Cactus Club Hotel

Noise Impact Study

County of San Bernardino, CA

Prepared for:

Mr. Eugene Jennings
Principal Regulatory Specialist
Jennings Environmental, LLC
35414 Acacia Avenue
Yucaipa, CA 92399

Prepared by:

MD Acoustics, LLC
Rachel Edelman
1197 Los Angeles Ave, Ste C-256
Simi Valley, CA 93065

Date: 8/14/2023

MD ACOUSTICS
Sound Solutions for Planning and Design

TABLE OF CONTENTS

LIST OF APPENDICES

LIST OF EXHIBITS

LIST OF TABLES

1.0 Introduction

1.1 Purpose of Analysis and Study Objectives

This noise assessment was prepared to evaluate the potential noise impacts for the project study area and to recommend noise mitigation measures, if necessary, to minimize the potential noise impacts. The assessment was conducted and compared to the noise standards set forth by the Federal, State, and Local agencies. Consistent with the County's Noise Guidelines, the project must demonstrate compliance to the applicable noise criterion as outlined within the County of San Bernardino General Plan and Municipal Code.

The following is provided in this report:

- A description of the study area and the proposed project;
- Information regarding the fundamentals of noise;
- A description of the local noise guidelines and standards;
- An analysis of traffic noise impacts to the sensitive receptors and the project site; and
- An analysis of construction noise and vibration impacts to the sensitive receptors.

1.2 Site Location and Study Area

The project site is located near the southeast corner of Twentynine Palms Highway and Mile Square Road, in the County of San Bernardino, CA. See Exhibit A for the location. Existing land uses surrounding the Project site include vacant commercial zones to the west and east, vacant residential zones to the south, existing residents to the southwest, and Twentynine Palms Highway to the north.

1.3 Proposed Project Description

The project proposes to develop a 10,255 square-foot hotel consisting of a lobby, 17 hotel rooms, and 3 hotel suites. The hotel will also feature two (2) restaurants, a café, a wine bar, a club room, and a spa. The hotel will be two floors and there will be 36 surrounding parking spaces. The site plan is shown in Exhibit B.

1.4 Executive Summary of Findings and Mitigation Measures

The following is a summary of the analysis results:

Traffic Noise Levels
The project falls within the conditionally acceptable compatibility range at 70 dBA. The project will not increase the noise levels of Twentynine Palms Highway. The traffic noise impacts are therefore less than significant.

Operational Noise Levels
At the analyzed receptors, project-only noise levels are expected to be between 37 to 46 dBA Leq. Project plus ambient noise levels are expected to be at 56 dBA Leq and will increase the existing ambient noise level by 0 dB. The receptors are anticipated to have no change in noise level. The levels comply with the

city noise limits and will not result in a significant increase to the surrounding areas. The impact is therefore less than significant.

Mitigation Measures

A. Traffic Measures

No traffic mitigation required.

B. Operational Measures

No operational mitigation required.

C. Construction Measures

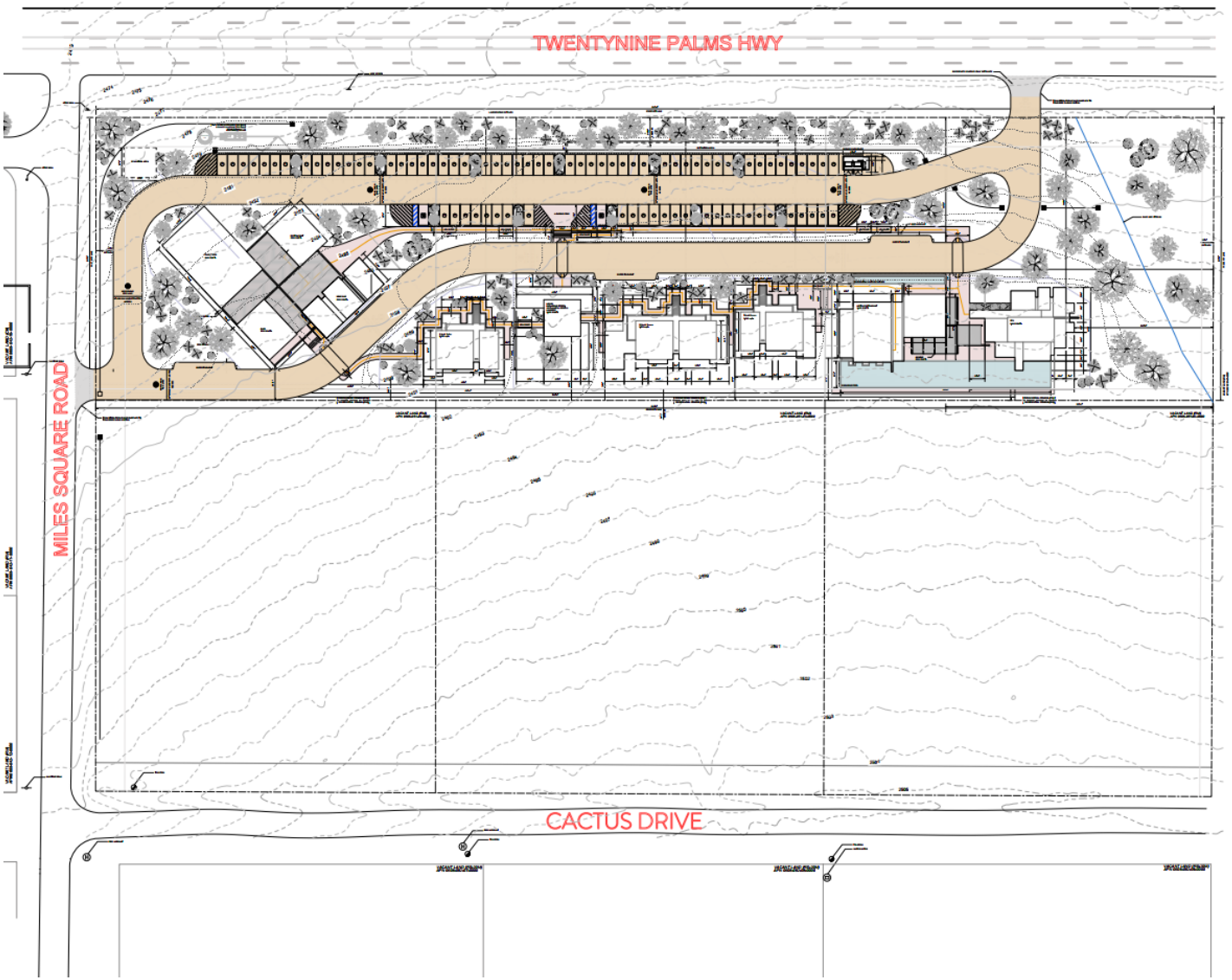
No construction mitigation required.

Exhibit A

Location Map

Exhibit B

Site Plan



VICINITY MAP

OFFICIAL USE ONLY

LEGEND

ROADWAY (Detailed in Fig.1)
WALKWAY (Detailed in Fig.2)
TOPOGRAPHY MAJOR LINES
TOPOGRAPHY MINOR LINES
FENCE
PROPOSED GRADING
WASTEWATER
DRAINAGE
ADA PATH

Fig.1 Truegrid HS/20 rated sustainable paving system

Fig.2 Concrete walkway

PROJECT SCOPE
CONDITIONAL USE PERMIT

Application for a permit to construct a hotel with accompanying facilities on our property, as described in CHAPTER 810.01 DEFINITIONS of the San Bernardino County code.

