Stonehill Avenue Camp Site

NOISE IMPACT ANALYSIS

COUNTY OF SAN BERNARDINO

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DECEMBER 15, 2022

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LIST OF ABBREVIATED TERMS

(1)	Reference
ADT	Average Daily Traffic
ANSI	American National Standards Institute
Calveno	California Vehicle Noise
CEQA	California Environmental Quality Act
CNEL	Community Noise Equivalent Level
dBA	A-weighted decibels
EPA	Environmental Protection Agency
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
INCE	Institute of Noise Control Engineering
L_{eq}	Equivalent continuous (average) sound level
L_{max}	Maximum level measured over the time interval
L_{min}	Minimum level measured over the time interval
mph	Miles per hour
OPR	Office of Planning and Research
PPV	Peak particle velocity
Project	Stonehill Avenue Camp Site
REMEL	Reference Energy Mean Emission Level
RMS	Root-mean-square
VdB	Vibration Decibels

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EXECUTIVE SUMMARY

Urban Crossroads, Inc. has prepared this noise study to determine the potential noise impacts and the necessary noise mitigation measures, if any, for Stonehill Avenue Camp Site development ("Project"). The proposed Project consist of a four (4) unit campsite on approximately 2.39 acres. This study has been prepared to satisfy applicable County of San Bernardino standards and thresholds of significance based on guidance provided by Appendix G of the California Environmental Quality Act (CEQA) Guidelines. (1)

OFF SITE TRAFFIC NOISE

Traffic generated by the operation of the proposed Project is not expected to substantially influence the traffic noise levels at local or regional off-site areas. Based on the trip generation rate for a camp site, the expected Project is anticipated to generate a maximum of two (2) P.M. and one (1) A.M. peak hour trips, which would represent an incremental increase to the existing roadway volumes and is not expected to generate perceptible noise level increase (i.e., less than 3 dBA CNEL) at nearby sensitive land uses adjacent to study area roadways. Due to the low traffic volumes generated by the Project, the off-site traffic noise levels generated by the Project are considered *less than significant* and no further analysis is required.

OPERATIONAL NOISE

Using reference noise levels to represent the expected noise sources from the Project, this analysis estimates the Project-related stationary-source operational noise levels at nearby receiver locations. The noise sources associated with the Project are anticipated to include jacuzzi pumps and outdoor gatherings. Based on modeling, Project operational noise levels are expected to range from 31.8 to 37.8 dBA L_{eq} during the daytime hours of 7:00 a.m. to 10:00 p.m. and 27.8 to 33.8 dBA L_{eq} during the nighttime hours of 10:00 p.m. to 7:00 a.m. Thus, the operational noise analysis shows that Project activities will satisfy the County of San Bernardino daytime and nighttime exterior noise level thresholds at all receiver locations.

Further, the Project is anticipated to generate a daytime and nighttime operational noise level increases ranging up to 1.0 dBA L_{eq} at the nearby receiver locations. Thus, this analysis demonstrates that the Project operational noise levels will not contribute a long-term operational noise level impact to the existing ambient noise environment at any of the sensitive receiver locations. Therefore, the operational noise level impacts associated with the proposed 24-hour seven days per week Project activities, such as the jacuzzi pumps and outdoor gatherings, are considered *less than significant*.

CONSTRUCTION NOISE ANALYSIS

Using sample reference noise levels to represent the planned construction activities of the Project site, this analysis estimates the Project-related construction noise levels at nearby sensitive receiver locations. Since the County of San Bernardino General Plan and Development Codes do not identify specific construction noise level thresholds, an hourly average L_{eq} threshold

is identified based on the Federal Transit Administration (FTA) *Transit Noise and Vibration Impact Assessment Manual* for noise sensitive residential use. The Project-related short-term construction noise levels are expected to range from 48.7 to 61.5 dBA L_{eq} and will satisfy the 80 dBA L_{eq} construction noise level threshold at all receiver locations. Additionally, construction activities are planned to typically occur between :00 a.m. to 7:00 p.m. except on Sundays and Federal holidays and would comply with the County of San Bernardino limitation on allowable hours of construction per Section 83.01.080(g)(3) of the Development Code. Therefore, based on the results of this analysis, all nearby sensitive receiver locations will experience *less than significant* impacts due to Project construction noise levels.

CONSTRUCTION VIBRATION ANALYSIS

Construction activity can result in varying degrees of ground vibration, depending on the equipment and methods used, distance to the affected structures, and soil type. It is expected that ground-borne vibration from Project construction activities would cause only intermittent, localized intrusion. Ground-borne vibration levels resulting from typical construction activities occurring within the Project site were estimated by data published by the Federal Transit Administration (FTA). At the nearest receivers Project construction vibration levels are expected to range from 0.00 to 0.01 in/sec PPV. Based on maximum acceptable vibration threshold of 0.20 PPV (in/sec), the typical Project construction vibration levels will comply with County of San Bernardino thresholds at all receiver locations and vibration impacts would be *less than significant*.

The results of this Stonehill Avenue Camp Site Noise Impact Analysis are summarized below based on the significance criteria in Section 4 of this report. Table ES-1 shows the findings of significance for each potential noise and/or vibration impact under CEQA before and after any required mitigation measures.

TABLE ES-1: SUMMARY OF CEQA SIGNIFICANCE FINDINGS

Analysis	Report Section	Significance Findings	
		Unmitigated	Mitigated
Off-Site Traffic Noise	7	*Less Than Significant*	-
Operational Noise	8	*Less Than Significant*	-
Construction Noise	9	*Less Than Significant*	-
Construction Vibration		*Less Than Significant*	-

1 INTRODUCTION

This noise analysis has been completed to determine the noise impacts associated with the development of Stonehill Avenue Camp Site ("Project"). This noise study briefly describes the proposed Project, provides information regarding noise fundamentals, outlines the local regulatory setting, provides the study methods and procedures for performing noise analysis, evaluates potential noise impacts from the project, and identifies mitigation measures to reduce impacts, as necessary.

1.1 SITE LOCATION

The Stonehill Avenue Camp Site Project is located at 2082 Stonehill Avenue in an unincorporated territory of Joshua Tree in San Bernardino County, APN 0631-283-07, as shown on Exhibit 1-A. The project is located approximately 5.5 miles north of Highway 62, a few hundred feet north of Moonlight Mesa Street and a few hundred feet west of Border Avenue. The Project is to consist of a four (4) yurt campsite on approximately 18,360 square feet (SF). The Project is located near existing noise sensitive rural residential land uses located to the north, south, east, and west of the Project site.

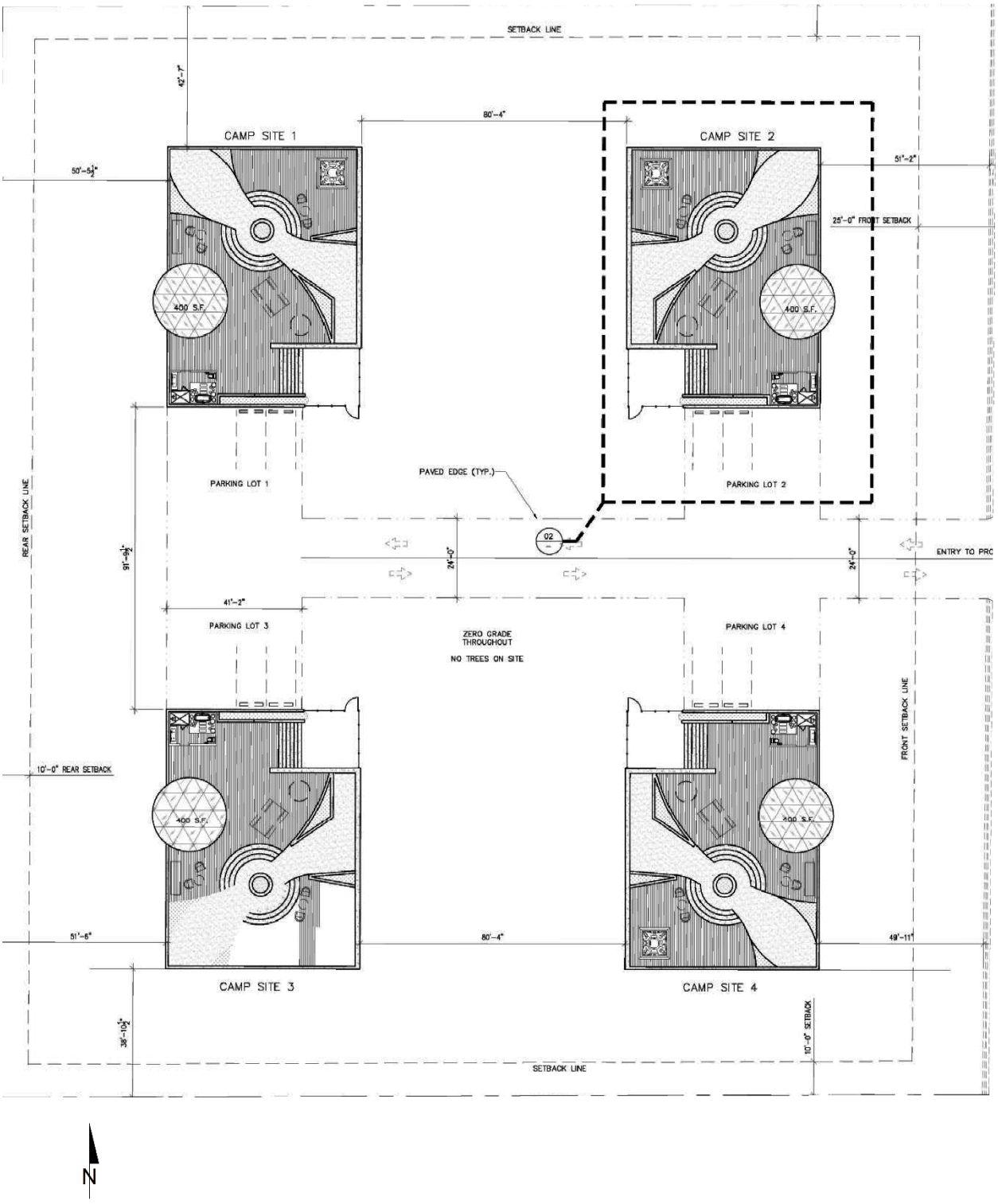
1.2 PROJECT DESCRIPTION

The Project intends to develop a four (4) unit campsite on approximately 2.4 acres, as shown in Exhibit 1-B. Each unit will consist of the Camping Dome, wood decking, outdoor jacuzzi, hot tub, fire pit, concrete step seating adjacent to the fire pit, sand base walkway, planter areas, and a 6-foot concrete perimeter wall. Each unit will have a four-space vehicle parking area adjacent. Access will be provided to the developed Camp site off of Stonehill Lane.

The on-site Project-related noise sources are expected to include: jacuzzi pumps and outdoor gatherings. This noise analysis is intended to describe noise level impacts associated with the expected typical operational activities at the Project site.

EXHIBIT 1-A: LOCATION MAP

EXHIBIT 1-B: SITE PLAN



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2 FUNDAMENTALS

Noise is simply defined as "unwanted sound." Sound becomes unwanted when it interferes with normal activities, when it causes actual physical harm or when it has adverse effects on health. Noise is measured on a logarithmic scale of sound pressure level known as a decibel (dB). A-weighted decibels (dBA) approximate the subjective response of the human ear to broad frequency noise source by discriminating against very low and very high frequencies of the audible spectrum. They are adjusted to reflect only those frequencies which are audible to the human ear. Exhibit 2-A presents a summary of the typical noise levels and their subjective loudness and effects that are described in more detail below.

EXHIBIT 2-A: TYPICAL NOISE LEVELS

COMMON OUTDOOR ACTIVITIES	COMMON INDOOR ACTIVITIES	A - WEIGHTED SOUND LEVEL dBA	SUBJECTIVE LOUDNESS	EFFECTS OF NOISE
THRESHOLD OF PAIN		140	INTOLERABLE OR DEAFENING	HEARING LOSS
NEAR JET ENGINE		130		
		120		
JET FLY-OVER AT 300m (1000 ft)	ROCK BAND	110		
LOUD AUTO HORN		100	VERY NOISY	
GAS LAWN MOWER AT 1m (3 ft)		90		
DIESEL TRUCK AT 15m (50 ft), at 80 km/hr (50 mph)	FOOD BLENDER AT 1m (3 ft)	80		SPEECH INTERFERENCE
NOISY URBAN AREA, DAYTIME	VACUUM CLEANER AT 3m (10 ft)	70	LOUD	
HEAVY TRAFFIC AT 90m (300 ft)	NORMAL SPEECH AT 1m (3 ft)	60		
QUIET URBAN DAYTIME	LARGE BUSINESS OFFICE	50	MODERATE	SLEEP DISTURBANCE
QUIET URBAN NIGHTTIME	THEATER, LARGE CONFERENCE ROOM (BACKGROUND)	40		
QUIET SUBURBAN NIGHTTIME	LIBRARY	30	FAINT	NO EFFECT
QUIET RURAL NIGHTTIME	BEDROOM AT NIGHT, CONCERT HALL (BACKGROUND)	20		
	BROADCAST/RECORDING STUDIO	10	VERY FAINT	
LOWEST THRESHOLD OF HUMAN HEARING	LOWEST THRESHOLD OF HUMAN HEARING	0		

2.1 RANGE OF NOISE

Since the range of intensities that the human ear can detect is so large, the scale frequently used to measure intensity is a scale based on multiples of 10, the logarithmic scale. The scale for measuring intensity is the decibel scale. Each interval of 10 decibels indicates a sound energy ten times greater than before, which is perceived by the human ear as being roughly twice as loud. (2) The most common sounds vary between 40 dBA (very quiet) to 100 dBA (very loud). Normal conversation at three feet is roughly at 60 dBA, while loud jet engine noises equate to 110 dBA at approximately 100 feet, which can cause serious discomfort. (3) Another important aspect of noise is the duration of the sound and the way it is described and distributed in time.

