

Appendix 6

Noise Impact Assessment

Noise Impact Assessment for the Ronald Reagan Park Project

City of Wildomar, California

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June 2023

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LIST OF ACRONYMS AND ABBREVIATIONS

CalEEMod	California Emissions Estimator Model
Caltrans	California Department of Transportation
City	City of Wildomar
CNEL	Community Noise Equivalent Level
County	Riverside County
dB	Decibel
dBA	Decibel is A-weighted
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
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.
MDR	Medium Density Residential
NIOSH	National Institute for Occupational Safety and Health
OPR	Office of Planning and Research
OSHA	Federal Occupational Safety and Health Administration
PF	Public Facility
PPV	Peak particle velocity
Project	Ronald Reagan Park Project
RCNM	Roadway Construction Noise Model
RMS	Root mean square
SF	Square feet
STC	Sound Transmission Class
VdB	Vibration Velocity Level

1.0 INTRODUCTION

This report documents the results of a Noise Impact Assessment completed for the Ronald Reagan Park Project (Project), which includes the construction of a 27-acre park with parking, amenities, a fire station, community center, amphitheater, and a diverse network of pedestrian and bicycling trails. This report was prepared as a comparison of predicted Project noise levels to noise standards promulgated by the County of Riverside General Plan Noise Element and the County's 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 Project Site is located on 27-acres in the City of Wildomar (City), within Riverside County (County). The Project Site is located between Wildomar Trail Road and Susan Drive, directly north and west of Ronald Reagan Elementary School. Under existing conditions, the Project Area is an undeveloped natural area. The Proposed Project would construct a 27-acre park with 221 parking spaces and driveways, amenities including bike trails and a bike plaza, fitness plaza, a 8,700 square foot (sf) fire station, splash pad, playgrounds, volleyball courts, gardens, community green area, a 8,700 sf community center/amphitheater, shade structures, lookout points, trails, bridge crossings, interpretive signs, bioretention/biofiltration areas, and a connection to Ronald Reagan Elementary School.

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.

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
Jet Fly-over at 300m (1000 ft)	110	Rock Band
Gas Lawn Mower at 1 m (3 ft)	100	
Diesel Truck at 15 m (50 ft), at 80 km (50 mph)	90	Food Blender at 1 m (3 ft)
Noisy Urban Area, Daytime	80	Garbage Disposal at 1 m (3 ft)
Gas Lawn Mower, 30 m (100 ft)	70	Vacuum Cleaner at 3 m (10 ft)
Commercial Area		Normal Speech at 1 m (3 ft)
Heavy Traffic at 90 m (300 ft)	60	Large Business Office
Quiet Urban Daytime	50	Dishwasher Next Room
Quiet Urban Nighttime	40	Theater, Large Conference Room (Background)
Quiet Suburban Nighttime	30	Library
Quiet Rural Nighttime	20	Bedroom at Night, Concert Hall (Background)
	10	Broadcast/Recording Studio
Lowest Threshold of Human Hearing	0	Lowest Threshold of Human Hearing

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. 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. 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 nearest existing noise-sensitive receptors is Ronald Reagan Elementary School which is located directly adjacent and to the southeast of the Project Site. Additionally, there are several single-family residences approximately 60 feet to the east of the Project Area, fronting El Diamante Drive.

3.1.1 Existing Ambient Noise Environment

The most common and significant sources of noise in the Project Area are traffic noises, noises associated with school activities, and activity typical of residential neighborhoods. The Project Site is currently vacant and has no significant noise sources associated with it. As shown in Table 3-1 below, the ambient recorded noise levels range from 44.5 to 65.6 dBA L_{eq} near the Project Site.

3.1.2 Existing Ambient Noise Measurements

As previously stated, the Project Site is currently a vacant lot. In order to quantify existing ambient noise levels in the Project Area, ECORP Consulting, Inc. conducted three short-term noise measurements (15-minutes) in the surrounding areas and one long-term noise measurement (24 hours) on the Project Site on the morning of May 9, 2023 (see Attachment A). The 15-minute measurements were taken between 9:55 a.m. and 10:47 a.m. on May 9th and are representative of typical existing noise exposure within and immediately adjacent to the Project Site during the daytime. The long-term measurement was taken from 10:59 a.m. on May 9th to 10:59 a.m. on May 10th. This 24-hour noise measurement site is representative of typical existing noise exposure on the Project Site during a typical 24-hour day. The average noise levels at each location are listed in Table 3-1.

Table 3-1. Existing (Baseline) Noise Measurements

Location Number	Location	CNEL dBA	L _{eq} dBA	L _{min} dBA	L _{max} dBA	Time
Short Term Measurements						
1	Southwest of intersection of Plata Court and El Diamante Drive and La Estrella Drive	N/A	44.5	40.0	59.4	9:55 a.m. – 10:10 a.m.
2	Corner of Wildomar Trail and Doheny Circle	N/A	65.6	39.1	81.0	10:14 a.m. – 10:30 a.m.
3	Southeast intersection of La Estrella Drive and Iodine Springs	N/A	58.8	42.7	76.3	10:32 a.m. – 10:47 a.m.
Long Term Measurement						
4	On Project Site, approximately 30 feet west of Wildomar Trail	57.0	52.9	30.5	86.5	10:59 a.m. – 10:59 a.m.

Source: Measurements were taken by ECorp with a Larson Davis LxT SE Sound Level Meter, which satisfies the American National Standards Institute for general environmental noise measurement instrumentation. Prior to the measurements, the LxT SE 0005120 sound level meter was calibrated according to manufacturer specifications. 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. 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.

As shown in Table 3-1, the ambient recorded noise levels range from 44.5 to 65.6 dBA L_{eq} over the course of the three short-term noise measurements taken in the Project vicinity. The ambient noise levels recorded by the long-term measurement indicate that the Project currently experiences a noise level of 57.0 CNEL dBA. The most common noise in the Project vicinity is produced by automotive vehicles (e.g., cars, trucks, buses, motorcycles) on Wildomar Trail. The ambient noise environment is also influenced by typical school operations from Ronald Reagan Elementary School (e.g., school bells, children playing, landscape equipment, etc.).

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.

4.2 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 County of Wildomar General Plan Noise Element

The Project Site is located in the City of Wildomar, and the Riverside County General Plan is used as a general planning document in Wildomar. The Noise Element of the General Plan is a comprehensive program for including noise management in the planning process, providing a tool for planners to use in achieving and maintaining land uses that are compatible with existing and future environmental noise levels. The Noise Element identifies noise-sensitive land uses and noise sources and defines areas of noise impact for the purpose of developing programs to ensure that residents, and other noise sensitive land uses will be protected from excessive noise intrusion.

The Noise Element of the General Plan contains noise goals and policies for the protection of residents, businesses, and visitors from stationary and non-stationary noise hazards by establishing exterior and interior noise standards and developing strategies related to land use compatibility and the protection of sensitive receptors from noise impacts. Uses such as schools, hospitals, childcare, senior care, neighborhood parks, and all types of residential use should be located outside of any area anticipated to exceed clearly compatible noise levels as defined by the Land Use Compatibility for Community Noise Exposure Table presented in the General Plan (Table N-1 of the General Plan Noise Element). A normally acceptable noise environment for parkland land uses, such as that proposed by the Project, is 70 dBA CNEL or lower.

The Noise Element also includes policies that are intended to achieve the vision of the General Plan and guide the City's efforts to minimize noise-land use incompatibilities and support the health and serenity of its citizens. The General Plan policies applicable to the Proposed Project are listed below.

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

N 1.2: Guide noise-tolerant land uses into areas irrevocably committed to land uses that are noise-producing, such as transportation corridors or within the projected noise contours of any adjacent airports.

N 1.3: Consider the following uses noise-sensitive and discourage these uses in areas in excess of 65 CNEL:

- Schools

- Hospitals
- Rest Homes
- Long Term Care Facilities
- Mental Care Facilities
- Residential Uses
- Libraries
- Passive Recreation Uses
- Places of Worship

According to the State of California Office of Planning and Research General Plan Guidelines, an acoustical study may be required in cases where these noise-sensitive land uses are located in an area of 60 CNEL or greater. Any land use that is exposed to levels higher than 65 CNEL will require noise attenuation measures.

Areas around airports may have different noise standards than those cited above. Each Area Plan affected by a public-use airport includes one or more Airport Influence Areas, one for each airport. The applicable noise compatibility criteria are fully set forth in Appendix L-1 [of the General Plan] and summarized in the Policy Area section of the affected Area Plan.

N 1.4: Determine if existing land uses will present noise compatibility issues with proposed projects by undertaking site surveys.