Our proposed hotel will consist of a lobby, 17 hotel rooms, and 3 hotel suites. The hotel will also feature a hotel restaurant, meeting facility, fine dining restaurant, wine bar and cafe. Cactus Club is an all inclusive experience and all facilities are exclusively available to guest members of Cactus Club Hotel. All the uses we propose for our hotel are permitted within the zoning of the commercial section of the property per the definition of a hotel.

In exceeding the 10,000 sq.ft. development standard for site plan permit we are applying for a Conditional Use Permit as per the relevant guidelines outlined by San Bernardino County Land Use Services.

In keeping with the intention of California Assembly Bill 661, which seeks to promote sustainable practices in construction and infrastructure development, internal circulation roads and parking will be paved with TrueGrid Plus paving technology. Truegrid Plus is a sustainable alternative to traditional paving that offers benefits, including improved site drainage, recyclability, and H20/HS20 rating for emergency vehicles. The grid structure of the pavers allows water to permeate through the surface and infiltrate the ground below reducing the risk of flooding and erosion and allowing water to replenish aquifers and support vegetation growth. The pavers are made from 100% post-consumer recycled HDPE plastic. This reduces waste and the need for additional resources to be extracted from the environment.

All walkways will be concrete and will adhere to current ADA standards, allowing full circulation of the property for disabled patrons. Our walkways will follow the same standards set by our neighbor, Copper Mountain college, which provides accessibility via walkway from the parking area to all structures.

LOCATION
ACCESSORS MAP BK. 0608
LOT 04 APN 0608-051-04-0000
LOT 03 APN 0608-051-03-0000
LOT 02 APN 0608-051-02-0000
SAN BERNARDINO COUNTY, CA

ZONING - COMMERCIAL NEIGHBORHOOD
CROSS STREETS - HWY 62 IS ON NORTH BOUNDARY,
CACTUS DRIVE IS ON SOUTH BOUNDARY

LOT AREA - 190,930 SQ. FT.
LAND USE - CN
ZONING - CN

DESIGN AND DRAWINGS
MATTHEW ARCHER STEPHENSON
archer@lamalkal.com
442-205-7932

evoqua Modern
LAMAL KAL

PROPERTY OWNER - SULLIVAN 80 LLC
ADDRESS: 6 VIA PERGOLA, RANCHO PALO VERDES, CA 90275 1 (760) 880-6436

UTILITIES

SOCAL EDISON	ELECTRIC	1 (800) 655-4555
JOSHUA BASIN WATER DISTRICT	WATER	1 (760) 366-8438
FRONTIER CABLE	CABLE	1 (800) 921-8101
BURRTEC	TRASH	1 (760)-365-2015

ANALYSIS
Parking Analysis
All on site facilities are for guest use only.

Land Use Requirements	Parking Rate	Bldg.Size/Rate	Required	Provided
Hotel	1/room (20)	-	20	20
Hotel Restaurant	8 employees	-	-	8
Hotel Spa	1 employee	-	-	1
Club room	No employees	-	-	-
Wine Bar	2 employees	-	-	2
Cafe	2 employees	-	-	2
Restaurant	5 employees	-	-	5
	TOTAL		20	80

Lot Coverage/FAR Analysis

Land Use Zoning	Proposed Lot Coverage	Lot Size	Max Coverage	Total Coverage
Commercial Neighborhood	28,500 sq.ft.	230,265 sq.ft.	80%	28,500/230,265 =0.16

Floor Are Ratio Analysis

Land Use Zoning	Floor Area Ratio	Total Building Area	Total Lot Area	Total Coverage
Commercial Neighborhood	1.25:1	28,500 sq.ft.	230,265 sq.ft.	0.11

NO NATIVE PROTECTED PLANTS PRESENT
LANDSCAPED AREA: 35%
68,700 SQ.FT. OF EXISTING PLANTS AND NEW NATIVE VEGETATION

2.0 Fundamentals of Noise

This section of the report provides basic information about noise and presents some of the terms used within the report.

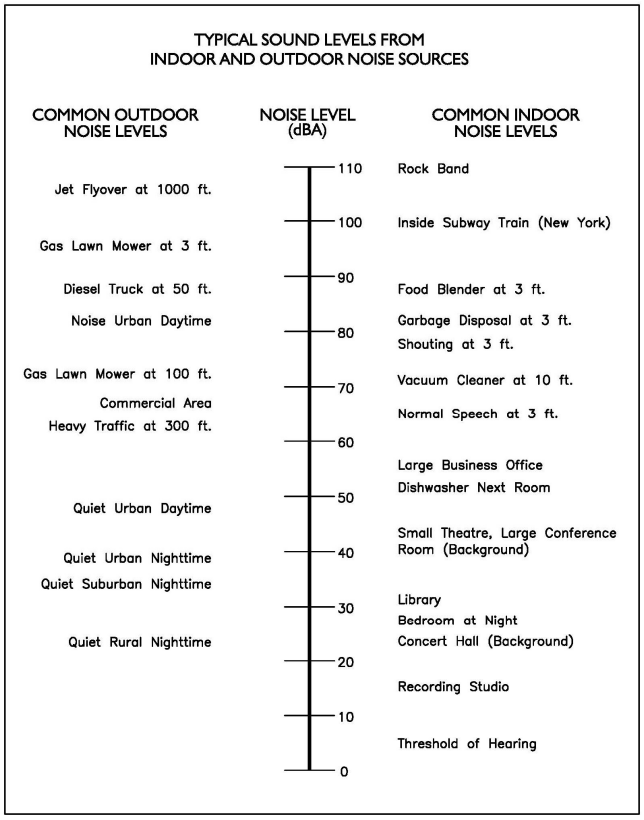
2.1 Sound, Noise, and Acoustics

Sound is a disturbance created by a moving or vibrating source and is capable of being detected by the hearing organs. Sound may be thought of as mechanical energy of a moving object transmitted by pressure waves through a medium to a human ear. For traffic or stationary noise, the medium of concern is air. *Noise* is defined as sound that is loud, unpleasant, unexpected, or unwanted.

2.2 Frequency and Hertz

A continuous sound is described by its *frequency* (pitch) and its *amplitude* (loudness). Frequency relates to the number of pressure oscillations per second. Low-frequency sounds are low in pitch (bass sounding) and high-frequency sounds are high in pitch (squeak). These oscillations per second (cycles) are commonly referred to as Hertz (Hz). The human ear can hear from the bass pitch starting at 20 Hz to the high pitch of 20,000 Hz.

