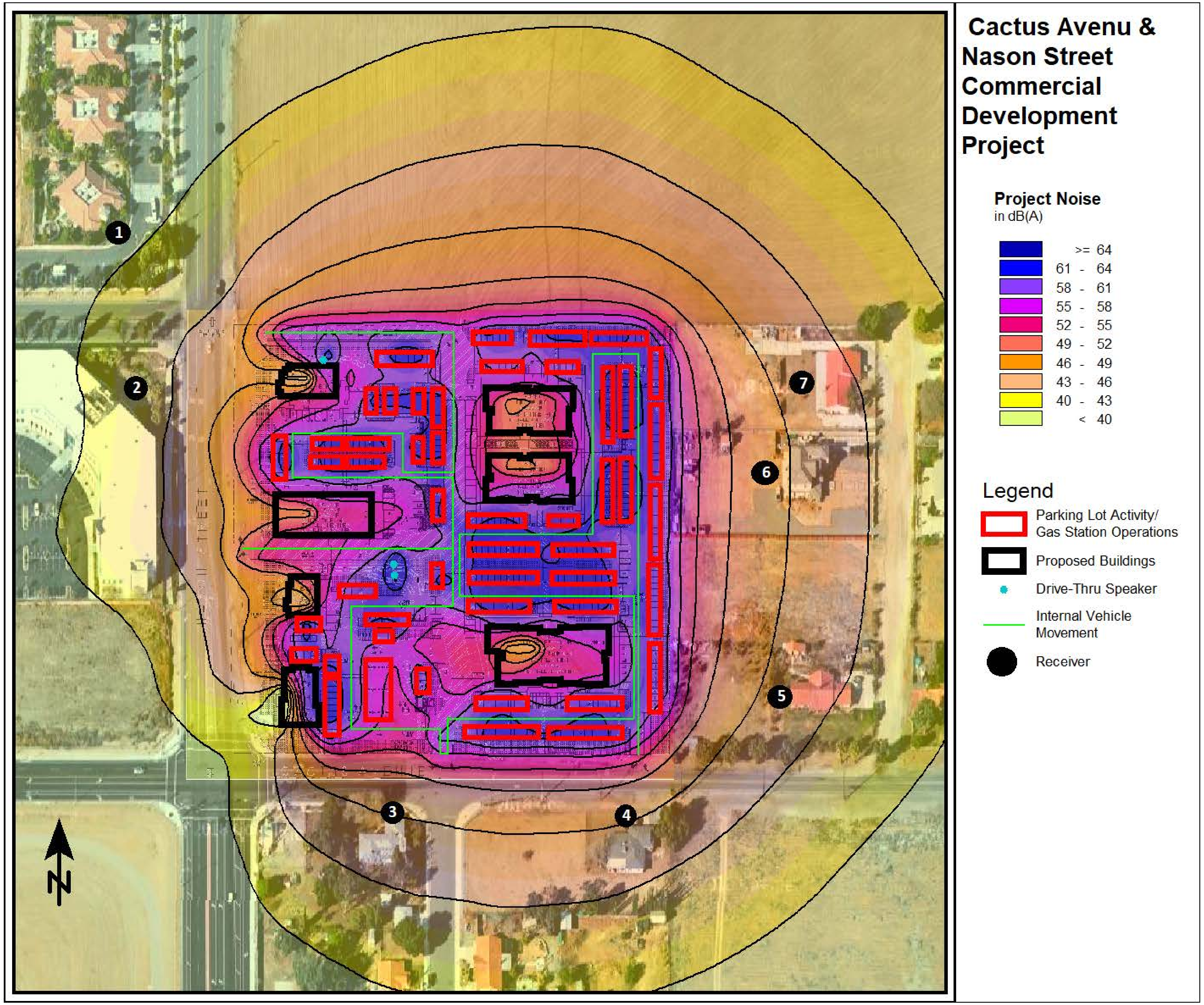
Table 5-3 shows the predicted Project noise levels at six nearby residences in the Project vicinity as well as the Riverside County Occupational Health & Wellness Center located west of the Project Site across Nason Street as predicted by SoundPLAN. Additionally, a noise contour graphic (see Figure 5-1) has been prepared to provide a visual depiction of the predicted noise levels in the Project vicinity from Project operations.

Table 5-3. Modeled Operational Noise Levels

Location	Modeled Operational Noise Attributed to the Project (dBA L_{eq})	Daytime/ Nighttime Exterior Noise Standards (dBA L_{eq})	Exceed Daytime/ Nighttime Exterior Standard?
#1 Residence northwest of Project Site	38.8	*60 / 55*	**No**
#2 Riverside County Occupational Health & Wellness Center	41.1	*65 / 60*	**No**
#3 Residence south of Project Site	45.7	*60 / 55*	**No**
#4 Residence south of Project Site	45.9	*60 / 55*	**No**
#5 Residence east of Project Site	44.6	*60 / 55*	**No**
#6 Residence east of Project Site	46.7	*60 / 55*	**No**
#7 Residence east of Project Site	44.4	*60 / 55*	**No**

Source: SounPLAN v 8.2. Refer to Attachment D for Model Data Outputs.

As shown in Table 5-3, Project operational noise would not exceed the daytime or nighttime exterior noise standards at any location.



Map Date: 2/14/2022
Photo (or Base) Source: *SoundPLAN*

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

Figure 5-1. Modeled Operational Noise Levels

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5.3.3 Would the Project Expose Structures to Substantial Groundborne Vibration During Construction?

Excessive groundborne vibration impacts result from continuously occurring vibration levels. Increases in groundborne vibration levels attributable to the Project would be primarily associated with short-term construction-related activities. Construction on the Project Site would have the potential to result in varying degrees of temporary groundborne vibration, depending on the specific construction equipment used and the operations involved. Ground vibration generated by construction equipment spreads through the ground and diminishes in magnitude with increases in distance.

Construction-related ground vibration is normally associated with impact equipment such as pile drivers, jackhammers, and the operation of some heavy-duty construction equipment, such as dozers and trucks. It is not anticipated that pile drivers or jackhammers would be necessary during Project construction. Vibration decreases rapidly with distance, and it is acknowledged that construction activities would occur throughout the Project Site and would not be concentrated at the point closest to sensitive receptors. Groundborne vibration levels associated with construction equipment are summarized in Table 5-4.