2.2 NOISE DESCRIPTORS

Environmental noise descriptors are generally based on averages, rather than instantaneous, noise levels. The most used figure is the equivalent level (L_{eq}). Equivalent sound levels are not measured directly but are calculated from sound pressure levels typically measured in A-weighted decibels (dBA). The equivalent sound level (L_{eq}) represents a steady state sound level containing the same total energy as a time varying signal over a given sample period (typically one hour) and is commonly used to describe the "average" noise levels within the environment.

To describe the time-varying character of environmental noise, the statistical or percentile noise descriptors L_{50}, L_{25}, L_8 and L_2, are commonly used. The percentile noise descriptors are the noise levels equaled or exceeded during 50 percent, 25 percent, 8 percent and 2 percent of a stated time. Sound levels associated with the L_2 and L_8 typically describe transient or short-term events, while levels associated with the L_{50} describe the steady state (or median) noise conditions. The relies on the percentile noise levels to describe the stationary source noise level limits. While the L_{50} describes the noise levels occurring 50 percent of the time, the L_{eq} accounts for the total energy (average) observed for the entire hour.

Peak hour or average noise levels, while useful, do not completely describe a given noise environment. Noise levels lower than peak hour may be disturbing if they occur during times when quiet is most desirable, namely evening and nighttime (sleeping) hours. To account for this, the Community Noise Equivalent Level (CNEL), representing a composite 24-hour noise level is utilized. The CNEL is the weighted average of the intensity of a sound, with corrections for time of day, and averaged over 24 hours. The time-of-day corrections require the addition of 5 decibels to dBA L_{eq} sound levels in the evening from 7:00 p.m. to 10:00 p.m., and the addition of 10 decibels to dBA L_{eq} sound levels at night between 10:00 p.m. and 7:00 a.m. These additions are made to account for the noise sensitive time periods during the evening and night hours when sound appears louder. CNEL does not represent the actual sound level heard at any time, but rather represents the total sound exposure. The County of San Bernardino relies on the 24-hour CNEL level to assess land use compatibility with transportation related noise sources.

2.3 SOUND PROPAGATION

When sound propagates over a distance, it changes in level and frequency content. The way noise reduces with distance depends on the following factors.

2.3.1 GEOMETRIC SPREADING

Sound from a localized source (i.e., a stationary point source) propagates uniformly outward in a spherical pattern. The sound level attenuates (or decreases) at a rate of 6 dB for each doubling of distance from a point source. Highways consist of several localized noise sources on a defined path and hence can be treated as a line source, which approximates the effect of several point sources. Noise from a line source propagates outward in a cylindrical pattern, often referred to as cylindrical spreading. Sound levels attenuate at a rate of 3 dB for each doubling of distance from a line source. (2)

2.3.2 GROUND ABSORPTION

The propagation path of noise from a highway to a receiver is usually very close to the ground. Noise attenuation from ground absorption and reflective wave canceling adds to the attenuation associated with geometric spreading. Traditionally, the excess attenuation has also been expressed in terms of attenuation per doubling of distance. This approximation is usually sufficiently accurate for distances of less than 200 ft. For acoustically hard sites (i.e., sites with a reflective surface between the source and the receiver, such as a parking lot or body of water), no excess ground attenuation is assumed. For acoustically absorptive or soft sites (i.e., those sites with an absorptive ground surface between the source and the receiver such as soft dirt, grass, or scattered bushes and trees), an excess ground attenuation value of 1.5 dB per doubling of distance is normally assumed. When added to the cylindrical spreading, the excess ground attenuation results in an overall drop-off rate of 4.5 dB per doubling of distance from a line source. (4)

2.3.3 ATMOSPHERIC EFFECTS

Receivers located downwind from a source can be exposed to increased noise levels relative to calm conditions, whereas locations upwind can have lowered noise levels. Sound levels can be increased at large distances (e.g., more than 500 feet) due to atmospheric temperature inversion (i.e., increasing temperature with elevation). Other factors such as air temperature, humidity, and turbulence can also have significant effects. (2)

2.3.4 SHIELDING

A large object or barrier in the path between a noise source and a receiver can substantially attenuate noise levels at the receiver. The amount of attenuation provided by shielding depends on the size of the object and the frequency content of the noise source. Shielding by trees and other such vegetation typically only has an "out of sight, out of mind" effect. That is, the perception of noise impact tends to decrease when vegetation blocks the line-of-sight to nearest residents. However, for vegetation to provide a substantial, or even noticeable, noise reduction, the vegetation area must be at least 15 feet in height, 100 feet wide and dense enough to completely obstruct the line-of sight between the source and the receiver. This size of vegetation may provide up to 5 dBA of noise reduction. The Federal Highway Administration (FHWA) does not consider the planting of vegetation to be a noise abatement measure. (4)

2.3.5 REFLECTION

Field studies conducted by the FHWA have shown that the reflection from barriers and buildings does not substantially increase noise levels. (4) If all the noise striking a structure was reflected back to a given receiving point, the increase would be theoretically limited to 3 dBA. Further, not all the acoustical energy is reflected back to same point. Some of the energy would go over the structure, some is reflected to points other than the given receiving point, some is scattered by ground coverings (e.g., grass and other plants), and some is blocked by intervening structures and/or obstacles (e.g., the noise source itself). Additionally, some of the reflected energy is lost due to the longer path that the noise must travel. FHWA measurements made to quantify

reflective increases in traffic noise have not shown an increase of greater than 1-2 dBA; an increase that is not perceptible to the average human ear.

2.4 NOISE CONTROL

Noise control is the process of obtaining an acceptable noise environment for an observation point or receiver by controlling the noise source, transmission path, receiver, or all three. This concept is known as the source-path-receiver concept. In general, noise control measures can be applied to these three elements.

2.5 NOISE BARRIER ATTENUATION

Effective noise barriers can reduce noise levels by up to 10 to 15 dBA, cutting the loudness of traffic noise in half. A noise barrier is most effective when placed close to the noise source or receiver. Noise barriers, however, do have limitations. For a noise barrier to work, it must be high enough and long enough to block the path of the noise source. (4)

2.6 LAND USE COMPATIBILITY WITH NOISE

Some land uses are more tolerant of noise than others. For example, schools, hospitals, churches, and residences are more sensitive to noise intrusion than are commercial or industrial developments and related activities. As ambient noise levels affect the perceived amenity or livability of a development, so too can the mismanagement of noise impacts impair the economic health and growth potential of a community by reducing the area's desirability as a place to live, shop and work. For this reason, land use compatibility with the noise environment is an important consideration in the planning and design process. The FHWA encourages State and Local government to regulate land development in such a way that noise-sensitive land uses are either prohibited from being located adjacent to a highway, or that the developments are planned, designed, and constructed in such a way that noise impacts are minimized. (5)

2.7 COMMUNITY RESPONSE TO NOISE

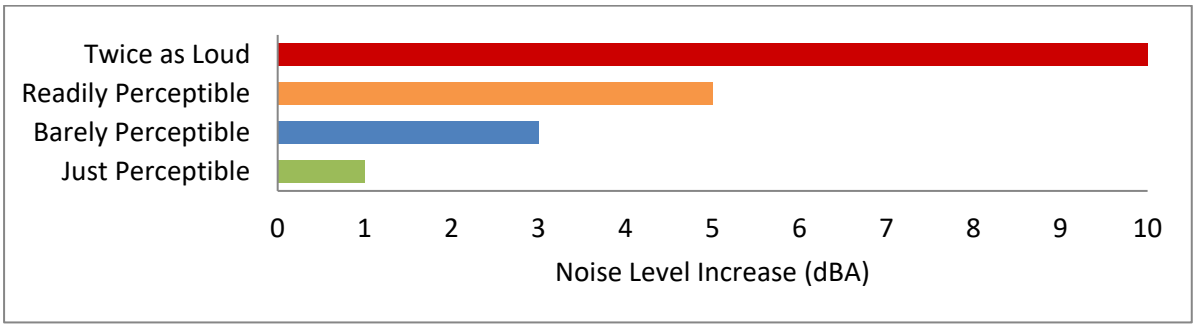
Community responses to noise may range from registering a complaint by telephone or letter, to initiating court action, depending upon everyone's susceptibility to noise and personal attitudes about noise. Several factors are related to the level of community annoyance including:

- Fear associated with noise producing activities;
- Socio-economic status and educational level;
- Perception that those affected are being unfairly treated;
- Attitudes regarding the usefulness of the noise-producing activity;
- Belief that the noise source can be controlled.

Approximately ten percent of the population has a very low tolerance for noise and will object to any noise not of their making. Consequently, even in the quietest environment, some complaints will occur. Twenty-five percent of the population will not complain even in very severe noise environments. Thus, a variety of reactions can be expected from people exposed to any given noise environment. (6) Surveys have shown that about ten percent of the people exposed to

traffic noise of 60 dBA will report being highly annoyed with the noise, and each increase of one dBA is associated with approximately two percent more people being highly annoyed. When traffic noise exceeds 60 dBA or aircraft noise exceeds 55 dBA, people may begin to complain. (6) Despite this variability in behavior on an individual level, the population can be expected to exhibit the following responses to changes in noise levels as shown on Exhibit 2-B. A change of 3 dBA are considered *barely perceptible*, and changes of 5 dBA are considered *readily perceptible*. (4)

EXHIBIT 2-B: NOISE LEVEL INCREASE PERCEPTION



2.8 VIBRATION

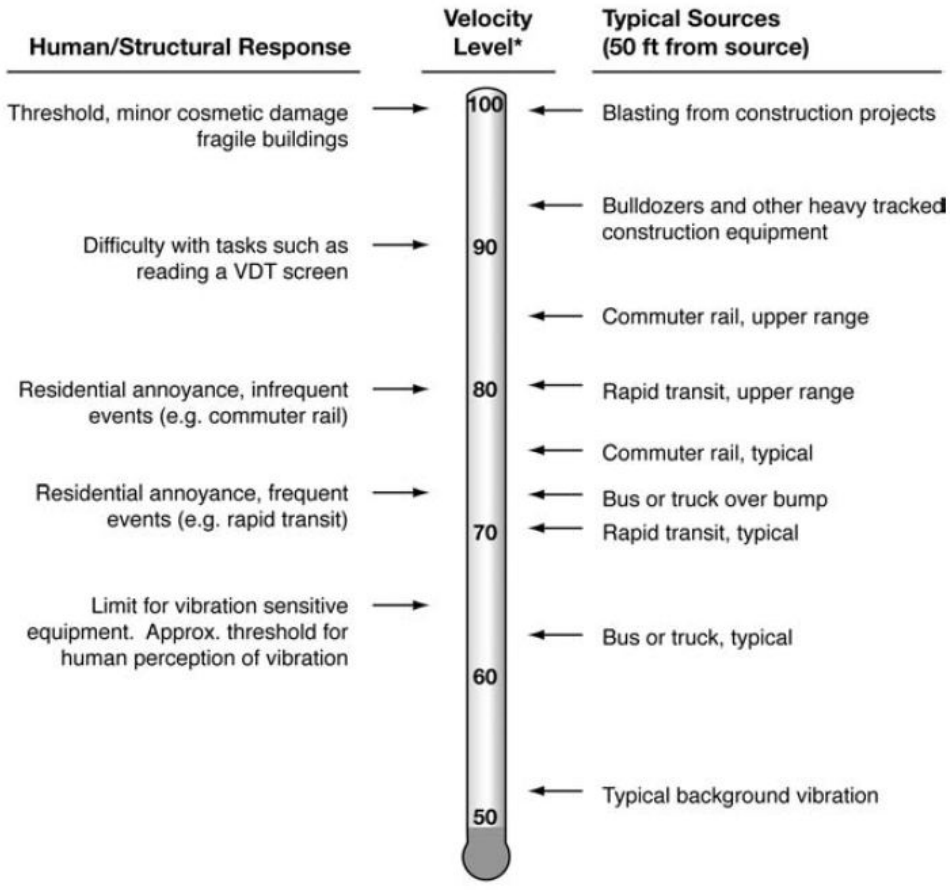
As defined in the Federal Transit Administration (FTA) *Transit Noise and Vibration Impact Assessment Manual* (7) and the California Department of Transportation (Caltrans) *Transportation and Construction Vibration Guidance Manual* (8), vibration is the periodic oscillation of a medium or object. The rumbling sound caused by the vibration of room surfaces is called structure-borne noise. Sources of ground-borne vibrations include natural phenomena (e.g., earthquakes, volcanic eruptions, sea waves, landslides) or human-generated sources (e.g., explosions, machinery, traffic, trains, construction equipment). Vibration sources may be continuous, such as factory machinery, or transient, such as explosions or train pass-byes. As is the case with airborne sound, ground-borne vibrations may be described by amplitude and frequency. Groundborne vibration is primarily a concern inside structures, and is almost never a problem outside of structures (7). Additionally, ground-borne vibration generated by man-made activities typically attenuates rapidly with distance from the source of the vibration. Sensitive receivers for vibration include older stone, adobe, and masonry structures, places where people reside (especially residents, the elderly, and sick), and vibration-sensitive equipment and/or activities.

There are several different methods that are used to quantify vibrations. The peak particle velocity (PPV) in inches per second (in/sec) is the most common and is defined as the maximum instantaneous peak of the vibration signal. The PPV is the was developed primarily to describe vibration impacts to buildings and is not always the most suitable for evaluating human response to vibration because it takes some time for the human body to respond to vibration signals. Instead, the human body responds to average vibration amplitude often described as the root mean square (RMS) amplitude in in/sec. The RMS amplitude is defined as the average of the squared amplitude of the signal and may be more appropriate for describing the effect of

vibration on the human body. However, the RMS amplitude and PPV are related mathematically, and the RMS amplitude can be calculated from the PPV. The RMS amplitude is approximately 70% of the PPV (8).