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

N 1.7: Require proposed land uses, affected by unacceptably high noise levels, to have an acoustical specialist prepare a study of the noise problems and recommend structural and site design features that will adequately mitigate the noise problem.

N 4.3: Ensure any use determined to be a potential generator of significant stationary noise impacts be properly analyzed and ensure that the recommended mitigation measures are implemented.

N 4.5: Encourage major stationary noise-generating sources throughout the County of Riverside to install additional noise buffering or reduction mechanisms within their facilities to reduce noise generation levels to the lowest extent practicable prior to the renewal of conditional use permits or business license or prior to the approval and/or issuance of new conditional use permits for said facilities.

N 12.1: Utilize natural barriers such as hills, berms, boulders, and dense vegetation to assist in noise reduction.

N 13.1: Minimize the impacts of construction noise on adjacent uses within acceptable practices.

N 13.2: Ensure that construction activities are regulated to establish hours of operation in order to prevent and/or mitigate the generation of excessive or adverse noise impacts on surrounding areas.

N 13.4: Require that all construction equipment utilizes noise reduction features (e.g., mufflers and engine shrouds) that are no less effective than those originally installed by the manufacturer.

N 14.4: Consider and, when necessary to lower noise to acceptable limits, require noise barriers and landscaped berms.

N 14.5: Consider the issue of adjacent residential land uses when designing and configuring all new, nonresidential development. Design and configure on site ingress and egress points that divert traffic away from nearby noise sensitive land uses to the greatest degree practicable.

N 14.8: Review all development applications for consistency with the standards and policies of the Noise Element of the General Plan.

N 16.2: Consider the following land uses sensitive to vibration:

- Hospitals
- Residential areas
- Concert halls
- Libraries
- Sensitive research operations
- Schools
- Offices

N 19.5: Require new developments that have the potential to generate significant noise impacts to inform impacted users on the effects of these impacts during the environmental review process.

4.3.2 City of Wildomar Municipal Code

The City of Wildomar's regulations with respect to noise are included in Chapter 9.48, *Noise Regulation*, of the City's Municipal Code. Specifically, a portion of Section 9.48.020, *Exemptions*, prohibits the construction from occurring between 6:00 p.m. – 6:00 a.m. from June to September and 6:00 p.m. – 7:00 a.m. during October to May. Additionally, another exemption to the City's noise regulations is sound emanating from public safety personnel in the course of executing their official duties, including, but not limited to, sworn peace officers, emergency personnel, such as whom would operate the proposed 8,700 sf fire station, and public utility personnel. This exemption includes, without limitation, sound emanating from all equipment used by such personnel, whether stationary or mobile. Furthermore, Section 9.48.040 establishes generalized noise level standards, including the maximum exterior sound level standards promulgated by the City. The surrounding residential areas have a land use designation of Medium Density Residential (MDR) and are subject to the maximum allowable exterior noise levels of 55 L_{max} dBA for daytime and 45 L_{max} dBA for nighttime. Ronald Reagan Elementary School, which is located directly adjacent to southeastern border of the Project Site, has a land use designation of Public Facility (PF) and is subject to the maximum exterior noise levels of 65 L_{max} dBA for daytime and 45 L_{max} dBA for nighttime.

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 the allowable hours of construction mandated by the City as well as 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 City does not regulate vibrations associated with construction or operations. However, a discussion of construction vibration is included for full disclosure purposes. For comparison purposes, Project groundborne vibration is evaluated against the County of Riverside standard of 0.01 inch per second RMS for assessing groundborne vibration from rail-related activities, promulgated by County General Plan Policy N 16.3.

The noise/land use compatibility associated with locating parkland at the Project Site is determined by a comparison of existing noise levels against the City's noise/land use compatibility standard of 70 dBA CNEL or lower for playgrounds and neighborhood parks, as defined by the Land Use Compatibility for Community Noise Exposure Table presented in the General Plan (Table N-1 of the General Plan Noise Element). Noise generated by the Project's offsite transportation noise is compared to the City's protective standard of 60 dBA CNEL promulgated by Policy N 1.3. Noise generated onsite by Project operations is compared against the City's Municipal Code Section 9.48.40, which establishes maximum exterior noise levels for daytime and nighttime hours.

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.

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 estimated from the Institute of Transportation Engineers' 10th and the 11th Edition Trip Generation Manuals. 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.

5.3 Impact Analysis

5.3.1 Would the Project Result in Short-Term Construction-Generated Noise in Excess of County 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 City prohibits construction noise between the hours of 6:00 p.m. and 6:00 a.m. during the months of June through September, and between the hours of 6:00 p.m. and 7:00 a.m. during the months of October through May (Municipal Code Section 9.48.020). The City 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.

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 362 feet distant from the nearest receptor, Ronald Reagan Elementary School. Additionally, the center of the Project Site is approximately 727 feet from the single-family residence fronting El Diamante Drive east of the Project Site. Because Ronald Reagan Elementary School is the closest receptor from the center of the site at 362 feet, construction noise will be calculated from that distance. 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?
Site Prep	70.4	85	No
Grading	71.0	85	No
Building Construction, Paving, and Painting	73.3	85	No

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

Notes: Construction equipment used during construction provided using the California Emissions Estimator Model (CalEEMod), version 2022.1. CalEEMod is designed to calculate air pollutant emissions from construction activity and contains default construction equipment and usage parameters for typical construction projects based on several construction surveys conducted in order to identify such parameters. Consistent with FTA recommendations for calculating construction noise, construction noise was measured from the center of the Project Site (FTA 2018), which is 362 feet 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, construction activities would not exceed the applicable noise standards. It is noted that construction noise was modeled on a worst-case basis. It is very unlikely that all pieces of construction equipment would be operating at the same time.

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 predict 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 26 daily trips in total. 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 mainly accessible from Wildomar Trail Road. In the area surrounding the Project Site, there are over 198 single family homes in the area that would use Wildomar Trail Road as a primary route of travel. According to the Institute of Transportation Engineers' 10th Edition Trip Generation Manual (2017), single family homes generate an average of 9.44 trips daily, and therefore these 198 existing residences could be expected to contribute up to 1,870 traffic trips daily on Wildomar Trail Road ($9.44 \times 198 = 1,870$). Additionally, Ronald Reagan Elementary School is also accessible from Wildomar Trail Road. According to the Institute of Transportation Engineers' Trip Generation Manual, 10th Edition, elementary schools will contribute approximately 1.51 average daily trips per elementary school student. According to Ronald Reagan Elementary School's official website, the school most recently had 560 enrolled students, which would contribute up to 846 average daily trips. In total, it can be expected that Wildomar Trail Road can expect up to 2,716 average daily trips per day, from the contributions of the residential and the school's traffic trips. Thus, the 26 daily trips generated during 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 receptor is Ronald Reagan Elementary School which is located directly adjacent and to the south and east of the Project Site. Additionally, there are several single-family residences approximately 60 feet to the east of the Project Area, fronting El Diamante Drive. Operational noise sources associated with the Proposed Project include recreational and park activities, noise associated with the proposed community center/amphitheater, and noise associated with the proposed fire station.

Project Land Use Compatibility

The City's General Plan establishes noise/land use compatibility standards within the Land Use Compatibility for Community Noise Exposure Table (Table N-1 of the General Plan Noise Element). The compatibility standards for playgrounds and neighborhood park uses, such as those proposed by the Project, establish noise level standards of 70 dBA CNEL or lower, as defined by the presented in the General Plan. The City's allowable noise level standards are applicable to new projects and act as a tool to gauge the compatibility of new land uses relative to existing noise levels. In the case that the noise levels identified at the Proposed Project Site fall under this standard, the Project is considered compatible with the existing noise environment. As previously stated, the Project proposes the development of a 27-acre park with parking, recreational amenities, a fire station, community center, and a diverse network of pedestrian and bicycling

trails. In order to quantify existing ambient noise levels in the Project Area, ECORP conducted three short-term noise measurements and one long term noise measurement from May 9th, 2023, to May 10th, 2023. The short-term noise measurement sites were representative of typical existing noise exposure within and immediately adjacent to the Project Site and are considered representative of the noise levels throughout the day. The long-term noise measurement is general representative of ambient noise levels experienced by the Site, as an average of day-night noise, with additional weighting added to noise during noise sensitive, nighttime hours. As shown in Table 3-1, the ambient recorded noise levels range from 44.5 to 65.6 dBA L_{eq} over the course of the three short-term noise measurements taken in the Project vicinity. The ambient noise levels recorded by the long-term measurement indicate that the Project currently experiences a noise level of 57.0 CNEL dBA. As these noise levels fall below the noise standard, the Project Site is considered an appropriate noise environment to locate the proposed community park land use.