Table 5-4. Representative Vibration Source Levels for Construction Equipment

Equipment Type	Peak Particle Velocity at 25 Feet (inches per second)
Large Bulldozer	0.089
Pile Driver	0.170
Loaded Trucks	0.076
Hoe Ram	0.089
Jackhammer	0.035
Small Bulldozer/Tractor	0.003
Vibratory Roller	0.210

Source: FTA 2018; Caltrans 2020b

The City of Moreno Valley does not regulate or have a numeric threshold associated with construction vibrations. However, a discussion of construction vibration is included for full disclosure purposes. For comparison purposes, the Caltrans (2020b) recommended standard of 0.3 inches per second PPV with respect to the prevention of structural damage for older residential buildings is used as a threshold. This is also the level at which vibrations may begin to annoy people in buildings. Consistent with FTA recommendations for calculating construction vibration, construction vibration was measured from the center of the Project Site (FTA 2018). The nearest structure of concern, with regard to groundborne vibrations, are residences off Cactus Avenue and Lynn Lee Lane located approximately 35 feet from the proposed offsite improvements. It is noted that the residences east of the Project Site were not included in this analysis as they are located at a further distance from the proposed construction activities.

Based on the representative vibration levels presented for various construction equipment types in Table 5-4 and the construction vibration assessment methodology published by the FTA (2018), it is possible to estimate the potential project construction vibration levels. The FTA provides the following equation:

$$[PPVequip = PPVref \times (25/D)^{1.5}]$$

Table 5-5 presents the expected Project related vibration levels at a distance of 35 feet.

Table 5-5 Construction Vibration Levels at 35 Feet

Receiver PPV Levels (in/sec)[1]					Peak Vibration	Threshold	Exceed Threshold?
Large Bulldozer, Caisson Drilling, & Hoe Ram	Loaded Trucks	Jackhammer	Pile Driver	Vibratory Roller			
0.053	0.045	0.0211	0.102	0.126	**0.126**	*0.3*	**No**

Notes: [1]Based on the Vibration Source Levels of Construction Equipment included on Table 5-4 (FTA 2018). Distance to the nearest structure of concern is approximately 35 feet measured from the center of the proposed offsite improvements.

As shown in Table 5-5, vibration as a result of onsite construction activities on the Project Site would not exceed 0.3 PPV at the nearest structure. Thus, onsite Project construction would not exceed the recommended threshold.

5.3.4 Would the Project Expose Structures to Substantial Groundborne Vibration During Operations?

Project operations would not include the use of any stationary equipment that would result in excessive vibration levels. While the Project may accommodate heavy-duty trucks for delivery during operations, these vehicles can only generate groundborne vibration velocity levels of 0.006 PPV at 50 feet under typical circumstances. Therefore, the Project would result in negligible groundborne vibration impacts during operations.

5.3.5 Would the Project Expose People Residing or Working in the Project area to Excessive Airport Noise?

The Project Site is located approximately 3.78 miles southwest of the March Air Reserve Base. The Project Site is located outside the 60 dBA CNEL noise impact zone per the Transportation-Related Noise section of the Moreno Valley General Plan Final Program Environmental Impact Report. Implementation of the Proposed Project would not affect airport operations nor result in increased exposure of noise-sensitive receptors to aircraft noise.

6.0 REFERENCES

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LIST OF ATTACHMENTS

ATTACHMENT A

Baseline (Existing) Noise Measurements – Project Site and Vicinity

Site Number: 1
Recorded By: Alden Louaas
Job Number: 2019-146
Date: 8/28/2019
Time: 11:25 a.m.
Location: On the Project site.
Source of Peak Noise: Vehicles on adjacent roadways.

Noise Data			
Leq (dB)	**Lmin (dB)**	**Lmax (dB)**	**Peak (dB)**
47.4	40.5	58.8	96.0

Equipment						
Category	**Type**	**Vendor**	**Model**	**Serial No.**	**Cert. Date**	**Note**
Sound	Sound Level Meter	**Larson Davis**	**LxT SE**	**0005120**	**8/05/2019**	
	Microphone	**Larson Davis**	**377B02**	**174464**	**8/05/2019**	
	Preamp	**Larson Davis**	**PRMLxT1L**	**042852**	**8/05/2019**	
	Calibrator	**Larson Davis**	**CAL200**	**14105**	**8/02/2019**	

Weather Data			
Est.	**Duration:** 10 minutes		**Sky:** Clear
	Note: dBA Offset = 0.01		**Sensor Height (ft):** 4 ft
	Wind Ave Speed (mph)	**Temperature (degrees Fahrenheit)**	**Barometer Pressure (hPa)**
	2-5	85	29.9

Photo of Measurement Location

Summary

File Name on Meter	LxT_Data.141
File Name on PC	SLM_0005120_LxT_Data_141.01.ldbin
Serial Number	0005120
Model	SoundExpert® LxT
Firmware Version	2.302
User	Alden Lovaas
Location	Moreno Valley
Job Description	Cactus and Nason
Note	

Measurement

Description	
Start	2019-08-28 11:24:06
Stop	2019-08-28 11:34:06
Duration	00:10:00.0
Run Time	00:10:00.0
Pause	00:00:00.0
Pre Calibration	2019-08-28 10:52:38
Post Calibration	None
Calibration Deviation	---

Overall Settings

RMS Weight	A Weighting			
Peak Weight	Z Weighting			
Detector	Slow			
Preamp	PRMLxT1L			
Microphone Correction	Off			
Integration Method	Linear			
OBA Range	Low			
OBA Bandwidth	1/1 and 1/3			
OBA Freq. Weighting	A Weighting			
OBA Max Spectrum	Bin Max			
Overload	122.8 dB			
	A	**C**	**Z**	
Under Range Peak	79.1	76.1	**81.1**	dB
Under Range Limit	**27.1**	26.5	31.9	dB
Noise Floor	17.0	17.4	22.7	dB

Results

LA_{eq}	**47.4**	
LAE	75.2	
EA	3.653 µPa²h	
$LZ_{peak\ (max)}$	2019-08-28 11:27:35	96.0 dB
LAS_{max}	2019-08-28 11:29:27	58.8 dB

LASmin	2019-08-28 11:24:23	40.5 dB	
SEA	-99.94	dB	
LAS > 85.0 dB (Exceedance Counts / Duration)	0	0.0 s	
LAS > 115.0 dB (Exceedance Counts / Duration)	0	0.0 s	
LZpeak > 135.0 dB (Exceedance Counts / Duration)	0	0.0 s	
LZpeak > 137.0 dB (Exceedance Counts / Duration)	0	0.0 s	
LZpeak > 140.0 dB (Exceedance Counts / Duration)	0	0.0 s	

Community Noise	**Ldn**	**LDay 07:00-22:00**	**LNight 22:00-07:00**	**Lden**	**LDay 07:00-19:00**	**LEvening 19:00-22:00**
	47.4	47.4	-99.94	47.4	47.4	-99.94