Exhibit C: Typical A-Weighted Noise Levels



2.3 Sound Pressure Levels and Decibels

The *amplitude* of a sound determines its loudness. The loudness of sound increases or decreases as the amplitude increases or decreases. Sound pressure amplitude is measure in units of micro-Newton per square inch meter (N/m2), also called micro-Pascal (µPa). One µPa is approximately one hundred billionths (0.00000000001) of normal atmospheric pressure. Sound pressure level (SPL or L_p) is used to describe in logarithmic units the ratio of actual sound pressures to a reference pressure squared. These units are called decibels abbreviated dB. Exhibit C illustrates references sound levels for different noise sources.

2.4 Addition of Decibels

Because decibels are on a logarithmic scale, sound pressure levels cannot be added or subtracted by simple plus or minus addition. When two sounds or equal SPL are combined, they will produce an SPL 3 dB greater than the original single SPL. In other words, sound energy must be doubled to produce a 3 dB increase. If two sounds differ by approximately 10 dB, the higher sound level is the predominant sound.

2.5 Sensitive Receptors

Noise-sensitive land uses include residential (single and multi-family dwellings, mobile home parks, dormitories, and similar uses); transient lodging (including hotels, motels, and similar uses); hospitals, nursing homes, convalescent hospitals, and other facilities for long-term medical care; public or private educational facilities, libraries, churches, and places of public assembly.

2.6 Human Response to Changes in Noise Levels

In general, the healthy human ear is most sensitive to sounds between 1,000 Hz and 5,000 Hz, (A-weighted scale) and it perceives a sound within that range as being more intense than a sound with a higher or lower frequency with the same magnitude. For purposes of this report as well as with most environmental documents, the A-scale weighting is typically reported in terms of A-weighted decibel (dBA). Typically, the human ear can barely perceive a change in noise level of 3 dB. A change in 5 dB is readily perceptible, and a change in 10 dB is perceived as being twice or half as loud. As previously discussed, a doubling of sound energy results in a 3 dB increase in sound, which means that a doubling of sound energy (e.g. doubling the volume of traffic on a highway) would result in a barely perceptible change in sound level.

Table 1: Decibel Changes and Loudness

Changes in Intensity Level, dBA	Changes in Apparent Loudness
1	Not perceptible
3	Just perceptible
5	Clearly noticeable
10	Twice (or half) as loud
Source: https://www.fhwa.dot.gov/environMent/noise/regulations_and_guidance/polguide/polguide02.cfm	

2.7 Noise Descriptors

Noise in our daily environment fluctuates over time. Some noise levels occur in regular patterns, others are random. Some noise levels are constant while others are sporadic. Noise descriptors were created to describe the different time-varying noise levels.

A-Weighted Sound Level: The sound pressure level in decibels as measured on a sound level meter using the A-weighted filter network. The A-weighting filter de-emphasizes the very low and very high-frequency components of the sound in a manner similar to the response of the human ear. A numerical method of rating human judgment of loudness.

Ambient Noise Level: The composite of noise from all sources, near and far. In this context, the ambient noise level constitutes the normal or existing level of environmental noise at a given location.

Community Noise Equivalent Level (CNEL): The average equivalent A-weighted sound level during a 24-hour day, obtained after the addition of five (5) decibels to sound levels in the evening from 7:00 to 10:00 PM and ten (10) decibels to sound levels in the night before 7:00 AM and after 10:00 PM.

Decibel (dB): A unit for measuring the amplitude of a sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure, which is 20 micro-pascals.

dB(A): A-weighted sound level (see definition above).

Equivalent Sound Level (LEQ): The sound level corresponding to a steady noise level over a given sample period with the same amount of acoustic energy as the actual time-varying noise level. The energy average noise level during the sample period.

Habitable Room: Any room meeting the requirements of the Uniform Building Code or other applicable regulations which is intended to be used for sleeping, living, cooking, or dining purposes, excluding such enclosed spaces as closets, pantries, bath or toilet rooms, service rooms, connecting corridors, laundries, unfinished attics, foyers, storage spaces, cellars, utility rooms, and similar spaces.

L(n): The A-weighted sound level exceeded during a certain percentage of the sample time. For example, L10 in the sound level exceeded 10 percent of the sample time. Similarly, L50, L90, and L99, etc.

Noise: *A*ny unwanted sound or sound which is undesirable because it interferes with speech and hearing, or is intense enough to damage hearing, or is otherwise annoying. The State Noise Control Act defines noise as "...excessive undesirable sound...".

Outdoor Living Area: Outdoor spaces that are associated with residential land uses typically used for passive recreational activities or other noise-sensitive uses. Such spaces include patio areas, barbecue areas, jacuzzi areas, etc. associated with residential uses; outdoor patient recovery or resting areas associated with hospitals, convalescent hospitals, or rest homes; outdoor areas associated with places of worship which have a significant role in services or other noise-sensitive activities; and outdoor school facilities routinely used for educational purposes which may be adversely impacted by noise. Outdoor areas usually not included in this definition are: front yard areas, driveways, greenbelts, maintenance areas and storage areas associated with residential land uses; exterior areas at hospitals that are not used for patient activities; outdoor areas associated with places of worship and principally used for short-term social gatherings; and, outdoor areas associated with school facilities that are not typically associated with educational uses prone to adverse noise impacts (for example, school play yard areas).

Percent Noise Levels: See L(n).

Sound Level (Noise Level): The weighted sound pressure level obtained by use of a sound level meter having a standard frequency filter for attenuating part of the sound spectrum.

Sound Level Meter: An instrument, including a microphone, an amplifier, an output meter, and frequency weighting networks for the measurement and determination of noise and sound levels.

Single Event Noise Exposure Level (SENEL): The dB(A) level which, if it lasted for one second, would produce the same A-weighted sound energy as the actual event.

2.8 Traffic Noise Prediction

Noise levels associated with traffic depends on a variety of factors: volume of traffic; the speed of traffic; auto, medium truck (2-axle), and heavy truck percentage (3-axle and greater); and sound propagation. Higher traffic volume, speeds, and truck percentages equate to a louder volume in noise. A doubling of the Average Daily Traffic (ADT) along a roadway will increase noise levels by approximately 3 dB; reasons for this are discussed in the sections above.

2.9 Sound Propagation

As sound propagates from a source it spreads geometrically. Sound from a small, localized source (i.e., a point source) radiates uniformly outward as it travels away from the source in a spherical pattern. The sound level attenuates at a rate of 6 dB per doubling of distance. The movement of vehicles down a roadway makes the source of the sound appear to propagate from a line (i.e., line source) rather than a point source. This line source results in the noise propagating from a roadway in a cylindrical spreading versus a spherical spreading that results from a point source. The sound level attenuates for a line source at a rate of 3 dB per doubling of distance.

As noise propagates from the source, it is affected by the ground and atmosphere. Noise models use hard site (reflective surfaces) and soft site (absorptive surfaces) to help calculate predicted noise levels. Hard site conditions assume no excessive ground absorption between the noise source and the receiver. Soft site conditions such as grass, soft dirt, or landscaping attenuate noise at a rate of 1.5 dB per doubling of distance. When added to the geometric spreading, the excess ground attenuation results in an overall noise attenuation of 4.5 dB per doubling of distance for a line source and 7.5 dB per doubling of distance for a point source.

Research has demonstrated that atmospheric conditions can have a significant effect on noise levels when noise receivers are located 200 feet from a noise source. Wind, temperature, air humidity, and turbulence can further impact have far sound can travel.