Operational Traffic Noise

The Project proposes to construct a 27-acre park with parking, recreational amenities, a fire station, community center, and a diverse network of pedestrian and bicycling trails. According to the ITE 10th and the 11th Edition Trip Generation Manuals, the Proposed Project is anticipated to generate a total of 253 daily weekday trips and 281 average daily weekend trips. The calculated noise levels as a result of Project traffic at affected sensitive land uses are compared against the City's protective standard of 60 dBA CNEL promulgated by Policy N 1.3. Using the FHWA roadway noise prediction model, the Project's traffic noise in conjunction with the estimated existing traffic noise, would equate to 50.1 dBA L_{dn} , with a total of daytime noise of 49.8 dBA L_{eq} , and a total nighttime noise of 41.3 dBA L_{eq} (see Attachment C). The operations of the Proposed Project are expected to occur mainly during daytime hours. The calculated Project traffic noise levels are below the noise standard established by the City for the protection of sensitive land uses surrounding the Project Site. Thus, the Proposed Project would not result in a transportation noise exposure in excess of standards.

Additionally, it is noted from the Caltrans Technical Noise Supplement to the Traffic Noise Analysis Protocol (2013) that 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). In the area surrounding the Project Site, there are over 198 single family homes in the area that would use Wildomar Trail Road as a primary route of travel. According to the Institute of Transportation Engineers' 10th Edition Trip Generation Manual (2017), single family homes generate an average of 9.44 trips daily, and therefore these 198 existing and planned residences could be expected to contribute up to 1,870 traffic trips daily on Wildomar Trail Road ($9.44 \times 198 = 1,870$). Additionally, Ronald Reagan Elementary School is accessible from Wildomar Trail Road as well. According to the Institute of Transportation Engineers' Trip Generation Manual, 10th Edition, elementary schools will contribute approximately 1.51 average daily trips per elementary school student. According to Ronald Reagan Elementary School's official website, the school most recently had 560 enrolled students, which would contribute up to 846 average daily trips. In total, it can be expected that Wildomar Trail Road can expect up to 2,716 average daily trips per day. Thus, the Project's contribution of 253 daily weekday trips and 281 average daily weekend trips would not result in a doubling of traffic or a perceivable difference in traffic noise.

Operational Onsite Noise

As previously mentioned, operational noise sources associated with the Proposed Project include recreational and park activities, noise associated with the proposed community center/amphitheater, and noise associated with the proposed fire station. The noises associated with the fire station may include sirens from emergency vehicles, backup beepers, training activities and routine firehouse activities.

As previously stated, Section 9.48.020 of the City's Municipal Code exempts the sound from public safety personnel in the course of executing their official duties, including, but not limited to, sworn peace officers, emergency personnel and public utility personnel. This exemption includes, without limitation, sound emanating from all equipment used by such personnel, whether stationary or mobile. As such, the noise produced (sirens) from emergency vehicles (firetrucks and emergency response vehicles) is exempt from noise standards in the City. Nonetheless, a full discussion of predicted sound levels generated by emergency vehicles has been included for disclosure purposes. The exempt onsite operational noise as a result the fire station is discussed below, as well as a full discussion of all 'non-exempt' onsite operational noise sources, as modeled by SoundPLAN.

Exempt Onsite Stationary Noise

The Project is proposing the construction of an 8,700 SF fire station. Due to the nature of this Project, it would be a source of noise due to emergency activities such as sirens from emergency vehicles. As previously mentioned, Section 9.48.020 of the City's Municipal Code exempts such noise from noise standards since it is associated with emergencies. Nonetheless, a full discussion of medical emergency-related noise sources has been included for informational purposes.

Emergency Sirens

Residential receptors and other noise-sensitive land uses in the immediate vicinity of the Project would experience periodic exposure to siren noise. The potential adverse effects of noise associated with the use of emergency vehicle sirens on the quality of life of nearby residents is often a concern in development of new fire stations. Federal regulation limits emergency siren noise to 123 dBA at 10 feet. Factoring an attenuation rate of approximately 6 dBA per doubling of distance from the source equates to a noise level of approximately 103.5 dBA at 100 feet. Since emergency vehicle response is by nature rapid, the duration of exposure to this peak noise level is estimated to last for a maximum of 10 to 20 seconds as emergency vehicles enter and exit the western boundary of Project Site, where the station is to be located. Thus, receptors would be exposed to very short-duration high noise levels for approximately 10 to 20 seconds for each emergency response event. Further, it is typical practice for emergency vehicles to use sirens to break traffic at intersections or warn drivers of the emergency vehicle approach when traffic is congested. It is not unlikely in minor emergency scenarios that a siren is not used. Responses to nighttime emergency calls, when nuisance noise is most noticeable, routinely occur without the use of sirens when possible. It is also noted that 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. 2006).

A key focus of analysis with regard to noise is the potential for long-term exposure to higher noise levels (i.e., continuous, involuntary exposure for many hours per day over a long period of time) that may adversely affect human health. As a result of this emphasis, noise standards focus on increases in long-term exposure to ongoing average noise levels rather than infrequent short-duration peak effects. Siren noise from intermittent emergency vehicle trips sourced from the Project Site would not substantially change the community noise level for the Project vicinity as the intermittent siren use would not constitute a significant change in the existing noise environment.

Onsite Operational Noise

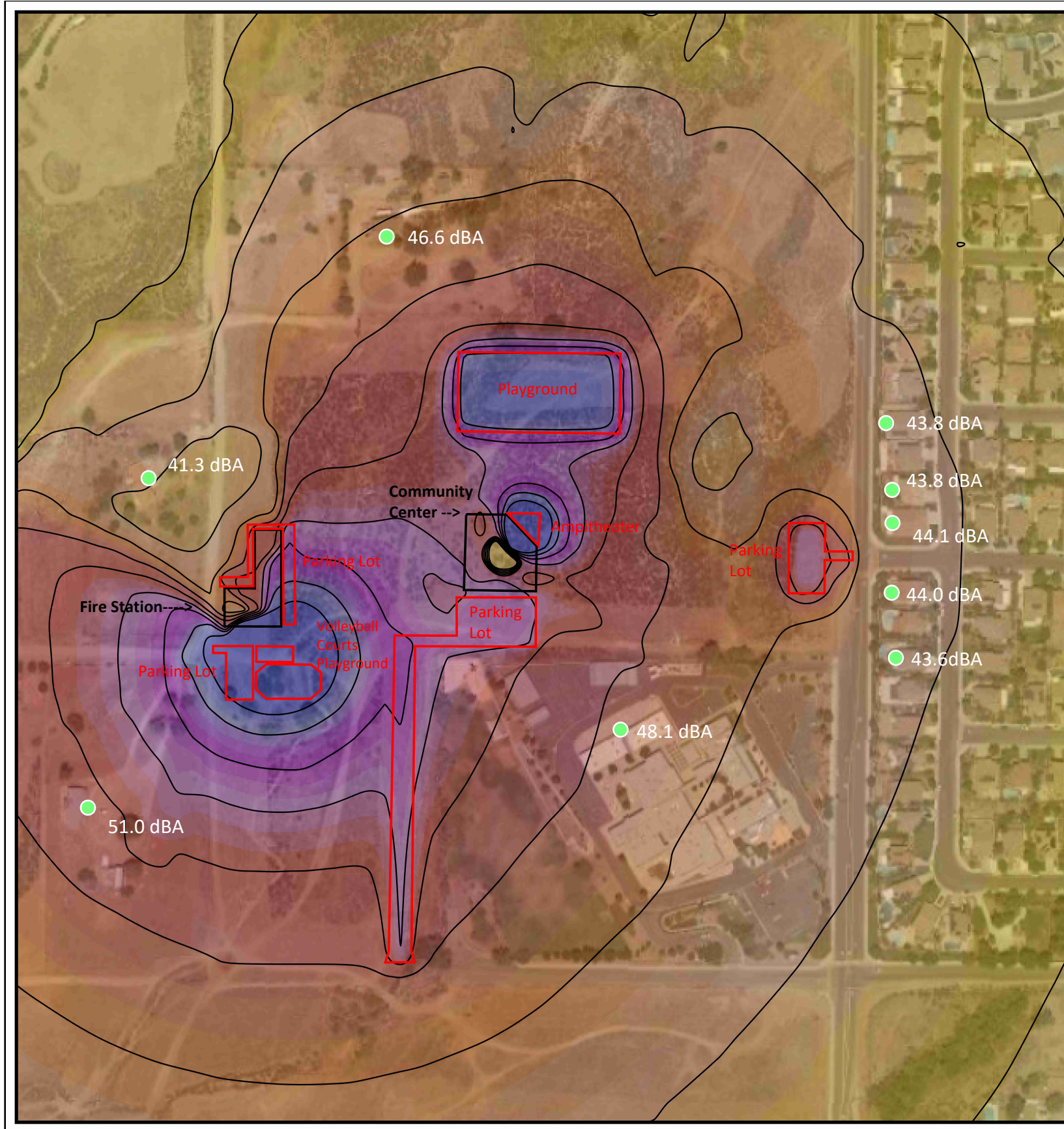
On-site noise associated with the Proposed Project has been calculated using the SoundPLAN 3D noise model. The SoundPLAN 3D Noise Model analysis was derived from information provided in Section 1.1, Project Description. According to the details from the proposed operations, both a daytime scenario and a nighttime scenario were modeled. The daytime modeling scenario includes all the features of the Proposed Project, namely the parking lots, standard day-to-day activities surrounding the fire station building, recreational play areas, volleyball courts, the community center building, and amphitheater. The nighttime modeling scenario includes only the amphitheater, the associated parking lot, and the proposed buildings on the Site. Reference noise measurements representing the parking lot, community center/amphitheater, and recreational play areas were previously taken by ECORP Consulting. Reference noise levels representing volleyball courts were provided from the SoundPLAN Noise Library.