While not universally accepted, vibration decibel notation (VdB) is used by the FTA in their guidance manual to describe vibration levels and provide a background of common vibration levels (9). As stated in the FTA guidance manual, the background vibration-velocity level in residential areas is generally 50 VdB. Ground-borne vibration is normally perceptible to humans at approximately 65 VdB. For most people, a vibration-velocity level of 75 VdB is the approximate dividing line between barely perceptible and distinctly perceptible levels. Typical outdoor sources of perceptible ground-borne vibration are construction equipment, steel-wheeled trains, and traffic on rough roads. If a roadway is smooth, the ground-borne vibration is rarely perceptible. The range of interest is from approximately 50 VdB, which is the typical background vibration-velocity level, to 100 VdB, which is the general threshold where minor damage can occur in fragile buildings. Exhibit 2-C illustrates common vibration sources and the human and structural response to ground-borne vibration.

EXHIBIT 2-C: TYPICAL LEVELS OF GROUND-BORNE VIBRATION



** RMS Vibration Velocity Level in VdB relative to 10^{-6} inches/second*

Source: Federal Transit Administration (FTA) Transit Noise and Vibration Impact Assessment Manual.

3 REGULATORY SETTING

To limit population exposure to physically and/or psychologically damaging as well as intrusive noise levels, the federal government, the State of California, various county governments, and most municipalities in the state have established standards and ordinances to control noise. In most areas, automobile and truck traffic is the major source of environmental noise. Traffic activity generally produces an average sound level that remains constant with time. Air and rail traffic, and commercial and industrial activities are also major sources of noise in some areas. Federal, state, and local agencies regulate different aspects of environmental noise. Federal and state agencies generally set noise standards for mobile sources such as aircraft and motor vehicles, while regulation of stationary sources is left to local agencies.

3.1 STATE OF CALIFORNIA NOISE REQUIREMENTS

The State of California regulates freeway noise, sets standards for sound transmission, provides occupational noise control criteria, identifies noise standards, and provides guidance for local land use compatibility. State law requires that each county and city adopt a General Plan that includes a Noise Element which is to be prepared per guidelines adopted by the Governor's Office of Planning and Research (OPR). (10) The purpose of the Noise Element is to *limit the exposure of the community to excessive noise levels*. In addition, the California Environmental Quality Act (CEQA) requires that all known environmental effects of a project be analyzed, including environmental noise impacts.

3.2 COUNTY OF SAN BERNARDINO GENERAL PLAN NOISE ELEMENT

The County of San Bernardino has adopted a Noise Element of the General Plan to limit the exposure of the community to excessive noise levels. (11) The most common sources of environmental noise in San Bernardino County are associated with roads, airports, railroad operations, and industrial activities. The facilities are used to transport residents, consumer products and provide basic infrastructure for the community. (11) To address these noise sources found in the County of San Bernardino, the following goals have been identified in the General Plan Noise Element:

N 1 *The County will abate and avoid excessive noise exposures through noise mitigation measures incorporated into the design of new noise-generating and new noise-sensitive land uses, while protecting areas within the County where the present noise environment is within acceptable limits.*

N 1.3 *When industrial, commercial, or other land uses, including locally regulated noise sources, are proposed for areas containing noise-sensitive land uses, noise levels generated by the proposed use will not exceed the performance standards of Table N-2 within outdoor activity areas. If outdoor activity areas have not yet been determined, noise levels shall not exceed the performance standards listed in Chapter 83.01 of the Development Code at the boundary of areas planned or zoned for residential or other noise-sensitive land uses.*

N 1.5 Limit truck traffic in residential and commercial areas to designated truck routes; limit construction, delivery, and through-truck traffic to designated routes; and distribute maps of approved truck routes to County traffic officers.

N 1.6 Enforce the hourly noise-level performance standards for stationary and other locally regulated sources, such as industrial, recreational, and construction activities as well as mechanical and electrical equipment.

N 2 The County will strive to preserve and maintain the quiet environment of mountain, desert and other rural areas.

N 2.1 The County will require appropriate and feasible on-site noise attenuating measures that may include noise walls, enclosure of noise generating equipment, site planning to locate noise sources away from sensitive receptors, and other comparable features.

3.3 COUNTY OF SAN BERNARDINO DEVELOPMENT CODE

While the County of San Bernardino General Plan Noise Element provides guidelines and criteria to assess transportation noise on sensitive land uses, the County Code, Title 8 Development Code contains the noise level limits for mobile, stationary, and construction-related noise sources. (12)

3.3.1 TRANSPORTATION NOISE STANDARDS

Section 83.01.080(d), Table 83-3, contains the County of San Bernardino's mobile noise source-related standards, shown on Exhibit 3-A. Based on the County's mobile noise source standards, there are no exterior noise level standards for the Project commercial land use. Exterior transportation (mobile) noise level standards for residential land uses in the Project study area are shown to be 60 dBA CNEL, while non-noise-sensitive land uses, such as office uses, require exterior noise levels of 65 dBA CNEL per the County's Table 83-3 mobile noise source standards.

EXHIBIT 3-A: COUNTY OF SAN BERNARDINO MOBILE NOISE LEVEL STANDARDS

Noise Standards for Adjacent Mobile Noise Sources			
Land Use		*Ldn (or CNEL) dB(A)*	
Categories	*Uses*	*Interior (1)*	*Exterior (2)*
Residential	Single and multi-family, duplex, mobile homes	45	60(3)
Commercial	Hotel, motel, transient housing	45	60(3)
	Commercial retail, bank, restaurant	50	N/A
	Office building, research and development, professional offices	45	65
	Amphitheater, concert hall, auditorium, movie theater	45	N/A
Institutional/Public	Hospital, nursing home, school classroom, religious institution, library	45	65
Open Space	Park	N/A	65

Notes:

(1) The indoor environment shall exclude bathrooms, kitchens, toilets, closets and corridors.

(2) The outdoor environment shall be limited to:

- Hospital/office building patios
- Hotel and motel recreation areas
- Mobile home parks
- Multi-family private patios or balconies
- Park picnic areas
- Private yard of single-family dwellings
- School playgrounds

(3) An exterior noise level of up to 65 dB(A) (or CNEL) shall be allowed provided exterior noise levels have been substantially mitigated through a reasonable application of the best available noise reduction technology, and interior noise exposure does not exceed 45 dB(A) (or CNEL) with windows and doors closed. Requiring that windows and doors remain closed to achieve an acceptable interior noise level shall necessitate the use of air conditioning or mechanical ventilation.

CNEL = (Community Noise Equivalent Level). The average equivalent A-weighted sound level during a 24-hour day, obtained after addition of approximately five decibels to sound levels in the evening from 7:00 p.m. to 10:00 p.m. and ten decibels to sound levels in the night from 10:00 p.m. to 7:00 a.m.

Source: County of San Bernardino County Code, Title 8 Development Code, Table 83-3.

3.3.2 OPERATIONAL NOISE STANDARDS

To analyze noise impacts originating from a designated fixed location or private property such as the Stonehill Avenue Camp Site Project, stationary-source (operational) noise such as the expected jacuzzi pumps and outdoor gatherings are typically evaluated against standards established under a jurisdiction's Municipal Code. The County of San Bernardino County Code, Title 8 Development Code, Section 83.01.080(c) establishes the noise level standards for stationary noise sources. Since the Project's land use will potentially impact adjacent noise-sensitive uses in the Project study area, this noise study relies on the more conservative residential noise level standards to describe potential operational noise impacts.

For residential properties, the exterior noise level shall not exceed 55 dBA L_{eq} during the daytime hours (7:00 a.m. to 10:00 p.m.) and 45 dBA L_{eq} during the nighttime hours (10:00 p.m. to 7:00 a.m.) for both the whole hour, and for not more than 30 minutes in any hour. (12) The exterior noise level standards shall apply for a cumulative period of 30 minutes in any hour, as well as the standard plus 5 dBA cannot be exceeded for a cumulative period of more than 15 minutes in any hour, or the standard plus 10 dBA for a cumulative period of more than 5 minutes in any hour, or the standard plus 15 dBA for a cumulative period of more than 1 minute in any hour, or the

standard plus 20 dBA for any period of time. Further, Section 83.01.080(e) indicates that if the existing ambient noise level already exceeds any of the exterior noise level limit categories, then the standard shall be adjusted to reflect the ambient conditions. The County of San Bernardino operational noise level standards are shown on Table 3-1 and included in Appendix 3.1.

TABLE 3-1: OPERATIONAL NOISE LEVEL STANDARDS

Affected Land Uses (Receiving Noise)	7:00 a.m. - 10:00 p.m. (dBA L_{eq})	10:00 p.m. - 7:00 a.m. (dBA L_{eq})
Residential	55	45
Professional Services	55	55
Other Commercial	60	60
Industrial	70	70

L_{eq} = (Equivalent Energy Level). The sound level corresponding to a steady-state sound level containing the same total energy as a time-varying signal over a given sample period, typically one, eight or 24 hours.
dB(A) = (A-weighted Sound Pressure Level). 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, placing greater emphasis on those frequencies within the sensitivity range of the human ear.

The percentile noise descriptors are provided to ensure that the duration of the noise source is fully considered. However, due to the relatively constant intensity of the Project operational activities, the L_{50} or average L_{eq} noise level metrics best describe the jacuzzi pumps and outdoor gatherings. In addition, the L_{eq} noise level metric accounts for noise fluctuations over time by averaging the louder and quieter events and giving more weight to the louder events. In addition, due to the mathematical relationship between the median (L_{50}) and the mean (L_{eq}), the L_{eq} will always be larger than or equal to the L_{50}. The more variable the noise becomes, the larger the L_{eq} becomes in comparison to the L_{50}. Therefore, this noise study conservatively relies on the average L_{eq} sound level limits to describe the Project operational noise levels.

3.4 CONSTRUCTION NOISE STANDARDS

Section 83.01.080(g)(3) of the County of San Bernardino Development Code, provided in Appendix 3.1, indicates that construction activity is considered exempt from the noise level standards between the hours of 7:00 a.m. to 7:00 p.m. except on Sundays and Federal holidays. (12) However, neither the County of San Bernardino General Plan or Municipal Code establish numeric maximum acceptable construction source noise levels at potentially affected receivers, which would allow for a quantified determination of what CEQA constitutes a *substantial temporary or periodic noise increase*. Therefore, a numerical construction threshold based on Federal Transit Administration (FTA) *Transit Noise and Vibration Impact Assessment Manual* is used for analysis of daytime construction impacts, as discussed below.

According to the FTA, local noise ordinances are typically not very useful in evaluating construction noise. They usually relate to nuisance and hours of allowed activity, and sometimes specify limits in terms of maximum levels, but are generally not practical for assessing the impact of a construction project. Project construction noise criteria should account for the existing noise

environment, the absolute noise levels during construction activities, the duration of the construction, and the adjacent land use. Due to the lack of standardized construction noise thresholds, the FTA provides guidelines that can be considered reasonable criteria for construction noise assessment. The FTA considers a daytime exterior construction noise level of 80 dBA L_{eq} as a threshold for noise sensitive residential land use, a noise level of 85 dBA L_{eq} for commercial locations, and 90 dBA L_{eq} for industrial locations. (7)

3.5 CONSTRUCTION VIBRATION STANDARDS

Construction activity can result in varying degrees of ground-borne vibration, depending on the equipment and methods used, distance to the affected structures and soil type. Construction vibration is generally associated with pile driving and rock blasting. Other construction equipment such as air compressors, light trucks, hydraulic loaders, etc., generates little or no ground vibration. (7)

The County of San Bernardino Development Code, Section 83.01.090(a) states that vibration shall be no *greater than or equal to two-tenths inches per second measured at or beyond the lot line*. (12) Therefore, to determine if the vibration levels due to the operation and construction of the Project, the peak particle velocity (PPV) vibration level standard of 0.2 inches per second is used.

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4 SIGNIFICANCE CRITERIA

The following significance criteria are based on currently adopted guidance provided by Appendix G of the California Environmental Quality Act (CEQA) Guidelines. (10) For the purposes of this report, impacts would be potentially significant if the Project results in or causes:

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

B. Generation of excessive ground-borne vibration or ground-borne noise levels?

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

While the County of San Bernardino General Plan Guidelines provide direction on noise compatibility and establish noise standards by land use type that are sufficient to assess the significance of noise impacts, they do not define the levels at which increases are considered substantial for use under Guideline A. CEQA Appendix G Guideline C applies to nearby public and private airports, if any, and the Project's land use compatibility.

4.1 CEQA GUIDELINES NOT FURTHER ANALYZED

The Project site is not located within two miles of a public airport or within an airport land use plan. The closest airport is the Yucca Valley Airport located over 8 miles southwest of the Project site. As such, the Project site would not be exposed to excessive noise levels from airport operations, and therefore, impacts are considered *less than significant,* and no further noise analysis is conducted in relation to CEQA Appendix G Guideline C.

4.2 NOISE-SENSITIVE RECEIVERS

Noise level increases resulting from the Project are evaluated based on the Appendix G CEQA Guidelines described above at the closest sensitive receiver locations. Under CEQA, consideration must be given to the magnitude of the increase, the existing ambient noise levels, and the location of noise-sensitive receivers to determine if a noise increase represents a significant adverse environmental impact. This approach recognizes *that there is no single noise increase that renders the noise impact significant.* (13)

Unfortunately, there is no completely satisfactory way to measure the subjective effects of noise or of the corresponding human reactions of annoyance and dissatisfaction. This is primarily because of the wide variation in individual thresholds of annoyance and differing individual experiences with noise. Thus, an important way of determining a person's subjective reaction to a new noise is the comparison of it to the existing environment to which one has adapted—the so-called *ambient* environment. In general, the more a new noise exceeds the previously existing ambient noise level, the less acceptable the new noise will typically be judged. The Federal Interagency Committee on Noise (FICON) (14) developed guidance to be used for the assessment

of project-generated increases in noise levels that consider the ambient noise level. The FICON recommendations are based on studies that relate aircraft noise levels to the percentage of persons highly annoyed by aircraft noise. Although the FICON recommendations were specifically developed to assess aircraft noise impacts, these recommendations are often used in environmental noise impact assessments involving the use of cumulative noise exposure metrics, such as the average-daily noise level (CNEL) and equivalent continuous noise level (L_{eq}).