3.0 Ground-Borne Vibration Fundamentals

3.1 Vibration Descriptors

Ground-borne vibrations consist of rapidly fluctuating motions within the ground that have an average motion of zero. The effects of ground-borne vibrations typically only cause a nuisance to people, but at extreme vibration levels, damage to buildings may occur. Although ground-borne vibration can be felt outdoors, it is typically only an annoyance to people indoors where the associated effects of the shaking of a building can be notable. Ground-borne noise is an effect of ground-borne vibration and only exists indoors since it is produced from noise radiated from the motion of the walls and floors of a room and may also consist of the rattling of windows or dishes on shelves.

Several different methods are used to quantify vibration amplitude.

PPV – Known as the peak particle velocity (PPV) which is the maximum instantaneous peak in vibration velocity, typically given in inches per second.

RMS – Known as root mean squared (RMS) can be used to denote vibration amplitude

VdB – A commonly used abbreviation to describe the vibration level (VdB) for a vibration source.

3.2 Vibration Perception

Typically, developed areas are continuously affected by vibration velocities of 50 VdB or lower. These continuous vibrations are not noticeable to humans whose threshold of perception is around 65 VdB. Outdoor sources that may produce perceptible vibrations are usually caused by construction equipment, steel-wheeled trains, and traffic on rough roads, while smooth roads rarely produce perceptible ground-borne noise or vibration. To counter the effects of ground-borne vibration, the Federal Transit Administration (FTA) has published guidance relative to vibration impacts. According to the FTA, fragile buildings can be exposed to ground-borne vibration levels of 0.3 inches per second without experiencing structural damage.

There are three main types of vibration propagation: surface, compression, and shear waves. Surface waves, or Rayleigh waves, travel along the ground's surface. These waves carry most of their energy along an expanding circular wavefront, similar to ripples produced by throwing a rock into a pool of water. P-waves, or compression waves, are body waves that carry their energy along an expanding spherical wavefront. The particle motion in these waves is longitudinal (i.e., in a "push-pull" fashion). P-waves are analogous to airborne sound waves. S-waves, or shear waves, are also body waves that carry energy along an expanding spherical wavefront. However, unlike P-waves, the particle motion is transverse, or side-to-side and perpendicular to the direction of propagation. As vibration waves propagate from a source, the vibration energy decreases in a logarithmic nature and the vibration levels typically decrease by 6 VdB per doubling of the distance from the vibration source. As stated above, this drop-off rate can vary greatly depending on the soil but has been shown to be effective enough for screening purposes to identify potential vibration impacts that may need to be studied through actual field tests.

4.0 Regulatory Setting

The proposed project is located in the County of San Bernardino, California, and noise regulations are addressed through the efforts of various federal, state, and local government agencies. The agencies responsible for regulating noise are discussed below.

4.1 Federal Regulations

The adverse impact of noise was officially recognized by the federal government in the Noise Control Act of 1972, which serves three purposes:

- Publicize noise emission standards for interstate commerce
- Assist state and local abatement efforts
- Promote noise education and research

The Federal Office of Noise Abatement and Control (ONAC) originally was tasked with implementing the Noise Control Act. However, it was eventually eliminated leaving other federal agencies and committees to develop noise policies and programs. Some examples of these agencies are as follows: The Department of Transportation (DOT) assumed a significant role in noise control through its various agencies. The Federal Aviation Agency (FAA) is responsible for regulating noise from aircraft and airports. The Federal Highway Administration (FHWA) is responsible for regulating noise from the interstate highway system. The Occupational Safety and Health Administration (OSHA) is responsible for the prohibition of excessive noise exposure to workers. The Housing and Urban Development (HUD) is responsible for establishing noise regulations as it relates to exterior/interior noise levels for new HUD-assisted housing developments near high noise areas.

The federal government advocates that local jurisdictions use their land use regulatory authority to arrange new developments in such a way that “noise sensitive” uses are either prohibited from being constructed adjacent to a highway or that the developments are planned and constructed in such a manner that potential noise impacts are minimized.

Since the federal government has preempted the setting of standards for noise levels that can be emitted by the transportation source, the City is restricted to regulating the noise generated by the transportation system through nuisance abatement ordinances and land use planning.