LCeq	65.3	dB
LAeq	47.4	dB
LCeq - LAeq	17.9	dB
LAIeq	49.1	dB
LAeq	47.4	dB
LAIeq - LAeq	1.7	dB

	A		**C**		**Z**	
	dB	**Time Stamp**	**dB**	**Time Stamp**	**dB**	**Time Stamp**
Leq	47.4		65.3			
LS(max)	58.8	2019/08/28 11:29:27				
LS(min)	40.5	2019/08/28 11:24:23				
LPeak(max)					96.0	2019/08/28 11:27:35

# Overloads	0	
Overload Duration	0.0	s
# OBA Overloads	1	
OBA Overload Duration	2.0	s

Statistics

LAI5.00	52.6	dB
LAI10.00	50.5	dB
LAI33.30	46.7	dB
LAI50.00	45.4	dB
LAI66.60	44.3	dB
LAI90.00	42.5	dB

Site Number: 2
Recorded By: Alden Louaas
Job Number: 2019-146
Date: 8/28/2019
Time: 11:42 a.m.
Location: At the upper northern corner of the Project site adjacent to residence fence.
Source of Peak Noise: Vehicles on adjacent roadways.

Noise Data			
Leq (dB)	**Lmin (dB)**	**Lmax (dB)**	**Peak (dB)**
41.7	36.8	49.3	96.8

Equipment						
Category	**Type**	**Vendor**	**Model**	**Serial No.**	**Cert. Date**	**Note**
Sound	Sound Level Meter	**Larson Davis**	**LxT SE**	**0005120**	**8/05/2019**	
	Microphone	**Larson Davis**	**377B02**	**174464**	**8/05/2019**	
	Preamp	**Larson Davis**	**PRMLxT1L**	**042852**	**8/05/2019**	
	Calibrator	**Larson Davis**	**CAL200**	**14105**	**8/02/2019**	

Weather Data			
Est.	**Duration:** 10 minutes		**Sky:** Clear
	Note: dBA Offset = 0.01		**Sensor Height (ft):** 4 ft
	Wind Ave Speed (mph)	**Temperature (degrees Fahrenheit)**	**Barometer Pressure (hPa)**
	2-5	85	29.9

Photo of Measurement Location

Summary

File Name on Meter	LxT_Data.142
File Name on PC	SLM_0005120_LxT_Data_142.01.ldbin
Serial Number	0005120
Model	SoundExpert® LxT
Firmware Version	2.302
User	Alden Lovaas
Location	Moreno Valley
Job Description	Cactus and Nason
Note	

Measurement

Description	
Start	2019-08-28 11:42:12
Stop	2019-08-28 11:52:12
Duration	00:10:00.0
Run Time	00:10:00.0
Pause	00:00:00.0
Pre Calibration	2019-08-28 10:52:38
Post Calibration	None
Calibration Deviation	---

Overall Settings

RMS Weight	A Weighting
Peak Weight	Z Weighting
Detector	Slow
Preamp	PRMLxT1L
Microphone Correction	Off
Integration Method	Linear
OBA Range	Low
OBA Bandwidth	1/1 and 1/3
OBA Freq. Weighting	A Weighting
OBA Max Spectrum	Bin Max
Overload	122.8 dB

	A	**C**	**Z**
Under Range Peak	79.1	76.1	**81.1** dB
Under Range Limit	**27.1**	26.5	31.9 dB
Noise Floor	17.0	17.4	22.7 dB

Results

LA_{eq}	**41.7**	
LAE	69.5	
EA	0.991 µPa²h	
$LZ_{peak\ (max)}$	2019-08-28 11:43:00	96.8 dB
LAS_{max}	2019-08-28 11:52:00	49.3 dB
LAS_{min}	2019-08-28 11:50:05	36.8 dB

SEA	-99.94	dB

LAS > 85.0 dB (Exceedance Counts / Duration)	0	0.0 s
LAS > 115.0 dB (Exceedance Counts / Duration)	0	0.0 s
LZ_{peak} > 135.0 dB (Exceedance Counts / Duration)	0	0.0 s
LZ_{peak} > 137.0 dB (Exceedance Counts / Duration)	0	0.0 s
LZ_{peak} > 140.0 dB (Exceedance Counts / Duration)	0	0.0 s

Community Noise	**Ldn**	**LDay 07:00-22:00**	**LNight 22:00-07:00**	**Lden**	**LDay 07:00-19:00**	**LEvening 19:00-22:00**
	41.7	41.7	-99.94	41.7	41.7	-99.94

LC_{eq}	61.7	dB
LA_{eq}	41.7	dB
LC_{eq} - LA_{eq}	19.9	dB
LAI_{eq}	43.2	dB
LA_{eq}	41.7	dB
LAI_{eq} - LA_{eq}	1.5	dB

	A		**C**		**Z**	
	dB	**Time Stamp**	**dB**	**Time Stamp**	**dB**	**Time Stamp**
L_{eq}	41.7		61.7			
$L_{S(max)}$	49.3	2019/08/28 11:52:00				
$L_{S(min)}$	36.8	2019/08/28 11:50:05				
$L_{Peak(max)}$					96.8	2019/08/28 11:43:00

# Overloads	0	
Overload Duration	0.0	s
# OBA Overloads	1	
OBA Overload Duration	4.0	s

Statistics		
LAI5.00	45.2	dB
LAI10.00	43.9	dB
LAI33.30	41.8	dB
LAI50.00	40.9	dB
LAI66.60	39.8	dB
LAI90.00	38.4	dB

Site Number: 3
Recorded By: Alden Louaas
Job Number: 2019-146
Date: 8/28/2019
Time: 11:00 a.m.
Location: On sidewalk oat Lynn Lee Lane facing Cactus Avenue.
Source of Peak Noise: Vehicles on adjacent roadways.