As previously stated, the approach used in this noise study recognizes *that there is no single noise increase that renders the noise impact significant*, based on a 2008 California Court of Appeal ruling on Gray v. County of Madera. (13) For example, if the ambient noise environment is quiet (<60 dBA) and the new noise source greatly increases the noise levels, an impact may occur if the noise criteria may be exceeded. Therefore, for this analysis, FICON identifies a *readily perceptible* 5 dBA or greater project-related noise level increase is considered a significant impact when the noise criteria for a given land use is exceeded. Per the FICON, in areas where the without project noise levels range from 60 to 65 dBA, a 3 dBA *barely perceptible* noise level increase appears to be appropriate for most people. When the without project noise levels already exceed 65 dBA, any increase in community noise louder than 1.5 dBA or greater is considered a significant impact if the noise criteria for a given land use is exceeded, since it likely contributes to an existing noise exposure exceedance.

The FICON guidance provides an established source of criteria to assess the impacts of substantial temporary or permanent increase in ambient noise levels. Based on the FICON criteria, the amount to which a given noise level increase is considered acceptable is reduced when the without Project noise levels are already shown to exceed certain land-use specific exterior noise level criteria. The specific levels are based on typical responses to noise level increases of 5 dBA or *readily perceptible*, 3 dBA or *barely perceptible*, and 1.5 dBA depending on the underlying without Project noise levels for noise-sensitive uses. These levels of increases and their perceived acceptance are consistent with guidance provided by both the Federal Highway Administration (4 p. 9) and Caltrans (15 p. 2_48).

4.3 SIGNIFICANCE CRITERIA SUMMARY

Noise impacts shall be considered significant if any of the following occur as a direct result of the proposed Project. Table 4-1 shows the significance criteria summary matrix.

TABLE 4-1: SIGNIFICANCE CRITERIA SUMMARY

Analysis	Land Use	Condition(s)	Significance Criteria	
			Daytime	**Nighttime**
Operational	Residential	Exterior Noise Level Limit[2]	55 dBA L_{eq}	45 dBA L_{eq}
	Noise-Sensitive[1]	if ambient is < 60 dBA L_{eq}	≥ 5 dBA L_{eq} Project increase	
		if ambient is 60 - 65 dBA L_{eq}	≥ 3 dBA L_{eq} Project increase	
		if ambient is > 65 dBA L_{eq}	≥ 1.5 dBA L_{eq} Project increase	
Construction	All	Permitted between 7:00 a.m. to 7:00 p.m.; except Sundays and Federal holidays.[3]		
	Residential	Noise Level Threshold[4]	80 dBA L_{eq}	n/a
	Commercial		85 dBA L_{eq}	n/a
	Industrial		90 dBA L_{eq}	n/a
	All	Vibration Level Threshold[5]	0.2 PPV in/sec	n/a

[1] FICON, 1992.
[2] County of San Bernardino Development Code, Title 8, Section 83.01.080 (Appendix 3.1)
[3] Section 83.01.080(g)(3) of the County of San Bernardino County Code.
[4] Federal Transit Administration, Transit Noise and Vibration Impact Assessment Manual.
[5] Section 83.01.090(a) of the County of San Bernardino County Code.
"Daytime" = 7:00 a.m. to 10:00 p.m.; "Nighttime" = 10:00 p.m. to 7:00 a.m. "n/a" = construction activities are not planned during the nighttime hours; "PPV" = peak particle velocity.

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5 EXISTING NOISE LEVEL MEASUREMENTS

To assess the existing noise level environment, 24-hour noise level measurements were taken at three locations in the Project study area. The receiver locations were selected to describe and document the existing noise environment within the Project study area. Exhibit 5-A provides the boundaries of the Project study area and the noise level measurement locations. To fully describe the existing noise conditions, noise level measurements were collected by Urban Crossroads, Inc. on Saturday, December 3rd, 2022. Appendix 5.1 includes study area photos.

5.1 MEASUREMENT PROCEDURE AND CRITERIA

To describe the existing noise environment, the hourly noise levels were measured during typical weekday conditions over a 24-hour period. By collecting individual hourly noise level measurements, it is possible to describe the daytime and nighttime hourly noise levels and calculate the 24-hour CNEL. The long-term noise readings were recorded using Piccolo Type 2 integrating sound level meter and dataloggers. The Piccolo sound level meters were calibrated using a Larson-Davis calibrator, Model CAL 150. All noise meters were programmed in "slow" mode to record noise levels in "A" weighted form. The sound level meters and microphones were equipped with a windscreen during all measurements. All noise level measurement equipment satisfies the American National Standards Institute (ANSI) standard specifications for sound level meters ANSI S1.4-2014/IEC 61672-1:2013. (16)

5.2 NOISE MEASUREMENT LOCATIONS

The long-term noise level measurements were positioned as close to the nearest sensitive receiver locations as possible to assess the existing ambient hourly noise levels surrounding the Project site. Both Caltrans and the FTA recognize that it is not reasonable to collect noise level measurements that can fully represent every part of a private yard, patio, deck, or balcony normally used for human activity when estimating impacts for new development projects. This is demonstrated in the Caltrans general site location guidelines which indicate that, *sites must be free of noise contamination by sources other than sources of interest. Avoid sites located near sources such as barking dogs, lawnmowers, pool pumps, and air conditioners unless it is the express intent of the analyst to measure these sources*. (2) Further, FTA guidance states, t*hat it is not necessary nor recommended that existing noise exposure be determined by measuring at every noise-sensitive location in the project area. Rather, the recommended approach is to characterize the noise environment for clusters of sites based on measurements or estimates at representative locations in the community*. (7)

Based on recommendations of Caltrans and the FTA, it is not necessary to collect measurements at each individual building or residence, because each receiver measurement represents a group of buildings that share acoustical equivalence. (7) In other words, the area represented by the receiver shares similar shielding, terrain, and geometric relationship to the reference noise source. Receivers represent a location of noise sensitive areas and are used to estimate the future noise level impacts.

EXHIBIT 5-A: NOISE MEASUREMENT LOCATIONS

Collecting reference ambient noise level measurements at the nearby sensitive receiver locations allows for a comparison of the before and after Project noise levels and is necessary to assess potential noise impacts due to the Project's contribution to the ambient noise levels.

5.3 NOISE MEASUREMENT RESULTS

The noise measurements presented below focus on the average or equivalent sound levels (L_{eq}). The equivalent sound level (L_{eq}) represents a steady state sound level containing the same total energy as a time varying signal over a given sample period. Table 5-1 identifies the hourly daytime (7:00 a.m. to 10:00 p.m.) and nighttime (10:00 p.m. to 7:00 a.m.) noise levels at each noise level measurement location.

TABLE 5-1: 24-HOUR AMBIENT NOISE LEVEL MEASUREMENTS

Location[1]	Description	Energy Average Noise Level (dBA L_{eq})[2]	
		Daytime	Nighttime
L1	Located to the southeast of the Project site near the residence at 2084 Border Avenue.	40.7	38.3
L2	Located to the east of the Project site near the residence at 2083 Stonehill Avenue	46.0	43.1
L3	Located along Polaris Avenue north of Moonlight Mesa Street.	37.7	34.5

[1] See Exhibit 5-A for the noise level measurement locations.
[2] Energy (logarithmic) average levels. The long-term 24-hour measurement worksheets are included in Appendix 5.2.
"Daytime" = 7:00 a.m. to 7:00 p.m.; "Nighttime" = 10:00 p.m. to 7:00 a.m.

Table 5-1 provides the (energy average) noise levels used to describe the daytime and nighttime ambient conditions. These daytime and nighttime energy average noise levels represent the average of all hourly noise levels observed during these time periods expressed as a single number. Appendix 5.2 provides summary worksheets of the noise levels for each hour as well as the minimum, maximum, L_1, L_2, L_5, L_8, L_{25}, L_{50}, L_{90}, L_{95}, and L_{99} percentile noise levels observed during the daytime and nighttime periods.

The background ambient noise levels in the Project study area are dominated by the transportation-related noise associated with surface streets in addition to background industrial land use activities. This includes the auto and truck activities on study area roadway segments near the noise level measurement locations.

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6 SENSITIVE RECEIVER LOCATIONS

To assess the potential for long-term operational and short-term construction noise impacts, the following sensitive receiver locations, as shown on Exhibit 6-A, were identified as representative locations for analysis. Sensitive receivers are generally defined as locations where people reside or where the presence of unwanted sound could otherwise adversely affect the use of the land. Noise-sensitive land uses are generally considered to include schools, hospitals, single-family dwellings, mobile home parks, churches, libraries, and recreation areas. Moderately noise-sensitive land uses typically include multi-family dwellings, hotels, motels, dormitories, out-patient clinics, cemeteries, golf courses, country clubs, athletic/tennis clubs, and equestrian clubs. Land uses that are considered relatively insensitive to noise include business, commercial, and professional developments. Land uses that are typically not affected by noise include: industrial, manufacturing, utilities, agriculture, undeveloped land, parking lots, warehousing, liquid and solid waste facilities, salvage yards, and transit terminals.

To describe the potential off-site Project noise levels, three receiver locations in the vicinity of the Project site were identified. All distances are measured from the Project site boundary to the outdoor living areas (e.g., private backyards), Project boundary line, or at the building façade, whichever is closer to the Project site. The selection of receiver locations is based on FHWA guidelines and is consistent with additional guidance provided by Caltrans and the FTA, as previously described in Section 5.2. Other sensitive land uses in the Project study area that are located at greater distances than those identified in this noise study will experience lower noise levels than those presented in this report due to the additional attenuation from distance and the shielding of intervening structures. Distance is measured in a straight line from the project boundary to each receiver location.

R1: Location R1 represents existing noise sensitive rural residence located at 2084 Border Avenue, approximately 157 feet to the east of the Project site. A 24-hour noise measurement was taken near this location, L2, to describe the existing ambient noise environment.

R2: Location R2 represents existing noise sensitive rural residence located at 2083 Stonehill Avenue, approximately 389 feet to the southeast of the Project site. A 24-hour noise measurement was taken near this location, L1, to describe the existing ambient noise environment.

R3: Location R3 represents the existing noise sensitive rural residence located northwest of the Polaris Avenue and Moonlight Mesa Street intersection, approximately 405 feet to the west of the Project site. A 24-hour noise measurement was taken near this location, L3, to describe the existing ambient noise environment.

EXHIBIT 6-A: SENSITIVE RECEIVER LOCATIONS

7 OFF-SITE TRANSPORTATION NOISE IMPACTS

The Project would result in a small increase in regional and local traffic volumes. The expected Project is anticipated to generate a maximum of two (2) P.M. and one (1) A.M. peak hour trips which would represent an incremental increase to the existing roadway volumes and is not expected to generate perceptible noise level increase (i.e., less than 3 dBA CNEL) at nearby sensitive land uses adjacent to study area roadways. Due to the low traffic volumes generated by the Project, the off-site traffic noise levels generated by the Project are considered *less than significant* and no further analysis is required.

8 OPERATIONAL NOISE IMPACTS

This section analyzes the potential stationary-source operational noise impacts at the nearest receiver locations, identified in Section 6, resulting from the operation of the Stonehill Avenue Camp Site Project. Exhibit 8-A identifies the representative noise source locations used to assess the hourly average L_{eq} operational noise levels consistent with the County of San Bernardino noise standards. Appendix 8.1 includes the detailed calculations for the Project operational noise levels presented in this section.

8.1 OPERATIONAL NOISE SOURCES

This operational noise analysis is intended to describe noise level impacts associated with the expected typical daytime and nighttime activities at the Project site. To present the potential worst-case noise conditions, this analysis assumes the Project would be operational 24 hours per day, seven days per week. The on-site Project-related noise sources are expected to include: the jacuzzi pumps and outdoor gatherings.

8.2 REFERENCE NOISE LEVELS

To estimate the Project operational noise impacts, reference noise levels were taken from manufacturers specifications or measurements were collected from similar types of activities to represent the noise levels expected with the development of the proposed Project. This section provides a detailed description of the reference noise level measurements shown on Table 8-1 used to estimate the Project operational noise impacts. It is important to note that the following projected noise levels assume the worst-case noise environment with the jacuzzi pumps and outdoor gatherings all operating at the same time. These sources of noise activity will likely vary throughout the day.

EXHIBIT 8-A: OPERATIONAL NOISE SOURCE LOCATIONS

TABLE 8-1: REFERENCE NOISE LEVEL MEASUREMENTS

Noise Source[1]	Noise Source Height (Feet)	Min./Hour[2]		Reference Noise Level (dBA L_{eq}) @ 50 Feet	Sound Power Level (dBA)[3]
		Day	Night		
Jacuzzi Pump	3'	45'	30'	52.1	83.7
Outdoor Gathering	5'	60'	30'	49.8	81.4

[1] As measured by Urban Crossroads, Inc.
[2] Anticipated duration (minutes within the hour) of noise activity during typical hourly conditions expected at the Project site. "Daytime" = 7:00 a.m. - 10:00 p.m.; "Nighttime" = 10:00 p.m. - 7:00 a.m.
[3] Sound power level represents the total amount of acoustical energy (noise level) produced by a sound source independent of distance or surroundings. Sound power levels calculated using the CadnaA noise model at the reference distance to the noise source. Numbers may vary due to size differences between point and area noise sources.