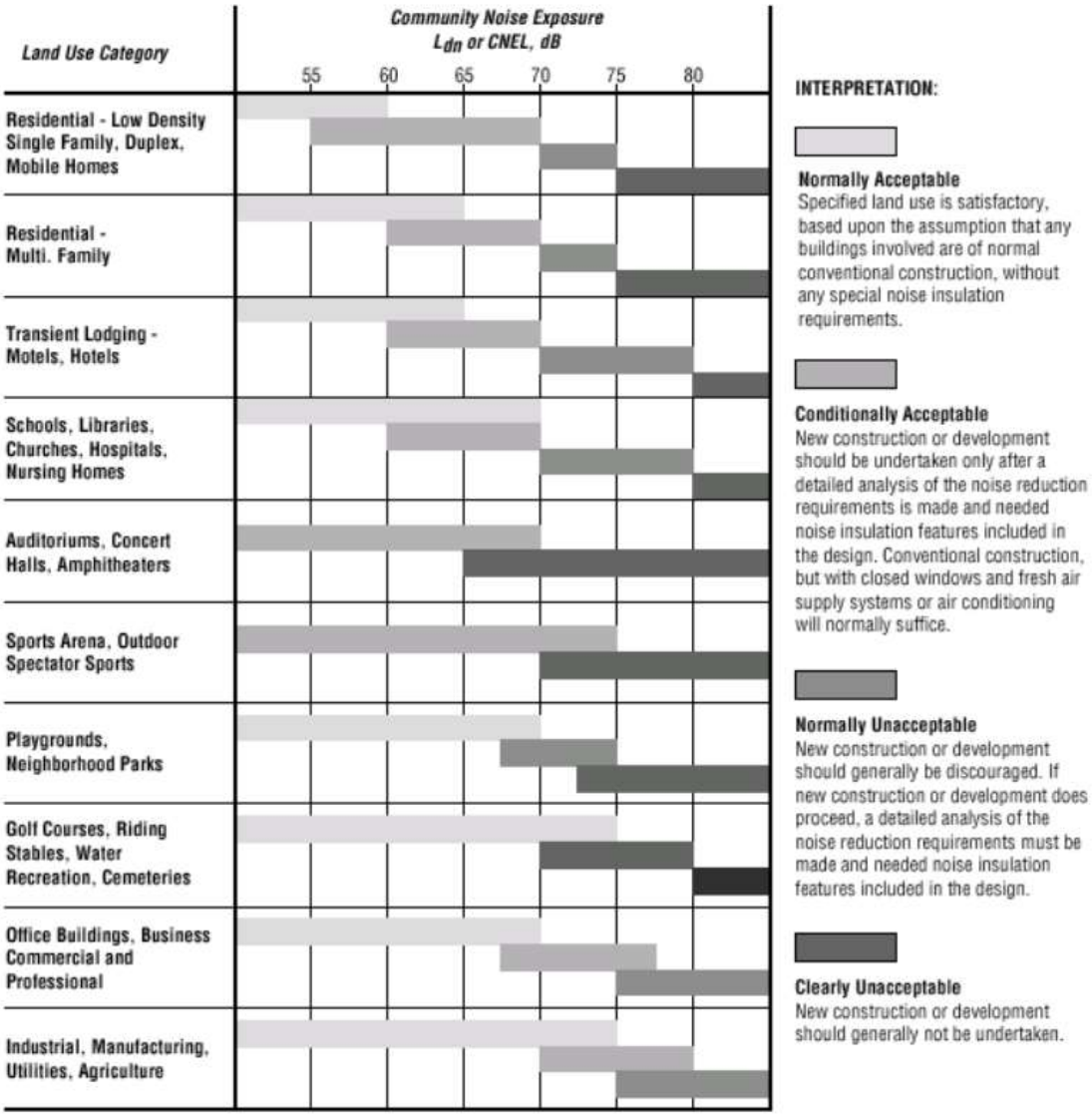
4.2 State Regulations

Established in 1973, the California Department of Health Services Office of Noise Control (ONC) was instrumental in developing regularity tools to control and abate noise for use by local agencies. One significant model is the “Land Use Compatibility for Community Noise Environments Matrix.” The matrix allows the local jurisdiction to delineate the compatibility of sensitive uses with various incremental levels of noise.

The State of California has established noise insulation standards as outlined in Title 24 and the Uniform Building Code (UBC) which in some cases requires acoustical analyses to outline exterior noise levels and to ensure interior noise levels do not exceed the interior threshold. The State mandates that the legislative body of each county and city adopt a noise element as part of its comprehensive general plan.

The local noise element must recognize the land use compatibility guidelines published by the State Department of Health Services. The guidelines rank noise land use compatibility in terms of normally acceptable, conditionally acceptable, normally unacceptable, and clearly unacceptable as illustrated in Exhibit D.

Exhibit D: Land Use Compatibility Guidelines



4.3 County of San Bernardino Noise Regulations

The County of San Bernardino outlines their noise regulations and standards within the Policy Plan, Safety and Security Section, Hazards Element from the General Plan and the Noise Ordinance from the Municipal Code.

County of San Bernardino General Plan

Applicable policies and standards governing environmental noise in the County are set forth in the General Plan Policy Plan. Section Safety and Security, in its goal HZ-2 Human-generated Hazards, outlines the noise policies within the county.

The County has outlined goals, policies, and implementation measures to reduce potential noise impacts and are presented below:

Goals, Policies, and Implementation Measures

Policies, goals and implementation program measures from the Policy Plan that would mitigate potential impacts on noise include the following.

Goal HZ-2 Human-generated Hazards: People and the natural environment protected from exposure to hazardous materials, excessive noise, and other human-generated hazards.

Policy HZ-2.6: Coordination with transportation authorities. We collaborate with airport owners, FAA, Caltrans, SBCTA, SCAG, neighboring jurisdictions, and other transportation providers in the preparation and maintenance of, updates to transportation-related plans and projects to minimize noise impacts and provide appropriate mitigation measures.

Policy HZ-2.7: Truck delivery areas. We encourage truck delivery areas to be located away from residential properties and require associated noise impacts to be mitigated.

Policy HZ-2.8: Proximity to noise generating uses. We limit or restrict new noise sensitive land uses in proximity to existing conforming noise generating uses and planned industrial areas.

Policy HZ-2.9: Control sound at the source. We prioritize noise mitigation measures that control sound at the source before buffers, soundwalls, and other perimeter measures.

Policy HZ-2.10: Agricultural operations. We require new development adjacent to existing conforming agricultural operations to provide adequate buffers to reduce the exposure of new development to operational noise, odor, and the storage or application of pesticides or other hazardous materials.

County of San Bernardino Municipal Code

Chapter 83.01 General Performance Standards of the County's Municipal Code outlines the County's noise ordinance.

Section 83.01.080 –Noise

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 2 (Table 83-2 in the Municipal Code) describes the noise standard for emanations from a stationary noise source, as it affects adjacent properties.

Table 2: Noise Standards for Stationary Noise Sources

Affected Land Uses (Receiving Noise)	Noise Level Limit (Leq dBA)	
	7:00 a.m. - 10:00 p.m.	10:00 p.m. - 7:00 a.m.
Residential	55	45
Professional Services	55	55
Other Commercial	60	60
Industrial	70	70

(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:

1. 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.
2. The noise standard plus five dB(A) for a cumulative period of more than 15 minutes in any hour.
3. The noise standard plus ten dB(A) for a cumulative period of more than five minutes in any hour.
4. The noise standard plus 15 dB(A) for a cumulative period of more than one minute in any hour.
5. 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 3 (Table 83-3 in the Municipal Code).

<Table 3, next page>

Table 3: Noise Standards for Adjacent Mobile Noise Sources

Land Use		Ldn (or CNEL) dBA	
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, 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
- 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.

(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) *Reduction in Allowable Noise Levels.* If the alleged offense consists entirely of impact noise or simple tone noise, each of the noise levels in Table 2 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.

Per the table outlined above, the City's noise limit for residential uses is 55 dBA during the hours of 7:00 AM to 6:00 PM, 50 dBA during the hours of 6:00 PM to 10:00 PM, 45 dBA during the hours of 10:00 PM to 7:00 AM.

Table 4: Noise Standards for Other Structures

Typical Uses	12-Hour Equivalent Sound Level (Interior) dBA Ldn
Educational institutions, libraries, meeting facilities, etc.	55
General office, reception, etc.	55
Retail stores, restaurants, etc.	60
Other areas for manufacturing, assembly, testing, warehousing, etc.	70

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.

5.0 Study Method and Procedure

The following section describes the noise modeling procedures and assumptions used for this assessment.

5.1 Noise Measurement Procedure and Criteria

Noise measurements are taken to determine the existing noise levels. A noise receiver or receptor is any location in the noise analysis in which noise might produce an impact. The following criteria are used to select measurement locations and receptors:

- Locations expected to receive the highest noise impacts, such as the first row of houses
- Locations that are acoustically representative and equivalent of the area of concern
- Human land usage
- Sites clear of major obstruction and contamination

All measurement equipment meets American National Standards Institute (ANSI) specifications for sound level meters (S1.4-1983 identified in Chapter 19.68.020.AA). MD noise measurement procedures are presented below:

- The sound level meter was calibrated (Piccolo-II) before and after the measurement
- Following the calibration of equipment, a windscreen was placed over the microphone
- Frequency weighting was set on “A” and slow response
- Results of the noise measurements were recorded on field data sheets
- Temperature and sky conditions were observed and documented

5.2 Noise Measurement Locations

The noise monitoring locations were selected to obtain a baseline of the existing noise environment. One short-term noise measurement was conducted at the Project site. Appendix A includes photos, the field sheet, and measured noise data. Exhibit E illustrates the location of the measurement.

5.3 SoundPLAN Noise Model (Operational Noise)

SoundPLAN acoustical modeling software was utilized to model project operational noise at nearby sensitive receptors. The SoundPLAN software utilizes algorithms (based on the inverse square law) to calculate noise level projections. It allows the user to input specific noise sources, spectral content, sound barriers, building placement, topography, and sensitive receptor locations. It also calculates noise level increases due to the reflection of noise from hard surfaces.