Noise Data			
Leq (dB)	**Lmin (dB)**	**Lmax (dB)**	**Peak (dB)**
46.5	45.8	46.2	81.0

Equipment						
Category	**Type**	**Vendor**	**Model**	**Serial No.**	**Cert. Date**	**Note**
Sound	Sound Level Meter	**Larson Davis**	**LxT SE**	**0005120**	**8/05/2019**	
	Microphone	**Larson Davis**	**377B02**	**174464**	**8/05/2019**	
	Preamp	**Larson Davis**	**PRMLxT1L**	**042852**	**8/05/2019**	
	Calibrator	**Larson Davis**	**CAL200**	**14105**	**8/02/2019**	

Weather Data			
Est.	**Duration:** 10 minutes		**Sky:** Clear
	Note: dBA Offset = 0.01		**Sensor Height (ft):** 4 ft
	Wind Ave Speed (mph)	**Temperature (degrees Fahrenheit)**	**Barometer Pressure (hPa)**
	2-5	85	29.9

Photo of Measurement Location

Summary

File Name on Meter	LxT_Data.140
File Name on PC	SLM_0005120_LxT_Data_140.01.ldbin
Serial Number	0005120
Model	SoundExpert® LxT
Firmware Version	2.302
User	Alden Lovaas
Location	Moreno Valley
Job Description	Cactus and Nason
Note	

Measurement

Description	
Start	2019-08-28 11:00:55
Stop	2019-08-28 11:10:55
Duration	00:10:00.0
Run Time	00:00:00.8
Pause	00:09:59.2
Pre Calibration	2019-08-28 10:52:47
Post Calibration	None
Calibration Deviation	---

Overall Settings

RMS Weight	A Weighting			
Peak Weight	Z Weighting			
Detector	Slow			
Preamp	PRMLxT1L			
Microphone Correction	Off			
Integration Method	Linear			
OBA Range	Low			
OBA Bandwidth	1/1 and 1/3			
OBA Freq. Weighting	A Weighting			
OBA Max Spectrum	Bin Max			
Overload	122.8	dB		
	A	**C**	**Z**	
Under Range Peak	79.1	76.1	**81.1**	dB
Under Range Limit	**27.1**	26.5	31.9	dB
Noise Floor	17.0	17.4	22.7	dB

Results

LA_{eq}	**46.5**		
LAE	45.5		
EA	0.004	µPa²h	
$LZ_{peak\ (max)}$	2019-08-28 11:00:55	81.0	dB
LAS_{max}	2019-08-28 11:00:56	46.2	dB
LAS_{min}	2019-08-28 11:00:55	45.8	dB

SEA	-99.94 dB	
LAS > 85.0 dB (Exceedance Counts / Duration)	0	0.0 s
LAS > 115.0 dB (Exceedance Counts / Duration)	0	0.0 s
LZ_{peak} > 135.0 dB (Exceedance Counts / Duration)	0	0.0 s
LZ_{peak} > 137.0 dB (Exceedance Counts / Duration)	0	0.0 s
LZ_{peak} > 140.0 dB (Exceedance Counts / Duration)	0	0.0 s

Community Noise	**Ldn**	**LDay 07:00-22:00**	**LNight 22:00-07:00**	**Lden**	**LDay 07:00-19:00**	**LEvening 19:00-22:00**
	46.5	46.5	-99.94	46.5	46.5	-99.94

LC_{eq}	63.7 dB
LA_{eq}	46.5 dB
LC_{eq} - LA_{eq}	17.2 dB
LAI_{eq}	47.4 dB
LA_{eq}	46.5 dB
LAI_{eq} - LA_{eq}	0.9 dB

	A		**C**		**Z**	
	dB	**Time Stamp**	**dB**	**Time Stamp**	**dB**	**Time Stamp**
L_{eq}	46.5		63.7			
$L_{S(max)}$	46.2	2019/08/28 11:00:56				
$L_{S(min)}$	45.8	2019/08/28 11:00:55				
$L_{Peak(max)}$					81.0	2019/08/28 11:00:55

# Overloads	0
Overload Duration	0.0 s
# OBA Overloads	0
OBA Overload Duration	0.0 s

Statistics	
LAI5.00	46.2 dB
LAI10.00	46.2 dB
LAI33.30	46.0 dB
LAI50.00	46.0 dB
LAI66.60	46.0 dB
LAI90.00	45.8 dB

Site Number: 4			
Recorded By: Alden Louaas			
Job Number: 2019-146			
Date: 8/28/2019			
Time: 12:15 p.m.			
Location: On the sidewalk adjacent to Nason Street approximately 300 feet from Project site.			
Source of Peak Noise: Vehicles on adjacent roadway and nearby construction.			
Noise Data			
Leq (dB)	**Lmin (dB)**	**Lmax (dB)**	**Peak (dB)**
64.2	44.9	78.6	100.7

Equipment						
Category	**Type**	**Vendor**	**Model**	**Serial No.**	**Cert. Date**	**Note**
Sound	Sound Level Meter	**Larson Davis**	**LxT SE**	**0005120**	**8/05/2019**	
	Microphone	**Larson Davis**	**377B02**	**174464**	**8/05/2019**	
	Preamp	**Larson Davis**	**PRMLxT1L**	**042852**	**8/05/2019**	
	Calibrator	**Larson Davis**	**CAL200**	**14105**	**8/02/2019**	

Weather Data			
Est.	**Duration:** 10 minutes		**Sky:** Clear
	Note: dBA Offset = 0.01		**Sensor Height (ft): 4** ft
	Wind Ave Speed (mph)	**Temperature (degrees Fahrenheit)**	**Barometer Pressure (hPa)**
	2-5	85	29.9

Photo of Measurement Location

Summary

File Name on Meter	LxT_Data.143		
File Name on PC	SLM_0005120_LxT_Data_143.01.ldbin		
Serial Number	0005120		
Model	SoundExpert® LxT		
Firmware Version	2.302		
User	Alden Lovaas		
Location	Moreno Valley		
Job Description	Cactus and Nason		
Note			

Measurement

Description			
Start	2019-08-28 12:13:32		
Stop	2019-08-28 12:23:32		
Duration	00:10:00.0		
Run Time	00:10:00.0		
Pause	00:00:00.0		
Pre Calibration	2019-08-28 10:52:38		
Post Calibration	None		
Calibration Deviation	---		

Overall Settings

RMS Weight	A Weighting		
Peak Weight	Z Weighting		
Detector	Slow		
Preamp	PRMLxT1L		
Microphone Correction	Off		
Integration Method	Linear		
OBA Range	Low		
OBA Bandwidth	1/1 and 1/3		
OBA Freq. Weighting	A Weighting		
OBA Max Spectrum	Bin Max		
Overload	122.8 dB		
	A	**C**	**Z**
Under Range Peak	79.1	76.1	**81.1** dB
Under Range Limit	**27.1**	26.5	31.9 dB
Noise Floor	17.0	17.4	22.7 dB

Results

LA_{eq}	**64.2**	
LAE	92.0	
EA	177.087 µPa²h	
$LZ_{peak\ (max)}$	2019-08-28 12:20:45	100.7 dB
LAS_{max}	2019-08-28 12:19:36	78.6 dB
LAS_{min}	2019-08-28 12:16:32	44.9 dB