8.2.1 MEASUREMENT PROCEDURES

The reference noise level measurements presented in this section were collected using a Larson Davis LxT Type 1 precisions sound level meter (serial number 01146). The LxT sound level meter was calibrated using a Larson-Davis calibrator, Model CAL 200, was programmed in "slow" mode to record noise levels in "A" weighted form and was located at approximately five feet above the ground elevation for each measurement. The sound level meters and microphones were equipped with a windscreen during all measurements. All noise level measurement equipment satisfies the American National Standards Institute (ANSI) standard specifications for sound level meters ANSI S1.4-2014/IEC 61672-1:2013. (17)

8.2.2 JACUZZI PUMP

To determine the noise levels associated with the Project jacuzzi pump units, Urban Crossroads collected reference noise level measurements of a similar pump in Coachella Valley. The jacuzzi pump reference noise level measured 52.1 dBA L_{eq} at 50 feet. For this noise analysis, outdoor gathering activity is expected operate continuously for 45 minutes per hour during the daytime hours and 30 minutes per hour during the nighttime hours and will be located three feet above the ground elevation.

8.2.3 OUTDOOR GATHERING

To assess the noise levels created by outdoor gathering activity, reference noise levels were based on the square footage of the area, number of people, and assuming raised voices. Assuming eight (8) people per gathering area the reference noise level is 49.8 dBA L_{eq} at 50 feet. For this noise analysis, outdoor gathering activity is expected operate continuously for 60 minutes per hour during the daytime hours and 30 minutes per hour during the nighttime hours and will be located five feet above the ground elevation.

8.3 CADNAA NOISE PREDICTION MODEL

To fully describe the exterior operational noise levels from the Project, Urban Crossroads, Inc. developed a noise prediction model using the CadnaA (Computer Aided Noise Abatement) computer program. CadnaA can analyze multiple types of noise sources using the spatially accurate Project site plan, georeferenced Nearmap aerial imagery, topography, buildings, and barriers in its calculations to predict outdoor noise levels.

Using the ISO 9613-2 protocol, CadnaA will calculate the distance from each noise source to the noise receiver locations, using the ground absorption, distance, and barrier/building attenuation inputs to provide a summary of noise level at each receiver and the partial noise level contributions by noise source. Consistent with the ISO 9613-2 protocol, the CadnaA noise prediction model relies on the reference sound power level (L_w) to describe individual noise sources. While sound pressure levels (e.g. L_{eq}) quantify in decibels the intensity of given sound sources at a reference distance, sound power levels (L_w) are connected to the sound source and are independent of distance. Sound pressure levels vary substantially with distance from the source and diminish because of intervening obstacles and barriers, air absorption, wind, and other factors. Sound power is the acoustical energy emitted by the sound source and is an absolute value that is not affected by the environment.

The operational noise level calculations provided in this noise study account for the distance attenuation provided due to geometric spreading, when sound from a localized stationary source (i.e., a point source) propagates uniformly outward in a spherical pattern. A default ground attenuation factor of 0.5 was used in the noise analysis to account for mixed ground representing a combination of hard and soft surfaces. Appendix 8.1 includes the detailed noise model inputs used to estimate the Project operational noise levels presented in this section.

8.4 PROJECT OPERATIONAL NOISE LEVELS

Using the reference noise levels to represent the proposed Project operations that include jacuzzi pumps and outdoor gatherings, Urban Crossroads, Inc. calculated the operational source noise levels that are expected to be generated at the Project site and the Project-related noise level increases that would be experienced at each of the sensitive receiver locations. Table 8-2 shows the Project operational noise levels during the daytime hours of 7:00 a.m. to 10:00 p.m. The daytime hourly noise levels at the off-site receiver locations are expected to range from 31.8 to 37.8 dBA L_{eq}.

Table 8-3 shows the Project operational noise levels during the nighttime hours of 10:00 p.m. to 7:00 a.m. The nighttime hourly noise levels at the off-site receiver locations are expected to range from 27.8 to 33.8 dBA L_{eq}. The differences between the daytime and nighttime noise levels are largely related to the duration of noise activity with minimal nighttime operations (Table 8-1).

TABLE 8-2: DAYTIME PROJECT OPERATIONAL NOISE LEVELS

Noise Source[1]	Daytime Noise Level (dBA L_{eq})		
	R1	R2	R3
Jacuzzi Pump	33.0	27.7	27.4
Outdoor Gathering	36.0	30.1	29.8
Total (All Noise Sources)	**37.8**	**32.1**	**31.8**

[1] See Exhibit 8-A for the noise source locations. CadnaA noise model calculations are included in Appendix 8.1.

TABLE 8-3: NIGHTTIME PROJECT OPERATIONAL NOISE LEVELS

Noise Source[1]	Nighttime Noise Level (dBA L_{eq})		
	R1	R2	R3
Jacuzzi Pump	29.0	23.7	23.4
Outdoor Gathering	32.0	26.2	25.8
Total (All Noise Sources)	**33.8**	**28.1**	**27.8**

[1] See Exhibit 8-A for the noise source locations. CadnaA noise model calculations are included in Appendix 8.1.

8.5 PROJECT OPERATIONAL NOISE LEVEL COMPLIANCE

To demonstrate compliance with local noise regulations, the Project-only operational noise levels are evaluated against exterior noise level thresholds based on the County of San Bernardino exterior noise level standards at nearest noise-sensitive receiver locations. Table 8-4 shows the operational noise levels associated with the Project will satisfy the County of San Bernardino exterior noise level standards at all nearby receiver locations. Therefore, the operational noise impacts are considered *less than significant* at the nearest noise-sensitive receiver locations.

TABLE 8-4: OPERATIONAL NOISE LEVEL COMPLIANCE

Receiver Location[1]	Project Operational Noise Levels (dBA L_{eq})[2]		Exterior Noise Level Standards (dBA L_{eq})[3]		Noise Level Standards Exceeded?[4]	
	Daytime	Nighttime	Daytime	Nighttime	Daytime	Nighttime
R1	37.8	33.8	55	45	No	No
R2	32.1	28.1	55	45	No	No
R3	31.8	27.8	55	45	No	No

[1] See Exhibit 6-A for the receiver locations.
[2] Proposed Project operational noise levels as shown in Tables 8-2 and 8-3.
[3] Exterior noise level standards are shown in Table 3-1.
[4] Do the estimated Project operational noise source activities exceed the noise level standards? "Daytime" = 7:01 a.m. to 10:00 p.m.; "Nighttime" = 10:01 p.m. to 7:00 a.m.

8.6 PROJECT OPERATIONAL NOISE LEVEL INCREASES

To describe the Project operational noise level increases, the Project operational noise levels are combined with the existing ambient noise levels measurements for the nearest receiver locations potentially impacted by Project operational noise sources. Since the units used to measure noise, decibels (dB), are logarithmic units, the Project-operational and existing ambient noise levels cannot be combined using standard arithmetic equations. (2) Instead, they must be logarithmically added using the following base equation:

$$SPL_{Total} = 10\log_{10}[10^{SPL1/10} + 10^{SPL2/10} + \ldots 10^{SPLn/10}]$$

Where "SPL1," "SPL2," etc. are equal to the sound pressure levels being combined, or in this case, the Project-operational and existing ambient noise levels. The difference between the combined Project and ambient noise levels describes the Project noise level increases to the existing ambient noise environment. As indicated on Tables 8-5 and 8-6, the Project will generate daytime and nighttime operational noise level increases ranging from 0.2 to 1.0 dBA L_{eq} at the nearest receiver locations. Project-related operational noise level increases will satisfy the operational noise level increase significance criteria presented on Table 4-1. Therefore, the incremental Project operational noise level increase is considered *less than significant* at all receiver locations.

TABLE 8-5: DAYTIME PROJECT OPERATIONAL NOISE LEVEL INCREASES

Receiver Location[1]	Total Project Operational Noise Level[2]	Measurement Location[3]	Reference Ambient Noise Levels[4]	Combined Project and Ambient[5]	Project Increase[6]	Increase Criteria[7]	Increase Criteria Exceeded?
R1	37.8	L2	46.0	46.6	0.6	5	No
R2	32.1	L1	40.7	41.3	0.6	5	No
R3	31.8	L3	37.7	38.7	1.0	5	No

[1] See Exhibit 6-A for the receiver locations.
[2] Total Project daytime operational noise levels as shown on Table 8-4.
[3] Reference noise level measurement locations as shown on Exhibit 5-A.
[4] Observed daytime ambient noise levels as shown on Table 5-1.
[5] Represents the combined ambient conditions plus the Project activities.
[6] The noise level increase expected with the addition of the proposed Project activities.
[7] Significance increase criteria as shown on Table 4-1.

TABLE 8-6: NIGHTTIME OPERATIONAL NOISE LEVEL INCREASES

Receiver Location[1]	Total Project Operational Noise Level[2]	Measurement Location[3]	Reference Ambient Noise Levels[4]	Combined Project and Ambient[5]	Project Increase[6]	Increase Criteria[7]	Increase Criteria Exceeded?
R1	33.8	L2	46.0	46.3	0.3	5	No
R2	28.1	L1	40.7	40.9	0.2	5	No
R3	27.8	L3	37.7	38.1	0.4	5	No

[1] See Exhibit 6-A for the receiver locations.
[2] Total Project nighttime operational noise levels as shown on Table 8-5.
[3] Reference noise level measurement locations as shown on Exhibit 5-A.
[4] Observed nighttime ambient noise levels as shown on Table 5-1.
[5] Represents the combined ambient conditions plus the Project activities.
[6] The noise level increase expected with the addition of the proposed Project activities.
[7] Significance increase criteria as shown on Table 4-1.

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9 CONSTRUCTION IMPACTS

This section analyzes potential impacts resulting from the short-term construction activities associated with the development of the Project. Exhibit 9-A shows the construction noise source activity location in relation to the nearest sensitive receiver locations previously described in Section 6. To prevent high levels of construction noise from impacting noise-sensitive land uses, County of San Bernardino Development Code Section 83.01.080(g)(3), states that construction activities are limited to the hours of 7:00 a.m. to 7:00 p.m. on any day and limited at any time on Sundays and federal holidays.

9.1 CONSTRUCTION NOISE LEVELS

Noise generated by the Project construction equipment will include a combination of trucks, power tools, concrete mixers, and portable generators that when combined can reach high levels. The number and mix of construction equipment are expected to occur in the following stages:

- Site Preparation
- Grading
- Structure Assembly
- Concrete pads/Paving

9.2 TYPICAL CONSTRUCTION REFERENCE NOISE LEVELS

To describe peak construction noise activities, this construction noise analysis was prepared using reference noise level measurements published in the *FHWA Road Construction Nosie Model* (RCNM) (18). The RCNM database provides a conservative source of reference construction noise levels. Table 9-1 provides a summary of the FHWA construction reference noise level measurements expressed in hourly average dBA L_{eq} using the estimated FHWA RCNM usage factors to describe the typical construction activities for each stage of Project construction (18).

EXHIBIT 9-A: CONSTRUCTION NOISE ACTIVITY

TABLE 9-1: CONSTRUCTION REFERENCE NOISE LEVELS

Construction Stage	Construction Equipment	Reference Noise Level @ 50 Feet (dBA L_{max})[1]	Reference Noise Level @ 50 Feet (dBA L_{eq})[1]	Composite Reference Noise Level (dBA L_{eq})
Site Preparation	Tractor	84.0	80.0	84.4
	Grader	85.0	81.0	
	Excavator	80.7	76.7	
Grading	Dozer	81.7	77.7	80.6
	Front End Loader	79.1	75.1	
	Backhoe	77.6	73.6	
Building Construction	Front End Loader	79.1	75.1	81.4
	Truck Crane	80.6	72.6	
	Flat Bed Truck	83.4	79.4	
Paving	Paver	77.2	74.2	77.8
	Roller	80.0	73.0	
	Vacuum Street Sweeper	81.6	71.6	

[1] FHWA's Roadway Construction Noise Model, January 2006.

9.3 CONSTRUCTION NOISE ANALYSIS

Using the reference construction equipment noise levels and the CadnaA noise prediction model, calculations of the Project construction noise level impacts at the nearest sensitive receiver locations were completed. To assess the worst-case construction noise levels, the Project construction noise analysis relies on the highest noise level impacts when equipment with the highest reference noise level is operating at the closest point from the edge of primary construction activity (Project site boundary) to each receiver location. This is simulated by modeling multiple pieces of construction as moving point sources. As shown on Table 9-2, the construction noise levels are expected to range from 48.7 to 61.5 dBA L_{eq}, and the highest construction levels are expected to range from 55.5 to 61.5 dBA L_{eq} at the nearest receiver locations. Appendix 9.1 includes the detailed CadnaA construction noise model inputs.

TABLE 9-2: CONSTRUCTION EQUIPMENT NOISE LEVEL SUMMARY

Receiver Location[1]	Construction Noise Levels (dBA L_{max})				
	Site Preparation	Grading	Building Construction	Paving	Highest Levels[2]
R1	61.5	58.2	59.9	54.7	61.5
R2	55.8	52.5	54.2	49.0	55.8
R3	55.5	52.2	53.9	48.7	55.5

[1] The nearest noise receiver locations are shown in Exhibit 9-A.
[2] Construction noise level calculations based on distance from the project site boundaries (construction activity area) to nearby receiver locations. CadnaA construction noise model inputs are included in Appendix 9.1.

9.4 CONSTRUCTION NOISE LEVEL COMPLIANCE

To evaluate whether the Project will generate potentially significant short-term noise levels at nearest receiver locations, a construction-related daytime noise level threshold of 80 dBA L_{eq} is used as a reasonable threshold to assess the daytime construction noise level impacts at residential locations. The construction noise analysis shows that the nearest receiver locations will satisfy the reasonable daytime significance thresholds shown in Table 4-1 during Project construction activities as shown on Table 9-3. Therefore, the noise impacts due to Project construction noise is considered *less than significant* at all receiver locations.

TABLE 9-3: CONSTRUCTION NOISE LEVEL COMPLIANCE

Receiver Location[1]	Construction Noise Levels (dBA L_{max})		
	Highest Construction Noise Levels[2]	Threshold[3]	Threshold Exceeded?[4]
R1	61.5	80	No
R2	55.8	80	No
R3	55.5	80	No

[1] All noise receiver locations are shown on Exhibit 6-A. The nearest noise receiver locations are shown in Exhibit 9-A.
[2] Highest construction noise level calculations based on distance from the construction noise source activity to nearby receiver locations as shown on Table 9-2.
[3] Construction noise level thresholds are limited to the noise sensitive receiver locations (Section 3.5).
[4] Do the estimated Project construction noise levels exceed the construction noise level threshold?