Measured and referenced sound level data was utilized to model the various stationary on-site noise sources associated with project operation, (i.e., parking movements, HVAC).

Noise associated with proposed hotel parking area was modeled using SoundPLAN methodology which takes into consideration the overall trip generation, and the number of parking spaces and estimates the

number of movements per hour per parking space. Rooftop HVAC units were modeled as point sources on each building. SoundPLAN noise modeling input and results are provided in Appendix B.

5.4 Traffic Noise Prediction Modeling

The FHWA Traffic Noise Prediction Model (FHWA-RD-77-108) was utilized to model future traffic noise levels on the project site and existing, existing plus ambient growth plus project traffic noise volumes along roadways affected by project generated vehicle traffic. The FHWA model arrives at the predicted noise level through a series of adjustments to the Reference Energy Mean Emission Level (REMEL).

Project-generated vehicle traffic will result in an incremental increase in ambient noise levels. To determine the project's noise impact to the surrounding land uses, MD generated noise contours for existing ADT, and opening year plus project conditions (2023). Traffic volumes were obtained from the city's General Plan Update Draft Environmental Report and the project's trip generation was obtained from the CalEEMod. Project completion conditions volumes were estimated by applying a 2% annual growth rate from the measured conditions within the study area. Table 5 indicates the roadway parameters and vehicle distribution utilized for the modeling.

Noise contours are used to provide a characterization of sound levels experienced at a set distance from the centerline of a subject roadway. They are intended to represent a worst-case scenario and do not take into account structures, sound walls, topography, and/or other sound attenuating features that may further reduce the actual noise level. Noise contours are developed for comparative purposes and are used to demonstrate potential increases/decreases along subject roadways as a result of a project. The referenced traffic data and traffic noise calculation worksheets outputs are located in Appendix C.

- Roadway classification – (e.g., freeway, major arterial, arterial, secondary, collector, etc.),
- Roadway Active Width – (distance between the center of the outermost travel lanes on each side of the roadway)
- Average Daily Traffic Volumes (ADT), Speeds, Percentages of autos, medium and heavy trucks
- Roadway grade and angle of view
- Site Conditions (e.g., soft vs. hard)
- Percentage of total ADT which flows each hour throughout a 24-hour period

Table 5: Roadway Parameters and Vehicle Distribution

Roadway	Existing ADT[1]	Opening + Project ADT[2]	Speed (MPH)	Site Conditions
Twentynine Palms Highway	15,000	15,478	65	Hard
Freeway Motor-Vehicle Type[3]		**Total % of Traffic Flow**		
Automobiles		94.1		
Medium Trucks		3.72		
Heavy Trucks		2.18		

Notes:
[1] 2020 Caltrans Traffic Volumes
[2] Project trip generation was calculated in CalEEMod.

6.0 Existing Noise Environment

One (1) 15-minute noise measurement was conducted at the project site to document the existing noise environment. The measurements include the 15-minute Leq, Lmin, Lmax, and other statistical data (e.g. L2, L8). The results of the noise measurement are presented in Table 6. Noise measurement field sheets are provided in Appendix A.

Table 6: Short-Term Noise Measurement Data (dBA)[1]

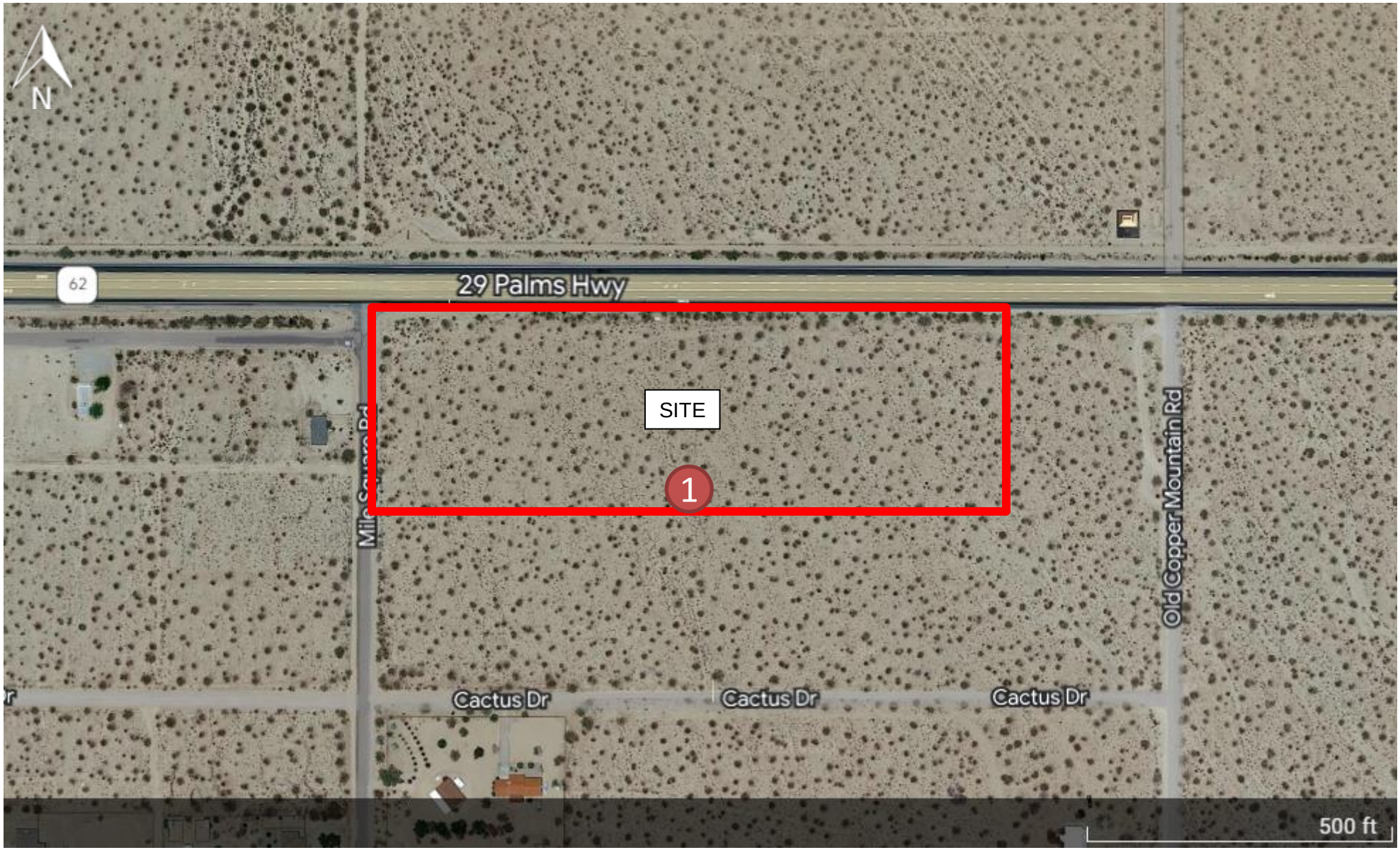
Location	Start Time	Stop Time	Leq	Lmax	Lmin	L(2)	L(8)	L(25)	L(50)	L(90)
NM3	4:17 PM	4:32 PM	55.8	65.4	43.8	61.6	59.2	56.9	54.3	49.2

Notes:
1. Short-term noise monitoring locations are illustrated in Exhibit E.