For the purposes of this analysis, the City of Wildomar exterior noise standards for the nearby receptors are used to evaluate Project related impacts from onsite noise. Table 5-2 shows the predicted Project noise levels at nine nearby sensitive receptors constituting of eight residences and Ronald Reagan Elementary School. Additionally, a noise contour graphic for each scenario (see Figure 5-1 and Figure 5-2) has been prepared to provide a visual depiction of the predicted noise levels in the Project vicinity from Project operations.

Table 5-2. Calculated Operational Onsite Noise			
Location	Modeled Operational Noise (daytime/nighttime)	City Exterior Noise Standards (dBA L_{eq}) (daytime/nighttime)	Exceed Standards?
#1 Residence on El Diamante Drive	43.8 / 36.7	55 / 45	No
#2 Residence on El Diamante Drive	43.8 / 36.7	55 / 45	No
#3 Residence on El Diamante Drive	44.1 / 36.9	55 / 45	No
#4 Residence on El Diamante Drive	44.0 / 36.4	55 / 45	No
#5 Residence on El Diamante Drive	43.6 / 35.4	55 / 45	No
#6 Residence on Susan Drive	46.6 / 37.2	55 / 45	No
#7 Residence on Susan Drive	41.3 / 29.2	55 / 45	No
#8 Residence on Steven Drive	51.0 / 27.3	55 / 45	No
#9 Ronald Reagan Elementary School	48.1 / 37.9	65 / 55	No

Source: SoundPLAN version 8.2. Refer to Attachment D for Model Data Outputs

As shown in Table 5-2, Project operational noise would not exceed the daytime or nighttime noise standards at any location.



Ronald Reagan Park Daytime Activities

Project Noise in dB(A)

Dark Blue	>= 64
Blue	61 - 64
Purple	58 - 61
Light Purple	55 - 58
Red	52 - 55
Dark Red	49 - 52
Orange	46 - 49
Light Orange	43 - 46
Yellow	40 - 43
Light Yellow	< 40

Legend

- Area Sources (Red outline)
- Proposed Buildings (Black outline)
- Receiver (Green dot)

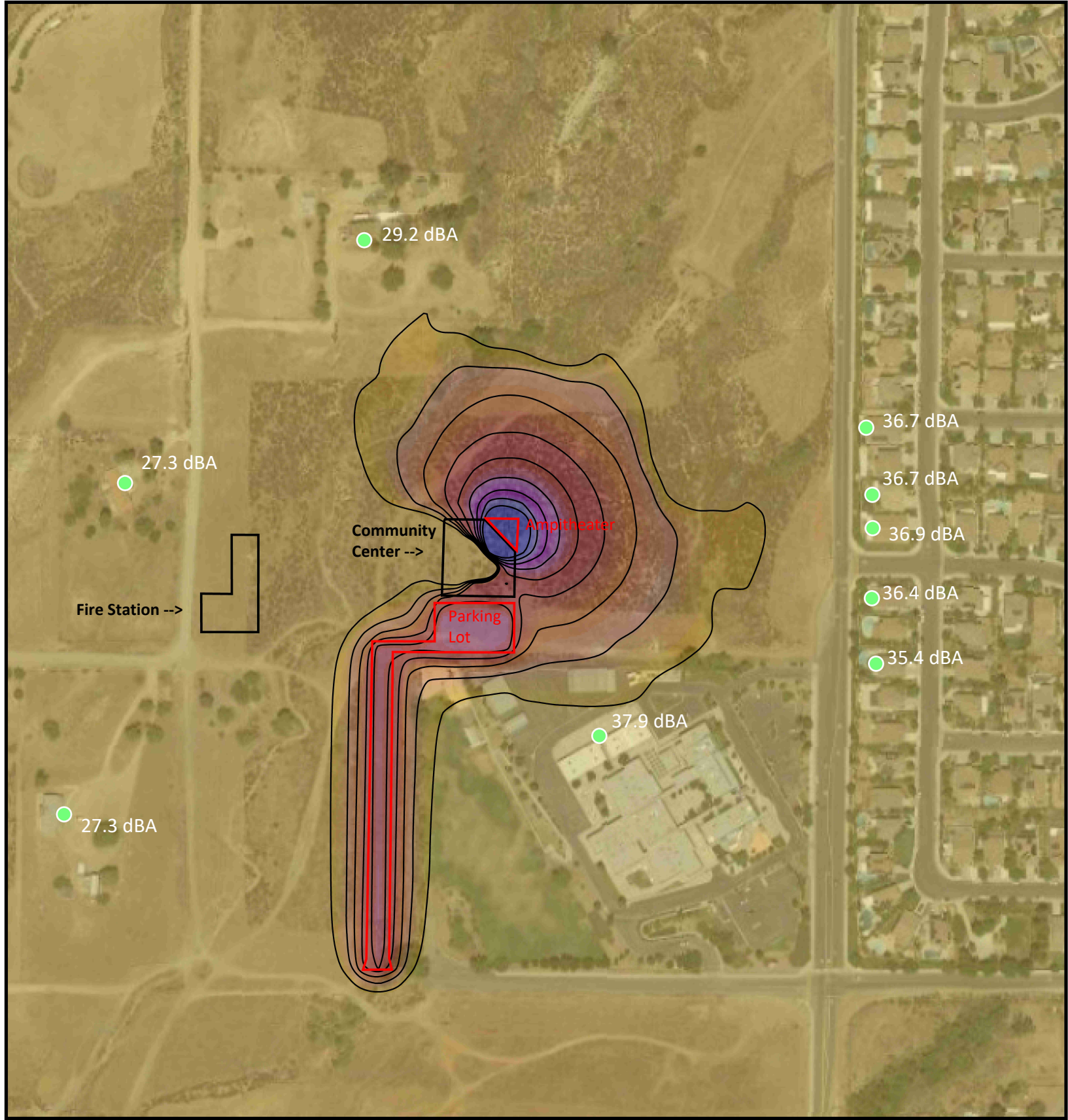
Scale 1:296

0 50 100 200

North Arrow

Map Date: 6/14/2023
 Photo (or Base) Source: SoundPLAN

Figure 5-1 SoundPLAN Daytime Noise Contour



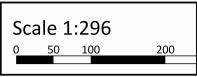
**Ronald Reagan
Park Nighttime
Activites**

**Project Noise
in dB(A)**

	>= 64
	61 - 64
	58 - 61
	55 - 58
	52 - 55
	49 - 52
	46 - 49
	43 - 46
	40 - 43
	< 40

Legend

- Area Sources
- Proposed Buildings
- Receiver



Map Date: 6/14/2023
Photo (or Base) Source: SoundPLAN

Figure 5-2 SoundPLAN Nighttime Noise Contour
2022-252.03 Ronald Regan Park Project

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 5-3.

Table 5-3. 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 Wildomar does not promulgate a threshold for assessing groundborne vibrations. For comparison purposes, the County of Riverside standard of 0.01 inch per second RMS for assessing groundborne vibration from rail-related activities, promulgated by County General Plan Policy N 16.3, is used as a threshold. As identified in Table 2-2 above, this level of ground vibration equates to the range of human perception and is unlikely to cause damage to any type of building. 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 to the construction site, with regard to groundborne vibrations, is Ronald Reagan Elementary School, approximately 362 feet from the center of the Site.