9.6 CONSTRUCTION VIBRATION IMPACTS

Construction activity can result in varying degrees of ground vibration, depending on the equipment and methods used, distance to the affected structures and soil type. It is expected that ground-borne vibration from Project construction activities would cause only intermittent, localized intrusion. Ground-borne vibration levels resulting from typical construction activities occurring within the Project site were estimated by data published by the Federal Transit Administration (FTA) (7) and Caltrans (19). However, while vehicular traffic is rarely perceptible, construction has the potential to result in varying degrees of temporary ground vibration, depending on the specific construction activities and equipment used.

Ground vibration levels associated with various types of construction equipment are summarized on Table 9-4. Based on the representative vibration levels presented for various construction equipment types, it is possible to estimate the potential Project construction vibration levels using the following vibration assessment methods defined by Caltrans. Caltrans provides the following equation: $PPV_{equip} = PPV_{ref} \times (25/D)^{1.5}$ (8).

TABLE 9-4: VIBRATION SOURCE LEVELS FOR CONSTRUCTION EQUIPMENT

Equipment	PPV (in/sec) at 25 feet
Small bulldozer	0.003
Jackhammer	0.035
Loaded Trucks	0.076
Large bulldozer	0.089

Federal Transit Administration, Transit Noise and Vibration Impact Assessment Manual

Table 9-5 presents the expected Project related vibration levels at the nearby receiver locations. At distances ranging from 157 feet to 405 feet from Project construction activities (at the Project site boundary), construction vibration levels are estimated to range from 0.00 to 0.01 in/sec PPV and will remain below the County of San Bernardino 0.2 in/sec PPV threshold for vibration at all receiver locations. Therefore, the Project-related vibration impacts are considered *less than significant* during the construction activities at the Project site.

Further, vibration levels at the site of the closest sensitive receiver are unlikely to be sustained during the entire construction period but will occur rather only during the times that heavy construction equipment is operating simultaneously adjacent to the Project site perimeter.

TABLE 9-5: PROJECT CONSTRUCTION VIBRATION LEVELS

Receiver[1]	Distance to Const. Activity (Feet)[2]	Typical Construction Vibration Levels PPV (in/sec)[3]					Thresholds PPV (in/sec)[4]	Thresholds Exceeded?[5]
		Small bulldozer	Jackhammer	Loaded Trucks	Large bulldozer	Highest Vibration Level		
R1	157'	0.00	0.00	0.00	0.01	0.01	0.20	No
R2	389'	0.00	0.00	0.00	0.00	0.00	0.20	No
R3	405'	0.00	0.00	0.00	0.00	0.00	0.20	No

[1] Receiver locations are shown on Exhibit 6-A.
[2] Distance from Project construction boundary to the receiver building structure.
[3] Based on the Vibration Source Levels of Construction Equipment (Table 9-4).
[4] Caltrans 2020.
[5] Does the peak vibration exceed the acceptable vibration thresholds?
"PPV" = Peak Particle Velocity

10 REFERENCES

1. **State of California.** *California Environmental Quality Act, Appendix G.* 2018.
2. **California Department of Transportation Environmental Program.** *Technical Noise Supplement - A Technical Supplement to the Traffic Noise Analysis Protocol.* Sacramento, CA : s.n., September 2013.
3. **Environmental Protection Agency Office of Noise Abatement and Control.** *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety.* March 1974. EPA/ONAC 550/9/74-004.
4. **U.S. Department of Transportation, Federal Highway Administration, Office of Environment and Planning, Noise and Air Quality Branch.** *Highway Traffic Noise Analysis and Abatement Policy and Guidance.* December 2011.
5. **U.S. Department of Transportation, Federal Highway Administration.** *Highway Traffic Noise in the United States, Problem and Response.* April 2000. p. 3.
6. **U.S. Environmental Protection Agency Office of Noise Abatement and Control.** *Noise Effects Handbook-A Desk Reference to Health and Welfare Effects of Noise.* October 1979 (revised July 1981). EPA 550/9/82/106.
7. **U.S. Department of Transportation, Federal Transit Administration.** *Transit Noise and Vibration Impact Assessment Manual, FTA Report No. 0123.* September 2018.
8. **California Department of Transportation.** *Transportation and Construciton Vibration Guidance Manual.* April 2020.
9. **U.S. Department of Transportation, Federal Transit Administration.** *Transit Noise and Vibration Impact Assessment Manual, FTA-VA-90-1003-06.* May 2006.
10. **Office of Planning and Research.** *State of California General Plan Guidelines.* October 2017.
11. **County of San Bernardino.** *General Plan Noise Element.* April 2007.
12. —. *Code of Ordinances, Title 8 Development Code, Chapter 83.01 General Performance Standards.*
13. **California Court of Appeal.** *Gray v. County of Madera, F053661.* 167 Cal.App.4th 1099; - Cal.Rptr.3d, October 2008.
14. **Federal Interagency Committee on Noise.** *Federal Agency Review of Selected Airport Noise Analysis Issues.* August 1992.
15. **California Department of Transportation.** *Technical Noise Supplement.* November 2009.
16. **American National Standards Institute (ANSI).** *Specification for Sound Level Meters ANSI S1.4-2014/IEC 61672-1:2013.*
17. —. *Specification for Sound Level Meters ANSI S1.4-2014/IEC 61672-1:2013.*
18. **U.S. Department of Transportation, Federal Highway Administration.** *Road Construction Noise Model, version 1.0.* 2006.
19. **California Department of Transportation.** *Transportation and Construction Vibration Guidance Manual.* April 2020.

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11 CERTIFICATION

The contents of this noise study report represent an accurate depiction of the noise environment and impacts associated with the proposed Stonehill Avenue Camp Site Project. The information contained in this noise study report is based on the best available data at the time of preparation. If you have any questions, please contact me directly at (619) 778-1971.

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EDUCATION

Bachelor of Science in Urban and Regional Planning
California Polytechnic State University, Pomona • June 2000

PROFESSIONAL AFFILIATIONS

ASA – Acoustical Society of America
AEP – Association of Environmental Planners
AWMA – Air and Waste Management Association
INCE – Institute of Noise Control Engineers

PROFESSIONAL CERTIFICATIONS

Approved Acoustical Consultant • County of San Diego
FHWA Traffic Noise Model of Training • November 2004
CadnaA Basic and Advanced Training Certificate • October 2008.

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APPENDIX 3.1:

COUNTY OF SAN BERNARDINO DEVELOPMENT CODE

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§ 83.01.080. Noise.

Latest version.

This Section establishes standards concerning acceptable noise levels for both noise-sensitive land uses and for noise-generating land uses.

(a) *Noise Measurement.* Noise shall be measured:

(1) At the property line of the nearest site that is occupied by, and/or zoned or designated to allow the development of noise-sensitive land uses;

(2) With a sound level meter that meets the standards of the American National Standards Institute (ANSI § SI4 1979, Type 1 or Type 2);

(3) Using the "A" weighted sound pressure level scale in decibels (ref. pressure = 20 micronewtons per meter squared). The unit of measure shall be designated as dB(A).

(b) *Noise Impacted Areas.* Areas within the County shall be designated as "noise-impacted" if exposed to existing or projected future exterior noise levels from mobile or stationary sources exceeding the standards listed in Subdivision (d) (Noise Standards for Stationary Noise Sources) and Subdivision (e) (Noise Standards for Adjacent Mobile Noise Sources), below. New development of residential or other noise-sensitive land uses shall not be allowed in noise-impacted areas unless effective mitigation measures are incorporated into the project design to reduce noise levels to these standards. Noise-sensitive land uses shall include residential uses, schools, hospitals, nursing homes, religious institutions, libraries, and similar uses.

(c) *Noise Standards for Stationary Noise Sources.*

(1) *Noise Standards.* Table 83-2 (Noise Standards for Stationary Noise Sources) describes the noise standard for emanations from a stationary noise source, as it affects adjacent properties:

Table 83-2		
Noise Standards for Stationary Noise Sources		
Affected Land Uses (Receiving Noise)	7:00 a.m. - 10:00 p.m. Leq	10:00 p.m. - 7:
Residential	55 dB(A)	45

Professional Services	55 dB(A)	55
Other Commercial	60 dB(A)	60
Industrial	70 dB(A)	70

Leq = (Equivalent Energy Level). The sound level corresponding to a steady-state sound level co same total energy as a time-varying signal over a given sample period, typically one, eight or 24

dB(A) = (A-weighted Sound Pressure Level). The sound pressure level, in decibels, as measured level meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very lo high frequency components of the sound, placing greater emphasis on those frequencies within range of the human ear.

Ldn = (Day-Night Noise Level). The average equivalent A-weighted sound level during a 24-hour by adding 10 decibels to the hourly noise levels measured during the night (from 10:00 p.m. to 7 this way Ldn takes into account the lower tolerance of people for noise during nighttime periods.

(2) *Noise Limit Categories.* No person shall operate or cause to be operated a source of sound at a location or allow the creation of noise on property owned, leased, occupied, or otherwise controlled by the person, which causes the noise level, when measured on another property, either incorporated or unincorporated, to exceed any one of the following:

(A) The noise standard for the receiving land use as specified in Subdivision (b) (Noise-Impacted Areas), above, for a cumulative period of more than 30 minutes in any hour.

(B) The noise standard plus five dB(A) for a cumulative period of more than 15 minutes in any hour.

(C) The noise standard plus ten dB(A) for a cumulative period of more than five minutes in any hour.

(D) The noise standard plus 15 dB(A) for a cumulative period of more than one minute in any hour.

(E) The noise standard plus 20 dB(A) for any period of time.

(d) *Noise Standards for Adjacent Mobile Noise Sources.* Noise from mobile sources may affect adjacent properties adversely. When it does, the noise shall be mitigated for any new development to a level that shall not exceed the standards described in the following Table 83-3 (Noise Standards for Adjacent Mobile Noise Sources).

Table 83-3

Noise Standards for Adjacent Mobile Noise Sources

Land Use		Ldn (or CNEL) dB(A)	
Categories	Uses	Interior (1)	Exteri
Residential	Single and multi-family, duplex, mobile homes		
Commercial	Hotel, motel, transient housing		
Commercial retail, bank, restaurant	50		
Office building, research and development,	45		

professional offices	
Amphitheater, concert hall, auditorium, movie theater	45
Institutional/Public	Hospital, nursing home, school classroom, religious institution, library
Open Space	Park
Notes:	
(1) The indoor environment shall exclude bathrooms, kitchens, toilets, closets and corridors.	
(2) The outdoor environment shall be limited to: · Hospital/office building patios · Hotel and motel recreation areas · Mobile home parks · Multi-family private patios or balconies · Park picnic areas · Private yard of single-family dwellings · School playgrounds	
(3) An exterior noise level of up to 65 dB(A) (or CNEL) shall be allowed provided exterior noise le been substantially mitigated through a reasonable application of the best available noise reductio and interior noise exposure does not exceed 45 dB(A) (or CNEL) with windows and doors closed that windows and doors remain closed to achieve an acceptable interior noise level shall necess of air conditioning or mechanical ventilation.	
CNEL = (Community Noise Equivalent Level). The average equivalent A-weighted so during a 24-hour day, obtained after addition of approximately five decibels to sound evening from 7:00 p.m. to 10:00 p.m. and ten decibels to sound levels in the night fro p.m. to 7:00 a.m.	

(e) *Increases in Allowable Noise Levels.* If the measured ambient level exceeds any of the first four noise limit categories in Subdivision (d)(2), above, the allowable noise exposure standard shall be increased to reflect the ambient noise level. If the ambient noise level exceeds the fifth noise limit category in Subdivision (d)(2), above, the maximum allowable noise level under this category shall be increased to reflect the maximum ambient noise level.

(f) *Reductions in Allowable Noise Levels.* If the alleged offense consists entirely of impact noise or simple tone noise, each of the noise levels in Table 83-2 (Noise Standards for Stationary Noise Sources) shall be reduced by five dB(A).

(g) *Exempt Noise.* The following sources of noise shall be exempt from the regulations of this Section:

(1) Motor vehicles not under the control of the commercial or industrial use.

(2) Emergency equipment, vehicles, and devices.

(3) Temporary construction, maintenance, repair, or demolition activities between 7:00 a.m. and 7:00 p.m., except Sundays and Federal holidays.

(h) *Noise Standards for Other Structures.* All other structures shall be sound attenuated against the combined input of all present and projected exterior noise to not exceed the criteria.

Table 83-4	
Noise Standards for Other Structures	
Typical Uses	12-Hour Equivalent Sound Leve dBA Ldn
Educational, institutions, libraries, meeting facilities, etc.	45
General office, reception, etc.	50
Retail stores, restaurants, etc.	55
Other areas for manufacturing, assembly, testing, warehousing, etc.	65

In addition, the average of the maximum levels on the loudest of intrusive sounds occurring during a 24-hour period shall not exceed 65 dBA interior.