The data presented in Table 6 and the field notes provided in Appendix A, indicate that ambient noise levels in the project vicinity were 55.8 dBA Leq, and the field data indicates that the dominant noise source is traffic along Twentynine Palms Highway.

Exhibit E
Measurement Locations

= Short-Term Monitoring Location



7.0 Future Noise Environment Impacts and Mitigation

This assessment analyzes future noise impacts to sensitive receptors and the project and compares the results to the County's Noise Standards. The analysis details the estimated exterior noise levels associated with traffic from adjacent roadway sources. The County has established different significance thresholds for different types of noise impacts.

7.1 Off-Site Traffic Noise Impact

The potential off-site noise impacts caused by the increase in vehicular traffic as a result of the project were calculated at a distance of 200 feet from affected road segments. The noise levels at 200 feet both with and without project-generated vehicle traffic were compared and the increase was calculated. The distance to the 55, 60, 65, and 70 dBA CNEL noise contours are also provided for reference (Appendix C). Noise contours were calculated for the following scenarios and conditions:

- Existing Condition: This scenario refers to the existing year traffic noise condition and is demonstrated in Table 7.

- Opening + Project Condition: This scenario refers to the opening year (2023) plus project traffic noise condition and is demonstrated in Table 7.

As shown in Table 7, the addition of project-generated vehicle traffic Twentynine Palms Highway would result in negligible increases in ambient noise levels and would not be significant.

Table 7: Change in Existing Noise Levels as a Result of Project Generated Traffic

Roadway	Segment	Modeled Noise Levels (dBA CNEL) at 200 feet from the Centerline			
		Existing without Project	Existing with Project	Change in Noise Level	Increase of 3 dB or more[2]
Twentynine Palms Highway	Mt Lassen Ave to Mt Shasta Ave	70.1	70.2	0.1	No

Notes:
[1] FHWA roadway noise modeling worksheets are provided in Appendix C.
[2] Typical CEQA significance threshold

7.2 On-Site Traffic Noise Impact

Future noise levels associated with traffic were modeled using the FHWA Traffic Noise Model calculations in order to evaluate the project in light of the City's exterior standards presented in Exhibit D of this report as they apply to future traffic noise impacts to the proposed project. The Project is currently within the conditionally acceptable range at 70 dBA CNEL. It will not change due to the increase in traffic levels due to the project.

7.3 Noise Impacts to Off-Site Receptors Due to Stationary Noise Sources

Existing conditions show that the existing residences to the southwest and west are sensitive receptors near the project site. Vacant commercial and residential land uses around the project site are potential sensitive receptors that may be affected by project operational noise, and where the city's noise ordinance limits shall apply. Worst-case operational noise was modeled using SoundPLAN acoustical modeling software. Four (4) receptors representative of adjacent commercial and vacant sites were modeled using the SoundPLAN noise model to evaluate the proposed project's operational impact. A receptor is denoted by a yellow dot, as shown in Exhibit F. All yellow dots are a property line on contiguous parcels. R1 is along the property line adjacent to Twentynine Palms Highway. R2 is on the east property line. R3 is to the south of the proposed hotel and R4 is on the west property line. The results are in Table 8. R1 represents the institutional zone to the north, R2 and R3 represent commercial zoning, and R4 represents residential zoning.

Project Operational Noise Levels

Worst-case "project-only" exterior operational noise is presented in Exhibit F. Operational noise levels are expected to reach 37 to 46 dBA Leq. The project-only noise level meets the nighttime noise level limits as stated in the Municipal Code (see Table 2).

Project Plus Ambient Operational Noise Levels

Existing plus project noise level projections are anticipated to reach 56 dBA Leq. The project will increase the existing ambient noise level by 0 dB. Thus, the noise due to the project is less than significant. See Table 8.

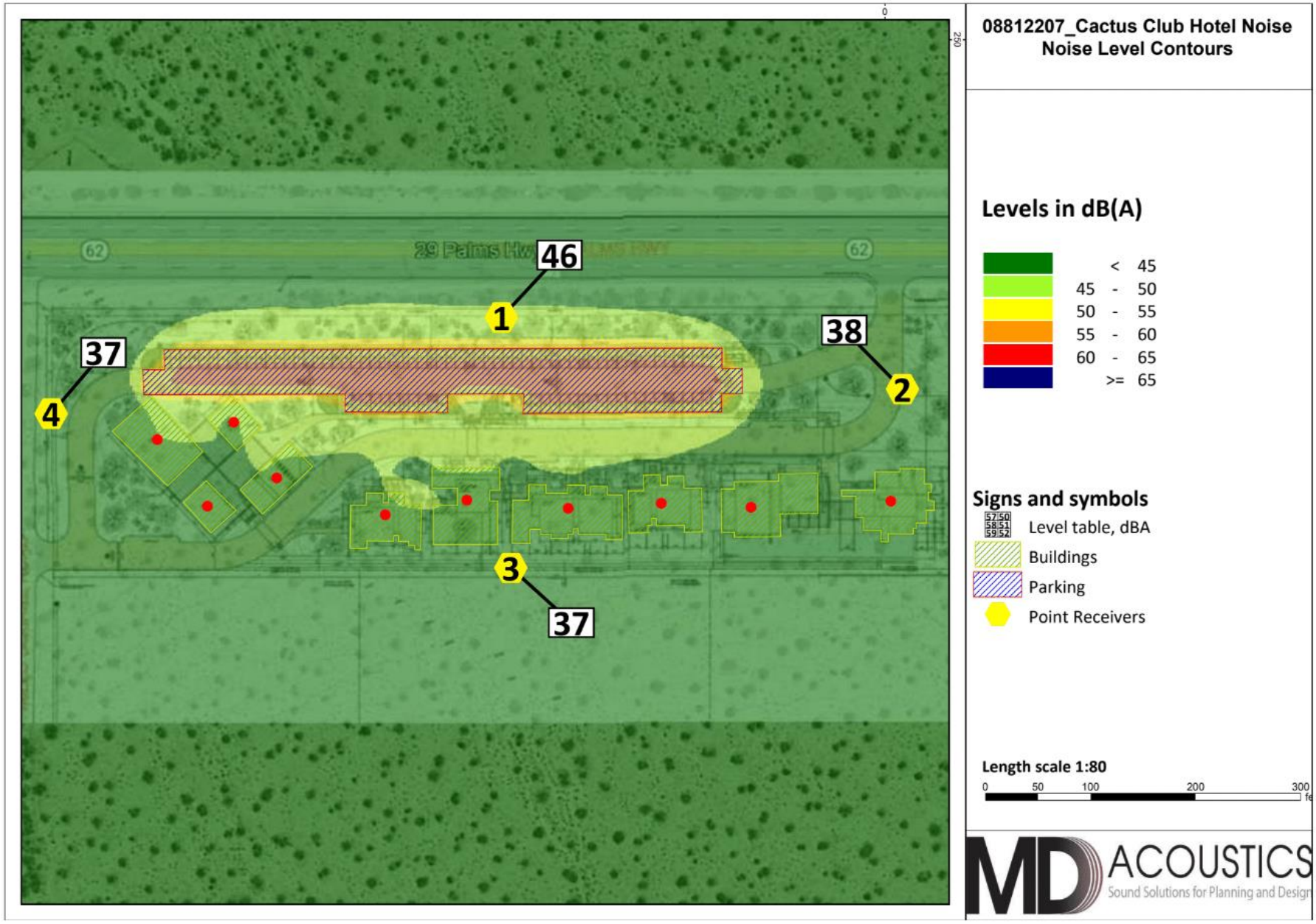
Table 8: Operational Noise Levels (dBA, Leq)