Based on the representative vibration levels presented for various construction equipment types in Table 5-3 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:

$$[PPV_{\text{equip}} = PPV_{\text{ref}} \times (25/D)^{1.5}]$$

Table 5-4 presents the expected Project related vibration levels at a distance of 362 feet.

Table 5-4 Construction Vibration Levels at 362 Feet								
Receiver PPV Levels (in/sec)¹					Peak Vibration	RMS Velocity Levels²	Threshold	Exceed Threshold?
Large Bulldozer, Caisson Drilling, & Hoe Ram	Loaded Trucks	Jackhammer	Pile Driver	Vibratory Roller				
0.0016	0.0016	0.0006	0.0031	0.0038	0.0038	0.002	0.01	No

Notes: ¹Based on the Vibration Source Levels of Construction Equipment included on Table 5-4 (FTA 2018). Distance to the nearest structure of concern is approximately 362 feet measured from Project Site center. ²Vibration levels in PPV are converted to RMS velocity using a 0.70 conversion factor identified by Caltrans (2020b).

As shown in Table 5-4, vibration as a result of onsite construction activities on the Project Site would not exceed 0.01 PPV at the nearest structure. Thus, onsite Project construction would not exceed the 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. The Project would not accommodate any heavy-duty trucks or equipment. 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 nearest airport to the Project Area is the French Valley Airport located approximately 6.86 miles to the southeast. The Project Area is not located within the French Valley Airport influence area or compatibility zone (Riverside County Airport Land Use Commission 2017). Implementation of the Proposed Project would not affect airport operations, nor result in increased exposure of those on the Project Site to aircraft noise.

6.0 REFERENCES

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LIST OF ATTACHMENTS

Attachment A - Baseline (Existing) Noise Measurements – Project Site and Vicinity

Attachment B – Federal Highway Administration Roadway Construction Noise Outputs

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

Attachment D – SoundPLAN Onsite Noise Generation

Baseline (Existing) Noise Measurements – Project Site and Vicinity



Noise Measurement Locations Map

Site Number: 1			
Recorded By: Lindsay Liegler			
Job Number: 2022-252.03			
Date: 5/9/2023			
Time: 9:55 a.m. – 10:10 a.m.			
Location: Southwest of intersection of Plata Court and El Diamante Drive and La Estrella Drive			
Source of Peak Noise: Vehicles along El Diamante Drive and Plata Court			
Noise Data			
Leq (dB)	Lmin (dB)	Lmax (dB)	Peak (dB)
44.5	40.0	59.4	90.2

Equipment						
Category	Type	Vendor	Model	Serial No.	Cert. Date	Note
Sound	Sound Level Meter	Larson Davis	LxT SE	0005120	12/14/2022	
	Microphone	Larson Davis	377B02	334361	12/14/2022	
	Preamp	Larson Davis	PRMLxT1L	042852	12/14/2022	
	Calibrator	Larson Davis	CAL200	14105	12/14/2022	
Weather Data						
Est.	Duration: 15 mins			Sky: Overcast		
	Note: dBA Offset = 0.05			Sensor Height (ft): 3.5		
	Wind Ave Speed (mph)		Temperature (degrees Fahrenheit)		Barometer Pressure (hPa)	
	6		57		30.00	

Photo of Measurement Location



Measurement Report

Report Summary

Meter's File Name	LxT_Data.475.s	Computer's File Name	LxTse_0005120-20230509 095535-LxT_Data.475.ldbin		
Meter	LxT SE 0005120	Firmware	2.404		
User		Location			
Job Description					
Note					
Start Time	2023-05-09 09:55:35	Duration	0:15:00.4		
End Time	2023-05-09 10:10:36	Run Time	0:15:00.4	Pause Time	0:00:00.0
Pre-Calibration	2023-05-09 09:51:18	Post-Calibration	None	Calibration Deviation	---

Results

Overall Metrics

LA _{eq}	44.5 dB		
LAE	74.0 dB	SEA	--- dB
EA	2.8 µPa²h		
LZ _{peak}	90.2 dB		2023-05-09 10:02:19
LAS _{max}	59.4 dB		2023-05-09 09:57:24
LAS _{min}	40.0 dB		2023-05-09 09:58:33
LA _{eq}	44.5 dB		
LC _{eq}	56.9 dB	LC _{eq} - LA _{eq}	12.4 dB
LAI _{eq}	47.4 dB	LAI _{eq} - LA _{eq}	2.9 dB

Exceedances

	Count	Duration
LAS > 85.0 dB	0	0:00:00.0
LAS > 115.0 dB	0	0:00:00.0
LZ _{peak} > 135.0 dB	0	0:00:00.0
LZ _{peak} > 137.0 dB	0	0:00:00.0
LZ _{peak} > 140.0 dB	0	0:00:00.0

Community Noise

LDN	LDay	LNight	
44.5 dB	44.5 dB	0.0 dB	
LDEN	LDay	LEve	LNight
44.5 dB	44.5 dB	--- dB	--- dB

Any Data

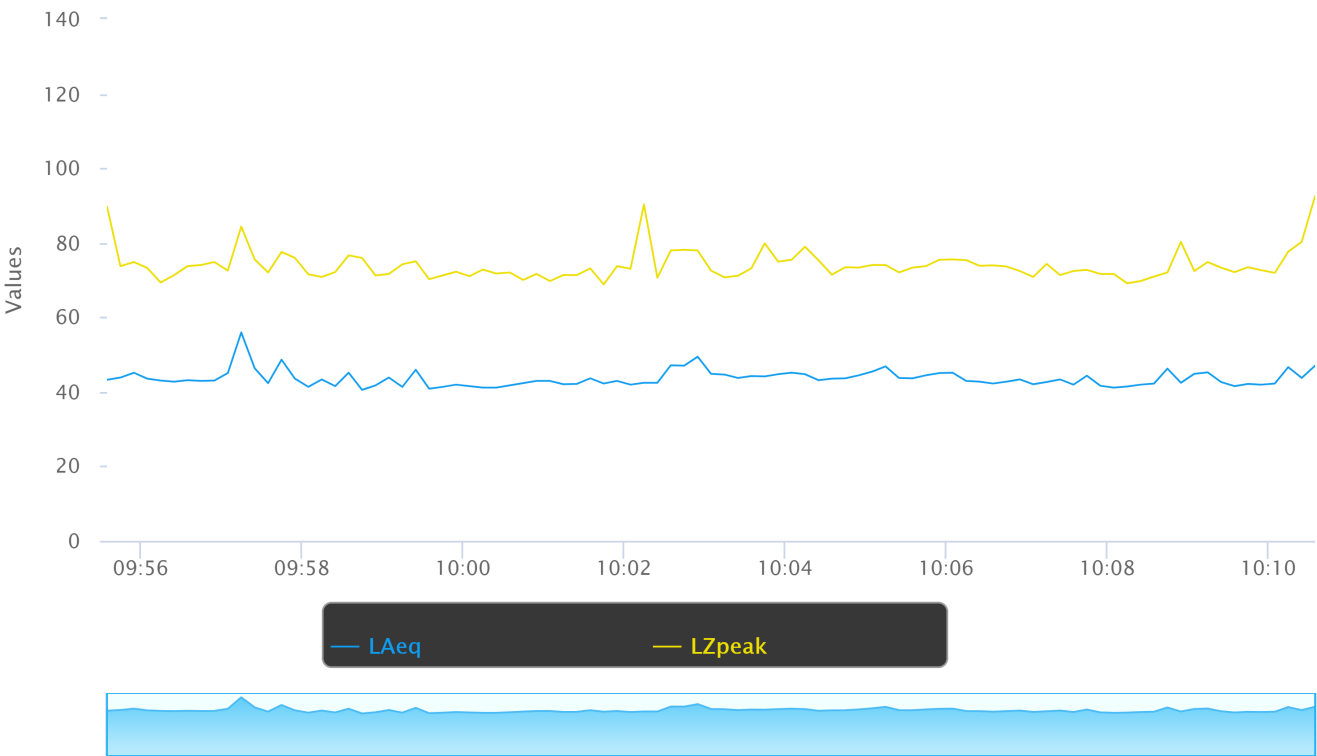
	A		C		Z	
	Level	Time Stamp	Level	Time Stamp	Level	Time Stamp
L _{eq}	44.5 dB		56.9 dB		--- dB	
LS _(max)	59.4 dB	2023-05-09 09:57:24	--- dB	None	--- dB	None
LS _(min)	40.0 dB	2023-05-09 09:58:33	--- dB	None	--- dB	None
L _{Peak(max)}	--- dB	None	--- dB	None	90.2 dB	2023-05-09 10:02:19