SEA	-99.94	dB

LAS > 85.0 dB (Exceedance Counts / Duration)	0	0.0 s
LAS > 115.0 dB (Exceedance Counts / Duration)	0	0.0 s
LZ_{peak} > 135.0 dB (Exceedance Counts / Duration)	0	0.0 s
LZ_{peak} > 137.0 dB (Exceedance Counts / Duration)	0	0.0 s
LZ_{peak} > 140.0 dB (Exceedance Counts / Duration)	0	0.0 s

Community Noise	**Ldn**	**LDay 07:00-22:00**	**LNight 22:00-07:00**	**Lden**	**LDay 07:00-19:00**	**LEvening 19:00-22:00**
	64.2	64.2	-99.94	64.2	64.2	-99.94

LC_{eq}	75.3	dB
LA_{eq}	64.2	dB
LC_{eq} - LA_{eq}	11.1	dB
LAI_{eq}	65.4	dB
LA_{eq}	64.2	dB
LAI_{eq} - LA_{eq}	1.1	dB

	A		**C**		**Z**	
	dB	**Time Stamp**	**dB**	**Time Stamp**	**dB**	**Time Stamp**
L_{eq}	64.2		75.3			
$L_{S(max)}$	78.6	2019/08/28 12:19:36				
$L_{S(min)}$	44.9	2019/08/28 12:16:32				
$L_{Peak(max)}$					100.7	2019/08/28 12:20:45

# Overloads	0	
Overload Duration	0.0	s
# OBA Overloads	7	
OBA Overload Duration	33.8	s

Statistics

LAI5.00	69.7	dB
LAI10.00	67.5	dB
LAI33.30	62.4	dB
LAI50.00	59.6	dB
LAI66.60	55.7	dB
LAI90.00	48.5	dB

ATTACHMENT B

Federal Highway Administration Highway Noise Prediction Model (FHWA-RD-77-108) Outputs – Traffic Noise

TRAFFIC NOISE LEVELS AND NOISE CONTOURS

Project Number: 2019-146
Project Name: Cactus Nason Plaza

Background Information

Model Description: FHWA Highway Noise Prediction Model (FHWA-RD-77-108) with California Vehicle Noise (CALVENO) Emission Levels.
Source of Traffic Volumes: Fehr & Peers 2019
Community Noise Descriptor: L_{dn}: ____ CNEL: x

Assumed 24-Hour Traffic Distribution:	Day	Evening	Night
Total ADT Volumes	77.70%	12.70%	9.60%
Medium-Duty Trucks	87.43%	5.05%	7.52%
Heavy-Duty Trucks	89.10%	2.84%	8.06%

Analysis Condition Roadway, Segment	Lanes	Median Width	ADT Volume	Design Speed (mph)	Alpha Factor	Vehicle Mix Medium Trucks	Vehicle Mix Heavy Trucks	CNEL at 100 Feet	Distance to Contour 70 CNEL	65 CNEL	60 CNEL	55 CNEL	Calc Dist	Traffic Volumes Day	Eve	Night
Existing Conditions																
Alessandro Boulevard																
East of Nason Street	2	0	3,285	50	0.5	1.8%	0.7%	57.5	-	-	68	147	100	2,552	417	315
West of Nason Street	2	0	2,952	50	0.5	1.8%	0.7%	57.1	-	-	64	137	100	2,294	375	283
Hospital Road																
West of Nason Street	4	0	1,071	35	0.5	1.8%	0.7%	49.1	-	-	-	-	100	832	136	103
Cactus Avenue																
West of Lasselle Street	4	0	4,158	40	0.5	1.8%	0.7%	56.3	-	-	57	122	100	3,231	528	399
Between Lasselle Street and Nason Street	4	0	2,745	40	0.5	1.8%	0.7%	54.5	-	-	-	92	100	2,133	349	264
Between Nason Street and Lynn Lee Lane	4	0	3,398	40	0.5	1.8%	0.7%	55.4	-	-	49	107	100	2,640	432	326
Between Lynn Lee Lane and Moreno Beach Drive	4	0	3,379	40	0.5	1.8%	0.7%	55.4	-	-	49	106	100	2,625	429	324
East of Moreno Beach Drive	4	0	2,592	40	0.5	1.8%	0.7%	54.2	-	-	-	89	100	2,014	329	249
Iris Avenue																
East of Nason Street	4	0	6,309	50	0.5	1.8%	0.7%	60.5	-	50	107	231	100	4,902	801	606
West of Nason Street	4	0	9,378	50	0.5	1.8%	0.7%	62.2	-	65	140	301	100	7,287	1,191	900
Lasselle Street																
North of Cactus Avenue	2	0	5,796	45	0.5	1.8%	0.7%	58.9	-	39	84	181	100	4,503	736	556
South of Cactus Avenue	2	0	8,370	45	0.5	1.8%	0.7%	60.5	-	50	107	231	100	6,503	1,063	804
Nason Street																
North of Alessandro Boulevard	4	0	6,759	45	0.5	1.8%	0.7%	59.6	-	-	94	203	100	5,252	858	649
Between Alessandro Boulevard and Hospital Road	4	0	5,449	45	0.5	1.8%	0.7%	58.7	-	-	82	176	100	4,234	692	523
Between Hospital Road and Cactus Avenue	4	0	5,382	45	0.5	1.8%	0.7%	58.6	-	-	81	175	100	4,182	684	517

Between Cactus Avenue and Iris Avenue	4	0	4,410	45	0.5	1.8%	0.7%	57.8	-	-	71	153	100	3,427	560	423
Sout of Iris Avenue	2	0	732	35	0.5	1.8%	0.7%	47.3	-	-	-	-	100	569	93	70
Lynn Lee Lane																
South of Cactus Avenue	2	0	54	35	0.5	1.8%	0.7%	36.0	-	-	-	-	100	42	7	5
Moreno Beach Drive																
North of Cactus Avenue	4	5	4,797	55	0.5	1.8%	0.7%	60.3	-	49	105	227	100	3,727	609	461
South of Cactus Avenue	4	5	5,751	55	0.5	1.8%	0.7%	61.1	-	55	119	256	100	4,469	730	552

TRAFFIC NOISE LEVELS AND NOISE CONTOURS

Project Number: 2019-146
Project Name: Cactus Nason Plaza

Background Information

Model Description: FHWA Highway Noise Prediction Model (FHWA-RD-77-108) with California Vehicle Noise (CALVENO) Emission Levels.
Source of Traffic Volumes: Fehr & Peers 2019
Community Noise Descriptor: L_{dn}: ____ CNEL: x

Assumed 24-Hour Traffic Distribution:	Day	Evening	Night
Total ADT Volumes	77.70%	12.70%	9.60%
Medium-Duty Trucks	87.43%	5.05%	7.52%
Heavy-Duty Trucks	89.10%	2.84%	8.06%