(Ord. 4011, passed - -2007; Am. Ord. 4245, passed - -2014)

APPENDIX 5.1:

STUDY AREA PHOTOS

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15024 - Stonehill Ave Camp Site

15024_L1_E
34, 12' 28.525680"116, 17' 42.089279"

15024_L1_N
34, 12' 28.533239"116, 17' 42.172799"

15024_L1_S
34, 12' 28.514520"116, 17' 42.101520"

15024_L1_W
34, 12' 28.535039"116, 17' 42.164879"

15024 - Stonehill Ave Camp Site

15024_L2_E
34, 12' 41.240520"116, 17' 38.547600"

15024_L2_N
34, 12' 44.239320"116, 17' 37.847759"

15024_L2_S
34, 12' 41.260320"116, 17' 38.564880"

15024_L2_W
34, 12' 41.230799"116, 17' 38.533559"

15024 - Stonehill Ave Camp Site

15024_L3_E
34, 12' 44.252280"116, 17' 37.863600"

15024_L3_N
34, 12' 41.250239"116, 17' 38.500440"

15024_L3_S
34, 12' 44.254080"116, 17' 37.875480"

15024_L3_W
34, 12' 44.255519"116, 17' 37.879080"

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APPENDIX 5.2:

NOISE LEVEL MEASUREMENT WORKSHEETS

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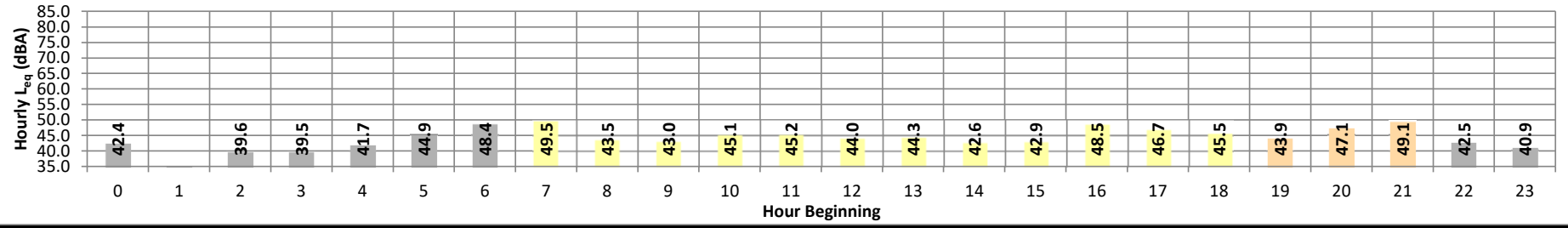
24-Hour Noise Level Measurement Summary

Date: Saturday, December 3, 2022 *Location:* L2 - Located to the east of the Project site near the residence at 2083 Stonehill Avenue *Meter:* Piccolo II *JN:* 15269

Project: Stonehill Avenue Camponmg *Analyst:* B. Maddux

Hourly L_{eq} dBA Readings (unadjusted)



Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%	L_{eq}	Adj.	Adj. L_{eq}
Night	0	42.4	45.9	35.8	45.8	45.6	45.4	45.3	44.3	41.5	36.9	36.3	35.9	42.4	10.0	52.4
	1	33.7	35.9	30.9	35.9	35.9	35.8	35.7	35.0	33.3	31.2	31.0	31.0	33.7	10.0	43.7
	2	39.6	45.9	33.3	45.9	45.8	45.1	44.2	40.3	37.7	33.8	33.6	33.3	39.6	10.0	49.6
	3	39.5	43.5	34.5	43.5	43.4	43.2	43.0	40.7	38.6	35.4	35.0	34.6	39.5	10.0	49.5
	4	41.7	45.7	35.9	45.6	45.6	45.4	45.0	43.4	40.9	36.8	36.3	36.0	41.7	10.0	51.7
	5	44.9	48.2	38.1	48.1	48.1	47.9	47.7	46.5	44.3	39.9	39.1	38.3	44.9	10.0	54.9
	6	48.4	52.3	42.2	52.2	52.1	51.8	51.5	50.0	47.6	43.2	42.7	42.3	48.4	10.0	58.4
Day	7	49.5	52.9	44.5	52.9	52.8	52.5	52.2	50.9	49.0	45.5	45.0	44.6	49.5	0.0	49.5
	8	43.5	47.3	38.4	47.2	47.1	46.9	46.6	45.2	42.7	39.0	38.7	38.4	43.5	0.0	43.5
	9	43.0	47.0	37.3	46.9	46.8	46.5	46.3	44.6	42.0	38.2	37.7	37.4	43.0	0.0	43.0
	10	45.1	49.5	38.2	49.5	49.4	49.0	48.6	46.9	43.9	39.3	38.8	38.3	45.1	0.0	45.1
	11	45.2	48.9	40.0	48.8	48.7	48.4	48.2	46.8	44.4	40.8	40.4	40.1	45.2	0.0	45.2
	12	44.0	48.1	37.3	48.1	48.0	47.7	47.4	45.8	43.0	38.7	37.9	37.4	44.0	0.0	44.0
	13	44.3	47.7	38.6	47.7	47.6	47.4	47.2	45.9	43.6	39.8	39.2	38.7	44.3	0.0	44.3
	14	42.6	46.3	36.7	46.3	46.2	45.9	45.7	44.3	41.9	37.8	37.2	36.8	42.6	0.0	42.6
	15	42.9	46.2	38.0	46.1	46.0	45.8	45.6	44.3	42.2	39.0	38.5	38.1	42.9	0.0	42.9
	16	48.5	51.9	43.9	51.8	51.8	51.6	51.3	49.8	47.8	44.8	44.3	44.0	48.5	0.0	48.5
	17	46.7	50.4	41.1	50.4	50.3	50.1	49.9	48.4	45.9	42.3	41.6	41.2	46.7	0.0	46.7
	18	45.5	49.2	41.0	49.1	49.1	48.7	48.5	47.0	44.6	41.7	41.4	41.1	45.5	0.0	45.5
Evening	19	43.9	47.4	40.0	47.3	47.2	46.9	46.5	45.1	43.4	40.7	40.4	40.1	43.9	5.0	48.9
	20	47.1	50.3	42.4	50.3	50.2	50.0	49.8	48.4	46.6	43.3	42.9	42.5	47.1	5.0	52.1
	21	49.1	52.6	42.8	52.5	52.5	52.3	52.0	50.8	48.5	44.0	43.5	43.0	49.1	5.0	54.1
Night	22	42.5	45.7	38.9	45.6	45.5	45.3	45.0	43.6	42.0	39.5	39.2	38.9	42.5	10.0	52.5
	23	40.9	44.3	37.2	44.2	44.1	43.8	43.5	41.8	40.4	38.0	37.7	37.3	40.9	10.0	50.9

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	42.6	46.2	36.7	46.1	46.0	45.8	45.6	44.3	41.9	37.8	37.2	36.8
(7am-7pm)	Max	49.5	52.9	44.5	52.9	52.8	52.5	52.2	50.9	49.0	45.5	45.0	44.6
Energy Average		45.6	Average:		48.7	48.6	48.4	48.1	46.7	44.2	40.6	40.1	39.7
Evening	Min	43.9	47.4	40.0	47.3	47.2	46.9	46.5	45.1	43.4	40.7	40.4	40.1
(7pm-10pm)	Max	49.1	52.6	42.8	52.5	52.5	52.3	52.0	50.8	48.5	44.0	43.5	43.0
Energy Average		47.2	Average:		50.0	50.0	49.7	49.5	48.1	46.2	42.7	42.2	41.9
Night	Min	33.7	35.9	30.9	35.9	35.9	35.8	35.7	35.0	33.3	31.2	31.0	31.0
(10pm-7am)	Max	48.4	52.3	42.2	52.2	52.1	51.8	51.5	50.0	47.6	43.2	42.7	42.3
Energy Average		43.1	Average:		45.2	45.1	44.8	44.6	42.8	40.7	37.2	36.8	36.4

L_{eq} (dBA)		
24-Hour	*Daytime (7am-10pm)*	*Nighttime (10pm-7am)*
45.1	**46.0**	**43.1**

24-Hour CNEL (dBA)

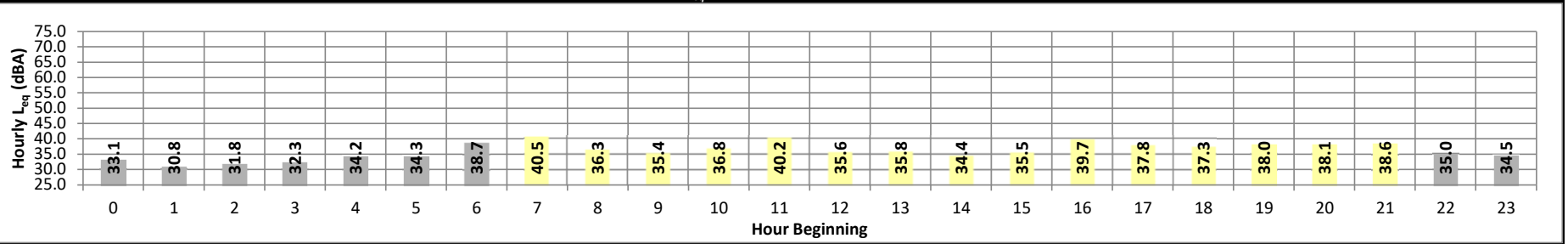
50.6

24-Hour Noise Level Measurement Summary

Date: Saturday, December 3, 2022 *Location:* L3 - Located along Polaris Avenue north of Moonlight Mesa *Meter:* Piccolo II *JN:* 15269

Project: Stonehill Avenue Camp *Source:* Street. *Analyst:* B. Maddux

Hourly L_{eq} dBA Readings (unadjusted)



Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%	L_{eq}	Adj.	Adj. L_{eq}
Night	0	33.1	36.8	30.5	36.5	36.0	35.3	35.1	33.9	32.9	30.8	30.7	30.6	33.1	10.0	43.1
	1	30.8	32.3	30.3	32.2	32.0	31.8	31.6	31.0	30.6	30.3	30.3	30.3	30.8	10.0	40.8
	2	31.8	35.0	30.3	34.8	34.6	34.2	33.8	32.7	30.9	30.4	30.4	30.3	31.8	10.0	41.8
	3	32.3	35.5	30.2	35.2	35.0	34.7	34.5	33.2	31.7	30.3	30.2	30.2	32.3	10.0	42.3
	4	34.2	39.1	30.6	38.7	38.3	37.6	37.2	35.5	33.4	30.9	30.8	30.6	34.2	10.0	44.2
	5	34.3	39.0	30.8	38.6	38.4	37.8	37.4	35.4	33.1	31.1	30.9	30.8	34.3	10.0	44.3
	6	38.7	44.6	33.9	43.9	43.2	42.2	41.6	39.6	37.9	35.1	34.7	34.0	38.7	10.0	48.7
Day	7	40.5	45.7	35.3	45.5	45.2	44.6	44.1	41.8	39.0	36.2	35.8	35.4	40.5	0.0	40.5
	8	36.3	40.8	33.2	40.6	40.4	39.7	39.2	37.2	35.3	33.7	33.5	33.2	36.3	0.0	36.3
	9	35.4	38.8	33.0	38.6	38.3	37.6	37.2	36.1	35.0	33.5	33.3	33.1	35.4	0.0	35.4
	10	36.8	41.5	33.5	41.2	40.9	40.2	39.6	37.6	35.8	34.1	33.9	33.6	36.8	0.0	36.8
	11	40.2	46.3	34.7	45.8	45.4	44.5	43.8	41.3	38.9	35.7	35.2	34.9	40.2	0.0	40.2
	12	35.6	40.8	32.5	40.5	40.1	39.2	38.6	36.2	34.5	33.0	32.8	32.6	35.6	0.0	35.6
	13	35.8	40.2	32.4	39.8	39.5	38.8	38.4	36.7	35.0	33.0	32.8	32.5	35.8	0.0	35.8
	14	34.4	40.0	31.6	39.2	38.4	37.2	36.6	35.2	33.8	32.1	31.9	31.7	34.4	0.0	34.4
	15	35.5	40.2	31.7	39.8	39.6	38.9	38.3	36.6	34.7	32.4	32.1	31.8	35.5	0.0	35.5
	16	39.7	44.9	34.2	44.6	44.3	43.4	43.0	40.9	38.6	35.4	34.8	34.3	39.7	0.0	39.7
	17	37.8	44.2	31.8	44.0	43.6	42.8	42.2	39.5	34.6	32.2	32.1	31.9	37.8	0.0	37.8
	18	37.3	43.5	32.7	43.1	42.7	41.4	40.6	38.1	35.9	33.5	33.2	32.8	37.3	0.0	37.3
	19	38.0	45.6	32.8	44.9	44.2	42.6	41.6	38.8	36.4	33.7	33.3	32.9	38.0	5.0	43.0
	20	38.1	43.6	32.4	43.1	42.7	41.9	41.4	39.5	37.1	33.2	32.8	32.5	38.1	5.0	43.1
	21	38.6	43.7	34.0	43.4	43.1	42.3	41.8	39.8	37.5	34.9	34.6	34.2	38.6	5.0	43.6
Night	22	35.0	41.5	31.6	41.1	40.5	39.1	38.0	35.4	33.7	32.1	31.9	31.7	35.0	10.0	45.0
	23	34.5	41.3	30.9	41.0	40.4	39.2	38.0	34.9	32.8	31.2	31.1	30.9	34.5	10.0	44.5

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	34.4	38.8	31.6	38.6	38.3	37.2	36.6	35.2	33.8	32.1	31.9	31.7
	Max	40.5	46.3	35.3	45.8	45.4	44.6	44.1	41.8	39.0	36.2	35.8	35.4
Energy Average		37.7	Average:		42.3	41.9	41.0	40.4	38.4	36.1	33.8	33.5	33.2
Night	Min	30.8	32.3	30.2	32.2	32.0	31.8	31.6	31.0	30.6	30.3	30.2	30.2
	Max	38.7	44.6	33.9	43.9	43.2	42.2	41.6	39.6	37.9	35.1	34.7	34.0
Energy Average		34.5	Average:		38.0	37.6	36.9	36.3	34.6	33.0	31.4	31.2	31.0