Overloads	Count	Duration	OBA Count	OBA Duration
	0	0:00:00.0	1	0:00:00.2

Statistics

LAS 5.0	47.9 dB
LAS 10.0	45.8 dB
LAS 33.3	43.6 dB
LAS 50.0	42.9 dB
LAS 66.6	42.3 dB
LAS 90.0	41.2 dB

Time History



Site Number: 2			
Recorded By: Lindsay Liegler			
Job Number: 2022-252.03			
Date: 5/9/2023			
Time: 10:14 a.m. – 10:30 a.m.			
Location: Corner of Wildomar Trail and Doheny Circle			
Source of Peak Noise: Vehicles along Wildomar Trail			
Noise Data			
Leq (dB)	Lmin (dB)	Lmax (dB)	Peak (dB)
62.6	39.1	81.0	101.3

Equipment						
Category	Type	Vendor	Model	Serial No.	Cert. Date	Note
Sound	Sound Level Meter	Larson Davis	LxT SE	0005120	12/14/2022	
	Microphone	Larson Davis	377B02	334361	12/14/2022	
	Preamp	Larson Davis	PRMLxT1L	042852	12/14/2022	
	Calibrator	Larson Davis	CAL200	14105	12/14/2022	
Weather Data						
Est.	Duration: 15 mins			Sky: Overcast		
	Note: dBA Offset = 0.05			Sensor Height (ft): 3.5		
	Wind Ave Speed (mph)		Temperature (degrees Fahrenheit)		Barometer Pressure (hPa)	
	6		57		30.00	

Photo of Measurement Location



Measurement Report

Report Summary

Meter's File Name	LxT_Data.476.s	Computer's File Name	LxTse_0005120-20230509 101438-LxT_Data.476.ldbin		
Meter	LxT SE 0005120	Firmware	2.404		
User		Location			
Job Description					
Note					
Start Time	2023-05-09 10:14:38	Duration	0:15:53.1		
End Time	2023-05-09 10:30:31	Run Time	0:15:53.1	Pause Time	0:00:00.0
Pre-Calibration	2023-05-09 09:51:18	Post-Calibration	None	Calibration Deviation	---

Results

Overall Metrics

LA _{eq}	62.6 dB		
LAE	92.4 dB	SEA	--- dB
EA	192.7 µPa²h		
LZ _{peak}	101.3 dB		2023-05-09 10:22:54
LAS _{max}	81.0 dB		2023-05-09 10:22:56
LAS _{min}	39.1 dB		2023-05-09 10:14:38
LA _{eq}	62.6 dB		
LC _{eq}	70.6 dB	LC _{eq} - LA _{eq}	8.0 dB
LAI _{eq}	65.5 dB	LAI _{eq} - LA _{eq}	2.9 dB

Exceedances

	Count	Duration
LAS > 85.0 dB	0	0:00:00.0
LAS > 115.0 dB	0	0:00:00.0
LZ _{peak} > 135.0 dB	0	0:00:00.0
LZ _{peak} > 137.0 dB	0	0:00:00.0
LZ _{peak} > 140.0 dB	0	0:00:00.0

Community Noise

LDN	LDay	LNight	
62.6 dB	62.6 dB	0.0 dB	
LDEN	LDay	LEve	LNight
62.6 dB	62.6 dB	--- dB	--- dB

Any Data

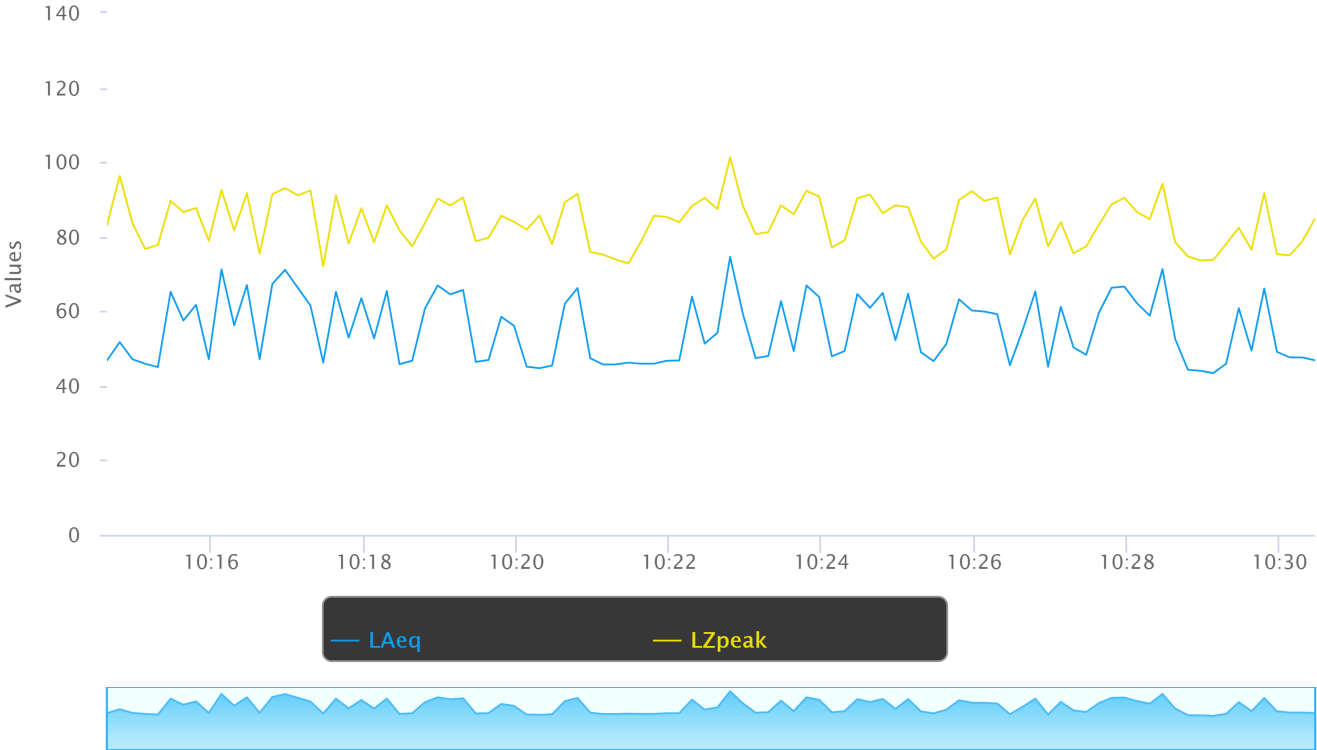
	A		C		Z	
	Level	Time Stamp	Level	Time Stamp	Level	Time Stamp
L _{eq}	62.6 dB		70.6 dB		--- dB	
LS _(max)	81.0 dB	2023-05-09 10:22:56	--- dB	None	--- dB	None
LS _(min)	39.1 dB	2023-05-09 10:14:38	--- dB	None	--- dB	None
L _{Peak(max)}	--- dB	None	--- dB	None	101.3 dB	2023-05-09 10:22:54

Overloads	Count	Duration	OBA Count	OBA Duration
	0	0:00:00.0	11	0:00:28.9

Statistics

LAS 5.0	69.9 dB
LAS 10.0	67.1 dB
LAS 33.3	54.9 dB
LAS 50.0	49.2 dB
LAS 66.6	46.8 dB
LAS 90.0	44.9 dB

Time History



Site Number: 3			
Recorded By: Lindsay Liegler			
Job Number: 2022-252.03			
Date: 5/9/2023			
Time: 10:32 a.m. – 10:47 a.m.			
Location: Southeast intersection of La Estrella Drive and Iodine Springs			
Source of Peak Noise: Vehicles along roadways			
Noise Data			
Leq (dB)	Lmin (dB)	Lmax (dB)	Peak (dB)
58.8	42.7	76.3	96.9

Equipment						
Category	Type	Vendor	Model	Serial No.	Cert. Date	Note
Sound	Sound Level Meter	Larson Davis	LxT SE	0005120	12/14/2022	
	Microphone	Larson Davis	377B02	334361	12/14/2022	
	Preamp	Larson Davis	PRMLxT1L	042852	12/14/2022	
	Calibrator	Larson Davis	CAL200	14105	12/14/2022	
Weather Data						
Est.	Duration: 15 mins			Sky: Overcast		
	Note: dBA Offset = 0.05			Sensor Height (ft): 3.5		
	Wind Ave Speed (mph)		Temperature (degrees Fahrenheit)		Barometer Pressure (hPa)	
	6		57		30.00	