Analysis Condition Roadway, Segment	Lanes	Median Width	ADT Volume	Design Speed (mph)	Alpha Factor	Vehicle Mix Medium Trucks	Vehicle Mix Heavy Trucks	Distance from Centerline of Roadway CNEL at 100 Feet	Distance to Contour 70 CNEL	65 CNEL	60 CNEL	55 CNEL	Calc Dist	Traffic Volumes Day	Eve	Night
Existing Conditions + Project																
Alessandro Boulevard																
East of Nason Street	2	0	3,375	50	0.5	1.8%	0.7%	57.6	-	32	70	150	100	2,622	429	324
West of Nason Street	2	0	3,096	50	0.5	1.8%	0.7%	57.3	-	-	66	142	100	2,406	393	297
Hospital Road																
West of Nason Street	4	0	1,341	35	0.5	1.8%	0.7%	50.0	-	-	-	47	100	1,042	170	129
Cactus Avenue																
West of Lasselle Street	4	0	4,338	40	0.5	1.8%	0.7%	56.5	-	-	58	125	100	3,371	551	416
Between Lasselle Street and Nason Street	4	0	4,954	40	0.5	1.8%	0.7%	57.1	-	-	64	137	100	3,849	629	476
Between Nason Street and Lynn Lee Lane	4	0	4,005	40	0.5	1.8%	0.7%	56.1	-	-	55	119	100	3,112	509	384
Between Lynn Lee Lane and Moreno Beach Drive	4	0	3,838	40	0.5	1.8%	0.7%	55.9	-	-	54	116	100	2,982	487	368
East of Moreno Beach Drive	4	0	2,772	40	0.5	1.8%	0.7%	54.5	-	-	-	93	100	2,154	352	266
Iris Avenue																
East of Nason Street	4	0	6,498	50	0.5	1.8%	0.7%	60.6	-	51	109	235	100	5,049	825	624
West of Nason Street	4	0	9,594	50	0.5	1.8%	0.7%	62.3	-	66	142	305	100	7,455	1,218	921
Lasselle Street																
North of Cactus Avenue	2	0	5,922	45	0.5	1.8%	0.7%	59.0	-	40	85	184	100	4,601	752	569
South of Cactus Avenue	2	0	8,514	45	0.5	1.8%	0.7%	60.5	-	50	109	234	100	6,615	1,081	817
Nason Street																
North of Alessandro Boulevard	4	0	7,110	45	0.5	1.8%	0.7%	59.8	-	45	98	210	100	5,524	903	683
Between Alessandro Boulevard and Hospital Road	4	0	7,074	45	0.5	1.8%	0.7%	59.8	-	45	97	210	100	5,496	898	679
Between Hospital Road and Cactus Avenue	4	0	5,832	45	0.5	1.8%	0.7%	59.0	-	-	86	184	100	4,531	741	560

Between Cactus Avenue and Iris Avenue	4	0	5,008	45	0.5	1.8%	0.7%	58.3	-	-	77	167	100	3,891	636	481
Sout of Iris Avenue	2	0	738	35	0.5	1.8%	0.7%	47.3	-	-	-	-	100	573	94	71
Lynn Lee Lane																
South of Cactus Avenue	2	0	54	35	0.5	1.8%	0.7%	36.0	-	-	-	-	100	42	7	5
Moreno Beach Drive																
North of Cactus Avenue	4	5	4,887	55	0.5	1.8%	0.7%	60.4	-	49	107	230	100	3,797	621	469
South of Cactus Avenue	4	5	5,931	55	0.5	1.8%	0.7%	61.3	-	56	121	261	100	4,608	753	569

TRAFFIC NOISE LEVELS AND NOISE CONTOURS

Project Number: 2019-146
Project Name: Cactus Nason Plaza

Background Information

Model Description:	FHWA Highway Noise Prediction Model (FHWA-RD-77-108) with California Vehicle Noise (CALVENO) Emission Levels.			
Source of Traffic Volumes:	Fehr & Peers 2019			
Community Noise Descriptor:	L_{dn}: ____		CNEL: x	

Assumed 24-Hour Traffic Distribution:	Day	Evening	Night
Total ADT Volumes	77.70%	12.70%	9.60%
Medium-Duty Trucks	87.43%	5.05%	7.52%
Heavy-Duty Trucks	89.10%	2.84%	8.06%

Analysis Condition Roadway, Segment	Lanes	Median Width	ADT Volume	Design Speed (mph)	Alpha Factor	Vehicle Mix Medium Trucks	Vehicle Mix Heavy Trucks	Distance from Centerline of Roadway CNEL at 100 Feet	Distance to Contour 70 CNEL	65 CNEL	60 CNEL	55 CNEL	Calc Dist	Traffic Volumes Day	Eve	Night
Cummulative without Project																
Alessandro Boulevard																
East of Nason Street	2	0	3,960	50	0.5	1.8%	0.7%	58.3	-	36	77	167	100	3,077	503	380
West of Nason Street	2	0	4,887	50	0.5	1.8%	0.7%	59.2	-	41	89	192	100	3,797	621	469
Hospital Road																
West of Nason Street	4	0	1,379	35	0.5	1.8%	0.7%	50.2	-	-	-	48	100	1,071	175	132
Cactus Avenue																
West of Lasselle Street	4	0	4,725	40	0.5	1.8%	0.7%	56.8	-	-	62	133	100	3,671	600	454
Between Lasselle Street and Nason Street	4	0	5,151	40	0.5	1.8%	0.7%	57.2	-	-	65	141	100	4,002	654	494
Between Nason Street and Lynn Lee Lane	4	0	4,145	40	0.5	1.8%	0.7%	56.3	-	-	56	122	100	3,221	526	398
Between Lynn Lee Lane and Moreno Beach Drive	4	0	3,933	40	0.5	1.8%	0.7%	56.0	-	-	55	117	100	3,056	499	378
East of Moreno Beach Drive	4	0	3,060	40	0.5	1.8%	0.7%	55.0	-	-	46	99	100	2,378	389	294
Iris Avenue																
East of Nason Street	4	0	8,577	50	0.5	1.8%	0.7%	61.8	-	61	132	283	100	6,664	1,089	823
West of Nason Street	4	0	10,818	50	0.5	1.8%	0.7%	62.8	-	71	154	331	100	8,406	1,374	1,039
Lasselle Street																
North of Cactus Avenue	2	0	6,561	45	0.5	1.8%	0.7%	59.4	-	42	91	196	100	5,098	833	630
South of Cactus Avenue	2	0	9,369	45	0.5	1.8%	0.7%	60.9	-	54	116	249	100	7,280	1,190	899
Nason Street																
North of Alessandro Boulevard	4	0	7,659	45	0.5	1.8%	0.7%	60.2	-	48	103	221	100	5,951	973	735
Between Alessandro Boulevard and Hospital Road	4	0	7,348	45	0.5	1.8%	0.7%	60.0	-	46	100	215	100	5,709	933	705
Between Hospital Road and Cactus Avenue	4	0	5,967	45	0.5	1.8%	0.7%	59.1	-	-	87	187	100	4,636	758	573