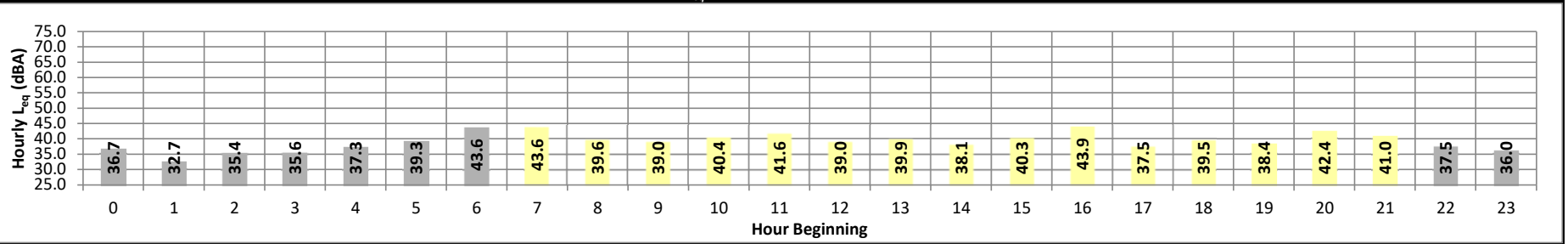
L_{eq} (dBA)		
24-Hour	Daytime (7am-10pm)	Nighttime (10pm-7am)
36.8	**37.7**	**34.5**

24-Hour Noise Level Measurement Summary

Date: Saturday, December 3, 2022 *Location:* L1 - Located to the southeast of the Project site near the *Meter:* Piccolo II *JN:* 15269

Project: Stonehill Avenue Camp *Source:* residence at 2084 Border Avenue. *Analyst:* B.Maddux

Hourly L_{eq} dBA Readings (unadjusted)



Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%	L_{eq}	Adj.	Adj. L_{eq}
Night	0	36.7	43.6	31.7	43.4	43.2	42.2	41.1	37.8	33.4	31.8	31.7	31.7	36.7	10.0	46.7
	1	32.7	35.7	31.5	35.5	35.3	34.8	34.6	33.1	31.9	31.6	31.5	31.5	32.7	10.0	42.7
	2	35.4	42.5	31.6	42.1	41.7	40.2	39.6	35.7	32.9	31.7	31.7	31.6	35.4	10.0	45.4
	3	35.6	42.2	31.5	42.1	42.0	41.2	39.3	36.7	33.1	31.6	31.6	31.5	35.6	10.0	45.6
	4	37.3	43.5	31.8	43.1	42.8	42.1	41.6	38.5	35.3	32.0	31.9	31.9	37.3	10.0	47.3
	5	39.3	46.6	32.0	46.1	45.9	45.3	44.9	39.5	35.0	32.3	32.1	32.0	39.3	10.0	49.3
	6	43.6	51.0	34.6	50.7	50.3	49.5	48.9	44.5	39.5	35.5	35.1	34.7	43.6	10.0	53.6
Day	7	43.6	49.9	36.3	49.7	49.4	48.8	48.1	44.8	41.3	37.4	36.9	36.5	43.6	0.0	43.6
	8	39.6	46.0	34.4	45.8	45.5	44.7	43.9	40.2	37.4	35.0	34.8	34.5	39.6	0.0	39.6
	9	39.0	45.3	33.8	45.1	44.9	44.3	43.5	39.8	36.5	34.3	34.1	33.9	39.0	0.0	39.0
	10	40.4	47.2	34.3	46.9	46.6	45.9	45.3	40.9	37.6	34.9	34.6	34.4	40.4	0.0	40.4
	11	41.6	47.5	35.6	47.2	46.9	46.3	45.8	42.8	39.8	36.5	36.1	35.8	41.6	0.0	41.6
	12	39.0	45.3	33.4	45.1	44.8	44.1	43.6	39.7	36.6	33.9	33.6	33.4	39.0	0.0	39.0
	13	39.9	47.6	33.1	47.0	46.4	45.2	44.5	40.7	36.9	33.6	33.4	33.2	39.9	0.0	39.9
	14	38.1	45.6	32.6	44.9	44.4	43.5	42.6	38.6	35.4	33.1	32.9	32.7	38.1	0.0	38.1
	15	40.3	46.8	32.5	46.5	46.3	45.7	45.2	41.3	37.2	33.1	32.9	32.6	40.3	0.0	40.3
	16	43.9	50.5	34.9	50.3	49.9	49.3	48.8	45.2	40.9	36.2	35.7	35.1	43.9	0.0	43.9
	17	37.5	42.7	33.0	42.4	42.1	41.4	41.0	38.4	36.1	33.7	33.3	33.1	37.5	0.0	37.5
	18	39.5	46.5	34.3	46.0	45.3	44.0	43.0	40.0	38.0	35.3	34.9	34.4	39.5	0.0	39.5
	19	38.4	44.6	33.6	44.1	43.6	42.4	41.7	39.4	37.1	34.6	34.2	33.7	38.4	5.0	43.4
	20	42.4	49.6	33.2	49.3	49.1	48.4	47.6	43.1	39.0	34.1	33.6	33.3	42.4	5.0	47.4
	21	41.0	47.7	34.7	47.4	47.0	46.1	45.6	42.0	38.6	35.5	35.2	34.8	41.0	5.0	46.0
Night	22	37.5	44.2	32.7	43.9	43.5	42.1	41.0	38.4	35.8	33.2	33.0	32.8	37.5	10.0	47.5
	23	36.0	43.4	32.4	43.1	42.6	40.8	39.5	36.1	34.3	32.7	32.6	32.4	36.0	10.0	46.0

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	37.5	42.7	32.5	42.4	42.1	41.4	41.0	38.4	35.4	33.1	32.9	32.6
	Max	43.9	50.5	36.3	50.3	49.9	49.3	48.8	45.2	41.3	37.4	36.9	36.5
Energy Average		40.7	Average:		46.5	46.2	45.4	44.7	41.1	37.9	34.7	34.4	34.1
Night	Min	32.7	35.7	31.5	35.5	35.3	34.8	34.6	33.1	31.9	31.6	31.5	31.5
	Max	43.6	51.0	34.6	50.7	50.3	49.5	48.9	44.5	39.5	35.5	35.1	34.7
Energy Average		38.3	Average:		43.3	43.0	42.0	41.2	37.8	34.6	32.5	32.4	32.2

L_{eq} (dBA)		
24-Hour	Daytime (7am-10pm)	Nighttime (10pm-7am)
39.9	**40.7**	**38.3**

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APPENDIX 8.1:

CADNAA OPERATIONAL NOISE MODEL INPUTS

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15269 - Stonehill Ave Camp Site - Operation

CadnaA Noise Prediction Model: 15269-02_Operation.cna
Date: 13.12.22
Analyst: B. Maddux

Calculation Configuration

Configuration	
Parameter	**Value**
General	
Max. Error (dB)	**0.00**
Max. Search Radius (#(Unit,LEN))	**2000.01**
Min. Dist Src to Rcvr	**0.00**
Partition	
Raster Factor	**0.50**
Max. Length of Section (#(Unit,LEN))	**999.99**
Min. Length of Section (#(Unit,LEN))	**1.01**
Min. Length of Section (%)	**0.00**
Proj. Line Sources	**On**
Proj. Area Sources	**On**
Ref. Time	
Reference Time Day (min)	**960.00**
Reference Time Night (min)	**480.00**
Daytime Penalty (dB)	**0.00**
Recr. Time Penalty (dB)	**5.00**
Night-time Penalty (dB)	**10.00**
DTM	
Standard Height (m)	**0.00**
Model of Terrain	**Triangulation**
Reflection	
max. Order of Reflection	**2**
Search Radius Src	**100.00**
Search Radius Rcvr	**100.00**
Max. Distance Source - Rcvr	**1000.00 1000.00**
Min. Distance Rvcr - Reflector	**1.00 1.00**
Min. Distance Source - Reflector	**0.10**
Industrial (ISO 9613)	
Lateral Diffraction	**some Obj**
Obst. within Area Src do not shield	**On**
Screening	**Incl. Ground Att. over Barrier**
	Dz with limit (20/25)
Barrier Coefficients C1,2,3	**3.0 20.0 0.0**
Temperature (#(Unit,TEMP))	**10**
rel. Humidity (%)	**70**
Ground Absorption G	**0.50**
Wind Speed for Dir. (#(Unit,SPEED))	**3.0**
Roads (TNM)	
Railways (FTA/FRA)	
Aircraft (???)	
Strictly acc. to AzB	

Receiver Noise Levels

Name	M.	ID	Level Lr			Limit. Value			Land Use			Height		Coordinates		
			Day	Night	CNEL	Day	Night	CNEL	Type	Auto	Noise Type			X	Y	Z
			(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)				(ft)		(ft)	(ft)	(ft)
R1		R1	37.8	33.8	40.8	0.0	0.0	0.0		x	Total	5.00	r	6546259.33	2386377.35	5.00
R2		R2	32.1	28.1	35.1	0.0	0.0	0.0		x	Total	5.00	r	6546488.50	2386114.32	5.00
R3		R3	31.8	27.8	34.8	0.0	0.0	0.0		x	Total	5.00	r	6545394.75	2386106.51	5.00

Point Source(s)

Name	M.	ID	Result. PWL			Lw / Li			Operating Time			Height		Coordinates		
			Day	Evening	Night	Type	Value	norm.	Day	Special	Night			X	Y	Z
			(dBA)	(dBA)	(dBA)			dB(A)	(min)	(min)	(min)	(ft)		(ft)	(ft)	(ft)
Gathering1		Gathering1	81.4	81.4	81.4	Lw	81.4		900.00	0.00	270.00	3.00	a	6545901.09	2386414.83	3.00
Gathering2		Gathering2	81.4	81.4	81.4	Lw	81.4		900.00	0.00	270.00	3.00	a	6545999.27	2386414.31	3.00
Gathering3		Gathering3	81.4	81.4	81.4	Lw	81.4		900.00	0.00	270.00	3.00	a	6545999.10	2386180.82	3.00
Gathering4		Gathering4	81.4	81.4	81.4	Lw	81.4		900.00	0.00	270.00	3.00	a	6545902.06	2386180.55	3.00
Pump1		Pump1	83.7	83.7	83.7	Lw	83.7		900.00	0.00	270.00	3.00	a	6545884.90	2386224.17	3.00
Pump2		Pump2	83.7	83.7	83.7	Lw	83.7		900.00	0.00	270.00	3.00	a	6546016.67	2386221.04	3.00
Pump3		Pump3	83.7	83.7	83.7	Lw	83.7		900.00	0.00	270.00	3.00	a	6546022.92	2386375.21	3.00
Pump4		Pump4	83.7	83.7	83.7	Lw	83.7		900.00	0.00	270.00	3.00	a	6545882.29	2386374.17	3.00

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APPENDIX 9.1:

CADNAA CONSTRUCTION NOISE LEVEL CALCULATIONS

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15269 - Stonehill Ave Camp Site

CadnaA Noise Prediction Model: 15269-02_Construction.cna
Date: 13.12.22
Analyst: B. Maddux

Calculation Configuration

Configuration	
Parameter	**Value**
General	
Max. Error (dB)	**0.00**
Max. Search Radius (#(Unit,LEN))	**2000.01**
Min. Dist Src to Rcvr	**0.00**
Partition	
Raster Factor	**0.50**
Max. Length of Section (#(Unit,LEN))	**999.99**
Min. Length of Section (#(Unit,LEN))	**1.01**
Min. Length of Section (%)	**0.00**
Proj. Line Sources	**On**
Proj. Area Sources	**On**
Ref. Time	
Reference Time Day (min)	**960.00**
Reference Time Night (min)	**480.00**
Daytime Penalty (dB)	**0.00**
Recr. Time Penalty (dB)	**5.00**
Night-time Penalty (dB)	**10.00**
DTM	
Standard Height (m)	**0.00**
Model of Terrain	**Triangulation**
Reflection	
max. Order of Reflection	**2**
Search Radius Src	**100.00**
Search Radius Rcvr	**100.00**
Max. Distance Source - Rcvr	**1000.00 1000.00**
Min. Distance Rvcr - Reflector	**1.00 1.00**
Min. Distance Source - Reflector	**0.10**
Industrial (ISO 9613)	
Lateral Diffraction	**some Obj**
Obst. within Area Src do not shield	**On**
Screening	**Incl. Ground Att. over Barrier**
	Dz with limit (20/25)
Barrier Coefficients C1,2,3	**3.0 20.0 0.0**
Temperature (#(Unit,TEMP))	**10**
rel. Humidity (%)	**70**
Ground Absorption G	**0.50**
Wind Speed for Dir. (#(Unit,SPEED))	**3.0**
Roads (TNM)	
Railways (FTA/FRA)	
Aircraft (???)	
Strictly acc. to AzB	

Receiver Noise Levels

Name	M.	ID	Level Lr			Limit. Value			Land Use			Height		Coordinates		
			Day	Night	CNEL	Day	Night	CNEL	Type	Auto	Noise Type			X	Y	Z
			(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)				(ft)		(ft)	(ft)	(ft)
R1		R1	61.5	-38.5	58.5	0.0	0.0	0.0		x	Total	5.00	r	6546259.33	2386377.35	5.00
R2		R2	55.8	-44.2	52.8	0.0	0.0	0.0		x	Total	5.00	r	6546488.50	2386114.32	5.00
R3		R3	55.5	-44.5	52.5	0.0	0.0	0.0		x	Total	5.00	r	6545394.75	2386106.51	5.00

Area Source(s)

Name	M.	ID	Result. PWL			Result. PWL"			Lw / Li			Operating Time			Height	
			Day	Evening	Night	Day	Evening	Night	Type	Value	norm.	Day	Special	Night	(ft)	
			(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)			dB(A)	(min)	(min)	(min)		
CONST_AREA		CONST_AREA01	112.6	12.6	12.6	72.9	-27.1	-27.1	PWL-Pt	112.6					8	a

Name	ID	Height				Coordinates			
		Begin		End		x	y	z	Ground
		(ft)		(ft)		(ft)	(ft)	(ft)	(ft)
CONST_AREA	CONST_AREA01	8.00	a			6545801.37	2386465.23	8.00	0.00
						6546102.65	2386465.97	8.00	0.00
						6546100.48	2386135.31	8.00	0.00
						6545799.10	2386134.50	8.00	0.00

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