Photo of Measurement Location



Measurement Report

Report Summary

Meter's File Name	LxT_Data.477.s	Computer's File Name	LxTse_0005120-20230509 103238-LxT_Data.477.ldbin		
Meter	LxT SE 0005120	Firmware	2.404		
User		Location			
Job Description					
Note					
Start Time	2023-05-09 10:32:38	Duration	0:14:59.9		
End Time	2023-05-09 10:47:38	Run Time	0:14:59.9	Pause Time	0:00:00.0
Pre-Calibration	2023-05-09 09:51:18	Post-Calibration	None	Calibration Deviation	---

Results

Overall Metrics

LA _{eq}	58.8 dB		
LAE	88.3 dB	SEA	--- dB
EA	75.8 µPa²h		
LZ _{peak}	96.9 dB	2023-05-09 10:38:16	
LAS _{max}	76.3 dB	2023-05-09 10:36:16	
LAS _{min}	42.7 dB	2023-05-09 10:34:49	
LA _{eq}	58.8 dB		
LC _{eq}	64.8 dB	LC _{eq} - LA _{eq}	6.0 dB
LAI _{eq}	61.8 dB	LAI _{eq} - LA _{eq}	3.0 dB

Exceedances

	Count	Duration
LAS > 85.0 dB	0	0:00:00.0
LAS > 115.0 dB	0	0:00:00.0
LZ _{peak} > 135.0 dB	0	0:00:00.0
LZ _{peak} > 137.0 dB	0	0:00:00.0
LZ _{peak} > 140.0 dB	0	0:00:00.0

Community Noise

LDN	LDay	LNight	
58.8 dB	58.8 dB	0.0 dB	
LDEN	LDay	LEve	LNight
58.8 dB	58.8 dB	--- dB	--- dB

Any Data

	A		C		Z	
	Level	Time Stamp	Level	Time Stamp	Level	Time Stamp
L _{eq}	58.8 dB		64.8 dB		--- dB	
LS _(max)	76.3 dB	2023-05-09 10:36:16	--- dB	None	--- dB	None
LS _(min)	42.7 dB	2023-05-09 10:34:49	--- dB	None	--- dB	None
L _{Peak(max)}	--- dB	None	--- dB	None	96.9 dB	2023-05-09 10:38:16

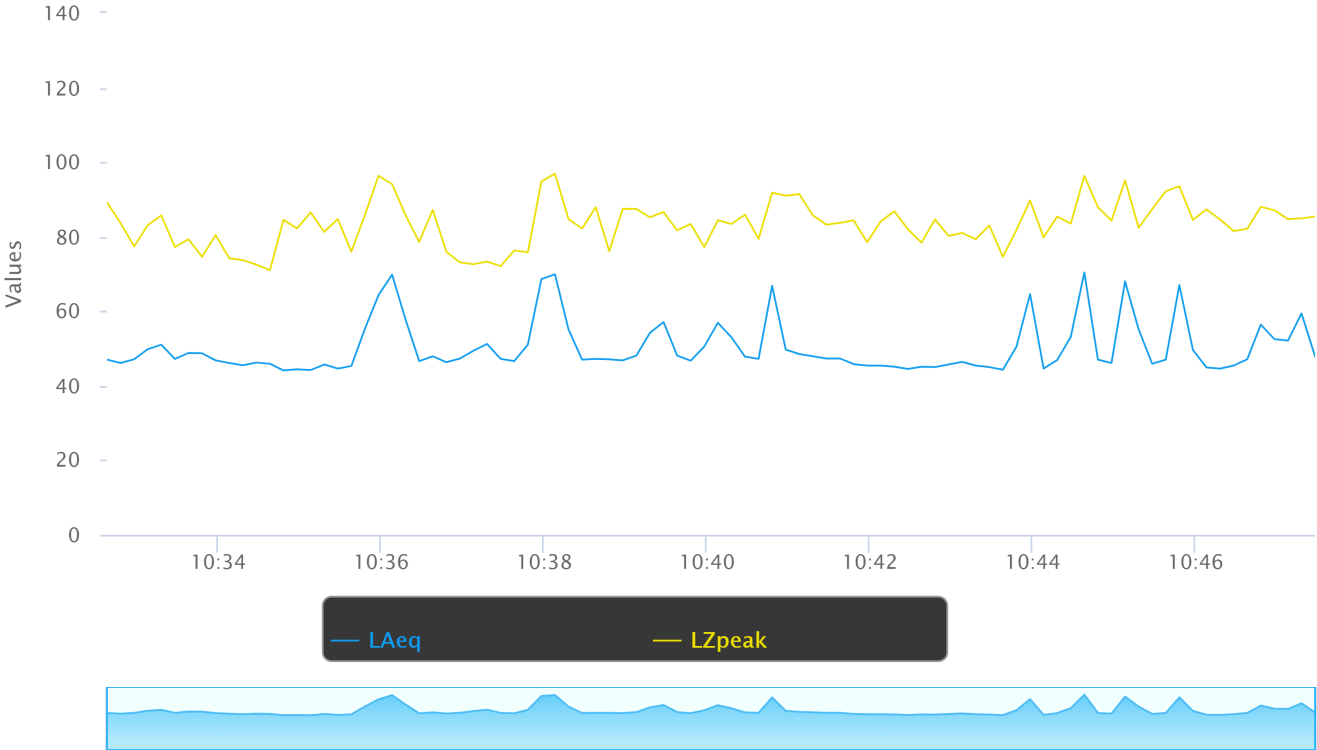
Overloads

Count	Duration	OBA Count	OBA Duration
0	0:00:00.0	10	0:00:25.6

Statistics

LAS 5.0	64.4 dB
LAS 10.0	58.2 dB
LAS 33.3	48.7 dB
LAS 50.0	47.1 dB
LAS 66.6	46.1 dB
LAS 90.0	44.5 dB

Time History



Site Number: 4 - Long Term			
Recorded By: Lindsay Liegler			
Job Number: 2022-252.03			
Date: 5/9/2023 – 5/10/2023			
Time: 10:59 a.m. – 10:59 a.m.			
Location: On Project Site, approximately 30 feet west of Wildomar Trail			
Source of Peak Noise: Vehicles along El Diamante Drive and Plata Court			
Noise Data			
Leq (dB)	Lmin (dB)	Lmax (dB)	Ldn (dB)
52.9	30.5	86.5	56.7

Equipment						
Category	Type	Vendor	Model	Serial No.	Cert. Date	Note
Sound	Sound Level Meter	Larson Davis	LxT SE	0005120	12/14/2022	
	Microphone	Larson Davis	377B02	334361	12/14/2022	
	Preamp	Larson Davis	PRMLxT1L	042852	12/14/2022	
	Calibrator	Larson Davis	CAL200	14105	12/14/2022	
Weather Data						
Est.	Duration: 24 hour			Sky: Overcast		
	Note: dBA Offset = 0.05			Sensor Height (ft): 3.5		
	Wind Ave Speed (mph)	Temperature (degrees Fahrenheit)		Barometer Pressure (hPa)		
	6	57		30.00		

Photo of Measurement Location



Measurement Report

Report Summary

Meter's File Name	LxT_Data.478.s	Computer's File Name	LxTse_0005120-20230509 105959-LxT_Data.478.ldbin		
Meter	LxT SE 0005120	Firmware	2.404		
User		Location			
Job Description					
Note					
Start Time	2023-05-09 10:59:59	Duration	24:00:00.0		
End Time	2023-05-10 10:59:59	Run Time	24:00:00.0	Pause Time	0:00:00.0
Pre-Calibration	2023-05-09 09:51:18	Post-Calibration	None	Calibration Deviation	---

Results

Overall Metrics

LA _{eq}	52.9 dB		
LAE	102.3 dB	SEA	131.6 dB
EA	1.9 mPa²h		
LZ _{peak}	121.6 dB		2023-05-10 10:59:42
LAS _{max}	86.5 dB		2023-05-10 10:55:22
LAS _{min}	30.5 dB		2023-05-10 02:32:02
LA _{eq}	52.9 dB		
LC _{eq}	65.2 dB	LC _{eq} - LA _{eq}	12.3 dB
LAI _{eq}	58.5 dB	LAI _{eq} - LA _{eq}	5.6 dB

Exceedances

	Count	Duration
LAS > 85.0 dB	3	0:00:03.4
LAS > 115.0 dB	0	0:00:00.0
LZ _{peak} > 135.0 dB	0	0:00:00.0
LZ _{peak} > 137.0 dB	0	0:00:00.0
LZ _{peak} > 140.0 dB	0	0:00:00.0

Community Noise

LDN	LDay	LNight	
56.7 dB	54.2 dB	0.0 dB	
LDEN	LDay	LEve	LNight
57.0 dB	54.8 dB	50.6 dB	49.1 dB