Between Cactus Avenue and Iris Avenue	4	0	5,170	45	0.5	1.8%	0.7%	58.5	-	-	79	170	100	4,017	657	496
Sout of Iris Avenue	2	0	846	35	0.5	1.8%	0.7%	47.9	-	-	-	34	100	657	107	81
Lynn Lee Lane																
South of Cactus Avenue	2	0	54	35	0.5	1.8%	0.7%	36.0	-	-	-	-	100	42	7	5
Moreno Beach Drive																
North of Cactus Avenue	4	5	6,003	55	0.5	1.8%	0.7%	61.3	-	57	122	263	100	4,664	762	576
South of Cactus Avenue	4	5	7,299	55	0.5	1.8%	0.7%	62.2	-	65	139	300	100	5,671	927	701

TRAFFIC NOISE LEVELS AND NOISE CONTOURS

Project Number: 2019-146
Project Name: Cactus Nason Plaza

Background Information

Model Description: FHWA Highway Noise Prediction Model (FHWA-RD-77-108) with California Vehicle Noise (CALVENO) Emission Levels.
Source of Traffic Volumes: Fehr & Peers 2019
Community Noise Descriptor: L_{dn}: ______ CNEL: x

Assumed 24-Hour Traffic Distribution:	Day	Evening	Night
Total ADT Volumes	77.70%	12.70%	9.60%
Medium-Duty Trucks	87.43%	5.05%	7.52%
Heavy-Duty Trucks	89.10%	2.84%	8.06%

Analysis Condition / Roadway, Segment	Lanes	Median Width	ADT Volume	Design Speed (mph)	Alpha Factor	Vehicle Mix: Medium Trucks	Vehicle Mix: Heavy Trucks	CNEL at 100 Feet	Distance to Contour: 70 CNEL	65 CNEL	60 CNEL	55 CNEL	Calc Dist	Traffic Volumes: Day	Eve	Night
Cummulative with Project																
Alessandro Boulevard																
East of Nason Street	2	0	4,536	50	0.5	1.8%	0.7%	58.9	-	39	85	183	100	3,524	576	435
West of Nason Street	2	0	3,807	50	0.5	1.8%	0.7%	58.2	-	35	75	162	100	2,958	483	365
Hospital Road																
West of Nason Street	4	0	1,449	35	0.5	1.8%	0.7%	50.4	-	-	-	49	100	1,126	184	139
Cactus Avenue																
West of Lasselle Street	4	0	4,905	40	0.5	1.8%	0.7%	57.0	-	-	63	136	100	3,811	623	471
Between Lasselle Street and Nason Street	4	0	5,071	40	0.5	1.8%	0.7%	57.2	-	-	65	139	100	3,940	644	487
Between Nason Street and Lynn Lee Lane	4	0	4,098	40	0.5	1.8%	0.7%	56.2	-	-	56	121	100	3,184	520	393
Between Lynn Lee Lane and Moreno Beach Drive	4	0	4,010	40	0.5	1.8%	0.7%	56.1	-	-	55	119	100	3,116	509	385
East of Moreno Beach Drive	4	0	3,240	40	0.5	1.8%	0.7%	55.2	-	-	48	103	100	2,517	411	311
Iris Avenue																
East of Nason Street	4	0	7,866	50	0.5	1.8%	0.7%	61.4	-	58	124	267	100	6,112	999	755
West of Nason Street	4	0	11,025	50	0.5	1.8%	0.7%	62.9	-	72	155	335	100	8,566	1,400	1,058
Lasselle Street																
North of Cactus Avenue	2	0	6,813	45	0.5	1.8%	0.7%	59.6	-	43	94	201	100	5,294	865	654
South of Cactus Avenue	2	0	9,513	45	0.5	1.8%	0.7%	61.0	-	54	117	252	100	7,392	1,208	913
Nason Street																
North of Alessandro Boulevard	4	0	8,415	45	0.5	1.8%	0.7%	60.6	-	51	109	235	100	6,538	1,069	808
Between Alessandro Boulevard and Hospital Road	4	0	7,812	45	0.5	1.8%	0.7%	60.3	-	48	104	224	100	6,070	992	750
Between Hospital Road and Cactus Avenue	4	0	6,412	45	0.5	1.8%	0.7%	59.4	-	-	91	196	100	4,982	814	616

Between Cactus Avenue and Iris Avenue	4	0	5,530	45	0.5	1.8%	0.7%	58.8	-	-	83	178	100	4,297	702	531
Sout of Iris Avenue	2	0	846	35	0.5	1.8%	0.7%	47.9	-	-	-	34	100	657	107	81
Lynn Lee Lane																
South of Cactus Avenue	2	0	54	35	0.5	1.8%	0.7%	36.0	-	-	-	-	100	42	7	5
Moreno Beach Drive																
North of Cactus Avenue	4	5	6,090	55	0.5	1.8%	0.7%	61.4	-	57	123	266	100	4,732	773	585
South of Cactus Avenue	4	5	7,479	55	0.5	1.8%	0.7%	62.3	-	66	142	305	100	5,811	950	718

ATTACHMENT C

Federal Highway Administration Roadway Construction Noise Outputs

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 2/13/2023
Case Description: Phase 1 & 2 Site Preparation

Description	Affected Land Use
Phase 1 & 2 Site Preparation	Residential

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)
Dozer	No	40		81.7	300
Dozer	No	40		81.7	300
Dozer	No	40		81.7	300
Tractor	No	40	84		300
Tractor	No	40	84		300
Tractor	No	40	84		300
Tractor	No	40	84		300

		Calculated (dBA)	
Equipment		***Lmax**	**Leq**
Dozer		66.1	62.1
Dozer		66.1	62.1
Dozer		66.1	62.1
Tractor		68.4	64.5
Tractor		68.4	64.5
Tractor		68.4	64.5
Tractor		68.4	64.5
	Total	**68.4**	**72.1**

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 2/13/2023
Case Description: Phase 1& 2 Grading

Description	**Affected Land Use**
Phase 1& 2 Grading	Residential

Description	**Impact Device**	**Usage(%)**	**Equipment Spec Lmax (dBA)**	**Actual Lmax (dBA)**	**Receptor Distance (feet)**
Excavator	No	40		80.7	300
Grader	No	40	85		300
Dozer	No	40		81.7	300
Tractor	No	40	84		300
Tractor	No	40	84		300
Tractor	No	40	84		300