Any Data

	A		C		Z	
	Level	Time Stamp	Level	Time Stamp	Level	Time Stamp
L _{eq}	52.9 dB		65.2 dB		--- dB	
LS _(max)	86.5 dB	2023-05-10 10:55:22	--- dB	None	--- dB	None
LS _(min)	30.5 dB	2023-05-10 02:32:02	--- dB	None	--- dB	None
L _{Peak(max)}	--- dB	None	--- dB	None	121.6 dB	2023-05-10 10:59:42

Overloads

Count	Duration	OBA Count	OBA Duration
0	0:00:00.0	131	0:08:09.5

Statistics

LAS 5.0	55.9 dB
LAS 10.0	53.7 dB
LAS 33.3	48.1 dB
LAS 50.0	45.8 dB
LAS 66.6	43.5 dB
LAS 90.0	39.2 dB

Federal Highway Administration Roadway Construction Noise Outputs

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 6/12/2023
Case Description: Site Preparation

Description **Land Use**
 Site Preparation School

Description	Impact Device	Usage(%)	Equipment		Receptor Distance (feet)
			Spec Lmax (dBA)	Actual Lmax (dBA)	
Dozer	No	40		81.7	362
Dozer	No	40		81.7	362
Dozer	No	40		81.7	362
Tractor	No	40	84		362
Tractor	No	40	84		362
Tractor	No	40	84		362
Tractor	No	40	84		362

Calculated (dBA)

Equipment	*Lmax	Leq
Dozer	64.5	60.5
Dozer	64.5	60.5
Dozer	64.5	60.5
Tractor	66.8	62.8
Tractor	66.8	62.8
Tractor	66.8	62.8
Tractor	66.8	62.8
Total	66.8	70.4

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 6/12/2023

Case Description: Grading

Description **Land Use**
 Grading School

Description	Impact Device	Usage(%)	Equipment		Receptor Distance (feet)
			Spec Lmax (dBA)	Actual Lmax (dBA)	
Excavator	No	40		80.7	362
Excavator	No	40		80.7	362
Grader	No	40	85		362
Dozer	No	40		81.7	362
Scraper	No	40		83.6	362
Scraper	No	40		83.6	362
Tractor	No	40	84		362
Tractor	No	40	84		362

Calculated (dBA)

Equipment	*Lmax	Leq
Excavator	63.5	59.5
Excavator	63.5	59.5
Grader	67.8	63.8
Dozer	64.5	60.5
Scraper	66.4	62.4
Scraper	66.4	62.4
Tractor	66.8	62.8
Tractor	66.8	62.8
Total	67.8	71

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 6/12/2023
Case Description: Building, Paving, and Painting

Description **Land Use**
 Building, Paving, and Painting School

Description	Impact Device	Usage(%)	Equipment	Actual Lmax (dBA)	Receptor Distance (feet)
			Spec Lmax (dBA)		
Crane	No	16		80.6	362
Gradall	No	40		83.4	362
Gradall	No	40		83.4	362
Gradall	No	40		83.4	362
Tractor	No	40	84		362
Tractor	No	40	84		362
Tractor	No	40	84		362
Welder / Torch	No	40		74	362
Paver	No	50		77.2	362
Paver	No	50		77.2	362
Pavement Scarafier	No	20		89.5	362
Pavement Scarafier	No	20		89.5	362
Roller	No	20		80	362
Roller	No	20		80	362
Compressor (air)	No	40		77.7	362
Generator	No	50		80.6	362

Calculated (dBA)

Equipment	*Lmax	Leq
Crane	63.4	55.4
Gradall	66.2	62.2
Gradall	66.2	62.2
Gradall	66.2	62.2
Tractor	66.8	62.8
Tractor	66.8	62.8
Tractor	66.8	62.8
Welder / Torch	56.8	52.8
Paver	60	57
Paver	60	57
Pavement Scarafier	72.3	65.3
Pavement Scarafier	72.3	65.3
Roller	62.8	55.8
Roller	62.8	55.8
Compressor (air)	60.5	56.5
Generator	63.4	60.4
Total	72.3	73.3

*Calculated Lmax is the Loudest value.

ATTACHMENT C

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

TRAFFIC NOISE LEVELS

Project Number: 2022-252.03

Project Name: Ronald Reagan Park Project

Background Information

Model Description: FHWA Highway Noise Prediction Model (FHWA-RD-77-108) with California Vehicle Noise (CALVENO) Emission Levels.

Analysis Scenario(s):

Existing

Source of Traffic Volumes:

ITE 10th Edition

Community Noise Descriptor:

L_{dn}: x CNEL:

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%

Traffic Noise Levels

Analysis Condition	Land Use	Lanes	Median Width	Peak Hour Volume	ADT Volume	Design Speed (mph)	Dist. from Center to Receptor'	Alpha Factor	Barrier Attn. dB(A)	Vehicle Mix Medium Trucks	Heavy Trucks	Peak Hour dB(A) L _{eq}	24-Hour dB(A) L _{dn}
Roadway Segment													
Wildomar Trail Road													
North of La Estrella	Residential	2	0	301.778	2,716	25	100	1	0	1.8%	0.7%	51.2	49.6

TRAFFIC NOISE LEVELS

Project Number: 2022-252.03

Project Name: Ronald Reagan Park Project

Background Information

Model Description: FHWA Highway Noise Prediction Model (FHWA-RD-77-108) with California Vehicle Noise (CALVENO) Emission Levels.

Analysis Scenario(s): **Existing +Project**

Source of Traffic Volumes: ITE 10th Edition

Community Noise Descriptor: L_{dn}: x CNEL:

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%

Traffic Noise Levels

Analysis Condition	Land Use	Lanes	Median Width	Peak Hour Volume	ADT Volume	Design Speed (mph)	Dist. from Center to Receptor'	Alpha Factor	Barrier Attn. dB(A)	Vehicle Mix Medium Trucks	Heavy Trucks	Peak Hour dB(A) L _{eq}	24-Hour dB(A) L _{dn}
Roadway Segment													
Wildomar Trail Road													
North of La Estrella	Residential	2	0	333	2,997	25	100	1	0	1.8%	0.7%	51.6	50.1

ATTACHMENT D

SoundPLAN Onsite Noise Generation

SoundPLAN
Output Source Information

Ronald Reagan Park Daytime Noise Activity

Number	Receiver Name	Floor	Level at Receiver
1	#1 Residence on El Diamante Drive	Ground Floor	43.8 dBA
2	#2 Residence on El Diamante Drive	Ground Floor	43.8 dBA
3	#3 Residence on El Diamante Drive	Ground Floor	44.1 dBA
4	#4 Residence on El Diamante Drive	Ground Floor	44.0 dBA
5	#5 Residence on El Diamante Drive	Ground Floor	43.6 dBA
6	#6 Residence on Susan Drive	Ground Floor	46.6 dBA
7	#7 Residence on Susan Drive	Ground Floor	41.3 dBA
8	#8 Residence on Steven Drive	Ground Floor	51.0 dBA
9	#9 Ronald Reagan Elementary School	Ground Floor	48.1 dBA

Number	Noise Source Information	Citation	Level at Source
2	Non busy Parking Lot Activity	ECORP Noise Measurements	51.0 dBA
3	City Playground	ECORP Noise Measurements	59.0 dBA
4	Recreational Beach Volleyball Game	SoundPLAN Noise Library	84.0 dBA
5	Concert	ECORP Noise Measurements	71.7 dBA

SoundPLAN
Output Source Information

Ronald Reagan Park Nighttime Noise Activity

Number	Receiver Name	Floor	Level at Receiver
1	#1 Residence on El Diamante Drive	Ground Floor	36.7 dBA
2	#2 Residence on El Diamante Drive	Ground Floor	36.7 dBA
3	#3 Residence on El Diamante Drive	Ground Floor	36.9 dBA
4	#4 Residence on El Diamante Drive	Ground Floor	36.4 dBA
5	#5 Residence on El Diamante Drive	Ground Floor	35.4 dBA
6	#6 Residence on Susan Drive	Ground Floor	37.2 dBA
7	#7 Residence on Susan Drive	Ground Floor	29.2 dBA
8	#8 Residence on Steven Drive	Ground Floor	27.3 dBA
9	#9 Ronald Reagan Elementary School	Ground Floor	37.9 dBA

Number	Noise Source Information	Citation	Level at Source
2	Non busy Parking Lot Activity	ECORP Noise Measurements	51.0 dBA
3	City Playground	ECORP Noise Measurements	59.0 dBA
4	Recreational Beach Volleyball Game	SoundPLAN Noise Library	84.0 dBA
5	Concert	ECORP Noise Measurements	71.7 dBA