Calculated (dBA)

Equipment		***Lmax**	**Leq**
Excavator		65.1	61.2
Grader		69.4	65.5
Dozer		66.1	62.1
Tractor		68.4	64.5
Tractor		68.4	64.5
Tractor		68.4	64.5
	Total	**69.4**	**71.7**

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM)

Report date: 2/13/2023
Case Description: Phase 1 Building Construction, Paving & Architectural Coating

Description	**Affected Land Use**
Phase 1 Building Construction, Paving & Architectural Coating	Residential

Description	**Impact Device**	**Usage(%)**	**Equipment Spec Lmax (dBA)**	**Actual Lmax (dBA)**	**Receptor Distance (feet)**
Crane	No	16		80.6	300
Gradall	No	40		83.4	300
Gradall	No	40		83.4	300
Gradall	No	40		83.4	300
Generator	No	50		80.6	300
Tractor	No	40	84		300
Tractor	No	40	84		300
Tractor	No	40	84		300
Welder / Torch	No	40		74	300
Paver	No	50		77.2	300
Paver	No	50		77.2	300
Paver	No	50		77.2	300
Paver	No	50		77.2	300
Roller	No	20		80	300
Roller	No	20		80	300
Compressor (air)	No	40		77.7	300

	Calculated (dBA)	
Equipment	***Lmax**	**Leq**
Crane	65	57
Gradall	67.8	63.9
Gradall	67.8	63.9
Gradall	67.8	63.9
Generator	65.1	62.1
Tractor	68.4	64.5
Tractor	68.4	64.5
Tractor	68.4	64.5
Welder / Torch	58.4	54.5
Paver	61.7	58.6

Paver		61.7	58.6
Paver		61.7	58.6
Paver		61.7	58.6
Roller		64.4	57.4
Roller		64.4	57.4
Compressor (air)		62.1	58.1
	Total	**68.4**	**73.6**

*Calculated Lmax is the Loudest value.

Report date: 2/13/2023
Case Description: Phase 2 Building Construction, Paving & Architectural Coating

Description	**Affected Land Use**
Phase 2 Building Construction, Paving & Architectural Coating	Residential

Description	**Impact Device**	**Usage(%)**	**Equipment Spec Lmax (dBA)**	**Actual Lmax (dBA)**	**Receptor Distance (feet)**
Crane	No	16		80.6	300
Gradall	No	40		83.4	300
Gradall	No	40		83.4	300
Gradall	No	40		83.4	300
Generator	No	50		80.6	300
Tractor	No	40	84		300
Tractor	No	40	84		300
Tractor	No	40	84		300
Welder / Torch	No	40		74	300
Paver	No	50		77.2	300
Paver	No	50		77.2	300
Paver	No	50		77.2	300
Paver	No	50		77.2	300
Roller	No	20		80	300
Roller	No	20		80	300
Compressor (air)	No	40		77.7	300

	Calculated (dBA)	
Equipment	***Lmax**	**Leq**
Crane	65	57
Gradall	67.8	63.9
Gradall	67.8	63.9
Gradall	67.8	63.9
Generator	65.1	62.1
Tractor	68.4	64.5
Tractor	68.4	64.5
Tractor	68.4	64.5
Welder / Torch	58.4	54.5
Paver	61.7	58.6

Paver		61.7	58.6
Paver		61.7	58.6
Paver		61.7	58.6
Roller		64.4	57.4
Roller		64.4	57.4
Compressor (air)		62.1	58.1
	Total	**68.4**	**73.6**

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 2/13/2023
Case Description: Phase 3 Site Preparation

Description	**Affected Land Use**
Phase 3 Site Preparation	Residential

Description	**Impact Device**	**Usage(%)**	**Equipment Spec Lmax (dBA)**	**Actual Lmax (dBA)**	**Receptor Distance (feet)**
Dozer	No	40		81.7	35
Tractor	No	40	84		35

Calculated (dBA)

Equipment		***Lmax**	**Leq**
Dozer		84.8	80.8
Tractor		87.1	83.1
	Total	**87.1**	**85.1**

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 2/13/2023
Case Description: Phase 3 Grading

Description	**Affected Land Use**
Phase 3 Grading	Residential

Description	**Impact Device**	**Usage(%)**	**Equipment Spec Lmax (dBA)**	**Actual Lmax (dBA)**	**Receptor Distance (feet)**
Grader	No	40	85		35

Calculated (dBA)

Equipment		***Lmax**	**Leq**
Grader		88.1	84.1
	Total	**88.1**	**84.1**

*Calculated Lmax is the Loudest value.

Report date: 2/13/2023
Case Description: Phase 3 Building Construction, Paving & Architectural Coating

Description	**Affected Land Use**
Phase 3 Building Construction, Paving & Architectural Coating	Residential

Description	**Impact Device**
Crane	No
Tractor	No
Welder / Torch	No
Paver	No
Paver	No
Roller	No
Compressor (air)	No

Equipment		Calculated ***Lmax**
Crane		83.6
Tractor		87.1
Welder / Torch		77.1
Paver		80.3
Paver		80.3
Roller		83.1
Compressor (air)		80.8
	Total	**87.1**

*Calculatec

Roadway Construction Noise Model (RCNM),Version 1.1

Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)
16		80.6	35
40	84		35
40		74	35
50		77.2	35
50		77.2	35
20		80	35
40		77.7	35

(dBA)

Leq
75.7
83.1
73.1
77.3
77.3
76.1
76.8
86.6

d Lmax is the Loudest value.

ATTACHMENT D

SoundPLAN Onsite Noise Generation

SoundPLAN
Output Source Information

Number	Reciever Name	Floor	Level at Receiver
1	Residence northwest of Project Site	Ground Floor	38.8 dBA
2	Riverside County Occupational Health & Wellness Center	Ground Floor	41.1 dBA
3	Residence south of Project Site	Ground Floor	45.7 dBA
4	Residence south of Project Site	Ground Floor	45.9 dBA
5	Residence east of Project Site	Ground Floor	44.6 dBA
6	Residence east of Project Site	Ground Floor	46.7 dBA
7	Residence east of Project Site	Ground Floor	44.4 dBA

Number	Noise Source Information	Citation	Level at Source
1	Parking Lot Activity/ Internal Circulation	ECORP Noise Measurements	61.1 dBA
2	Drive-Thru Loud Speaker	ECORP Noise Measurements	80.4 dBA
3	Fueling Activity	ECORP Noise Measurements	49.5 dBA