Receptor[1]	Existing Ambient Noise Level[2]	Project Noise Level[3]	Nighttime (10:00 p.m. - 7:00 a.m.) Non Transp. Noise Limit (dBA, Leq)	Total Combined Noise Level	Change in Noise Level as Result of Project
1	56	46	**55**	56	0
2	56	38	**60**	56	0
3	56	37	**45**	56	0
4	56	37	**60**	56	0

Notes:
[1.] Receptors 1-4 are located along the property lines. The predominant noise source is traffic along Twentynine Palms Highway.
[2.] See Table 1 for existing ambient level. The dominant noise source is traffic along Twentynine Palms Highway to the north.
[3.] See Exhibit F for the operational noise level projections at said receptors.

Exhibit F

Operational Noise Levels Contours Leq(h)



8.0 Construction Noise Impact

The degree of construction noise may vary for different areas of the project site and also vary depending on the construction activities. Noise levels associated with the construction will vary with the different phases of construction.

8.1 Construction Noise

The Environmental Protection Agency (EPA) has compiled data regarding the noise-generated characteristics of typical construction activities. The data is presented in Table 9.

Table 9: Typical Construction Noise Levels[1]

Equipment Powered by Internal Combustion Engines

Type	Noise Levels (dBA) at 50 Feet
Earth Moving	
Compactors (Rollers)	73 - 76
Front Loaders	73 - 84
Backhoes	73 - 92
Tractors	75 - 95
Scrapers, Graders	78 - 92
Pavers	85 - 87
Trucks	81 - 94
Materials Handling	
Concrete Mixers	72 - 87
Concrete Pumps	81 - 83
Cranes (Movable)	72 - 86
Cranes (Derrick)	85 - 87
Stationary	
Pumps	68 - 71
Generators	71 - 83
Compressors	75 - 86

Impact Equipment

Type	Noise Levels (dBA) at 50 Feet
Saws	71 - 82
Vibrators	68 - 82

Notes:
[1] Referenced Noise Levels from the Environmental Protection Agency (EPA)

Construction noise is considered a short-term impact and would be considered significant if construction activities are taken outside the allowable times as described in the County's Municipal Code (Section 83.01.080(g)(3)). Construction is anticipated to occur during the permissible hours (7 a.m. to 7 p.m.) according to the County's Municipal Code.

Typical operating cycles for these types of construction equipment may involve one or two minutes of full power operation followed by three to four minutes at lower power settings. Noise levels will be loudest during the paving phase. A likely worst-case construction noise scenario during site preparation

assumes the use two (2) rollers, one (1) paver, two (2) concrete mixer trucks, one (1) tractor, and additional paving equipment operating at 400 feet from the nearest sensitive receptor (west residence).

Assuming a usage factor of 40 percent for each piece of equipment, unmitigated noise levels at 400 feet have the potential to reach 60.1 dBA L_{eq} at the nearest sensitive receptors during paving. Noise levels for the other construction phases would be lower and range between 46 to 60 dBA. Construction noise will have a temporary or periodic increase in the ambient noise level above the existing within the project vicinity. However, the impact will be considered less than significant assuming construction occurs during the permissible hours (7 a.m. to 7 p.m.). See Appendix D.

8.2 Construction Vibration

Construction activities can produce vibration that may be felt by adjacent land uses. The construction of the proposed project would not require the use of equipment such as pile drivers, which are known to generate substantial construction vibration levels. The primary vibration source during construction may be from a vibratory roller. A vibratory roller has a vibration impact of 0.210 inches per second peak particle velocity (PPV) at 25 feet.

The fundamental equation used to calculate vibration propagation through average soil conditions and distance is as follows:

$$PPV_{equipment} = PPV_{ref} (100/D_{rec})^n$$

Where: PPV_{ref} = reference PPV at 100ft.
D_{rec} = distance from equipment to receiver in ft.
n = 1.1 (the value related to the attenuation rate through ground)

The thresholds from the Caltrans Transportation and Construction Induced Vibration Guidance Manual in Table 10 (below) provides general thresholds and guidelines as to the vibration damage potential from vibratory impacts.

<Table 10, next page>

Table 10: Guideline Vibration Damage Potential Threshold Criteria

Structure and Condition	Maximum PPV (in/sec)	
	Transient Sources	Continuous/Frequent Intermittent Sources
Extremely fragile historic buildings, ruins, ancient monuments	0.12	0.08
Fragile buildings	0.2	0.1
Historic and some old buildings	0.5	0.25
Older residential structures	0.5	0.3
New residential structures	1.0	0.5
Modern industrial/commercial buildings	2.0	0.5

Source: Table 19, Transportation and Construction Vibration Guidance Manual, Caltrans, Sept. 2013.
Note: Transient sources create a single isolated vibration event, such as blasting or drop balls. Continuous/frequent intermittent sources include impact pile drivers, pogo-stick compactors, crack-and-seat equipment, vibratory pile drivers, and vibratory compaction equipment.

Table 11 gives approximate vibration levels for particular construction activities. This data provides a reasonable estimate for a wide range of soil conditions.

Table 11: Vibration Source Levels for Construction Equipment[1]

Equipment	Peak Particle Velocity (inches/second) at 25 feet	Approximate Vibration Level LV (dVB) at 25 feet
Pile driver (impact)	1.518 (upper range)	112
	0.644 (typical)	104
Pile driver (sonic)	0.734 upper range	105
	0.170 typical	93
Clam shovel drop (slurry wall)	0.202	94
Hydromill	0.008 in soil	66
(slurry wall)	0.017 in rock	75
Vibratory Roller	0.21	94
Hoe Ram	0.089	87
Large bulldozer	0.089	87
Caisson drill	0.089	87
Loaded trucks	0.076	86
Jackhammer	0.035	79
Small bulldozer	0.003	58

[1] Source: Transit Noise and Vibration Impact Assessment, Federal Transit Administration, May 2006.

At a distance of 400 feet, a vibratory roller would yield a worst-case 0.010 PPV (in/sec) which below the threshold of perception and any risk of damage. The impact is less than significant and no mitigation is required.

9.0 References

State of California General Plan Guidelines: 2017. Governor's Office of Planning and Research

County of San Bernardino: General Policy Plan Hazards Element. October 2020.

County of San Bernardino: Chapter 83.01, Section 83.01.080 Noise of the Municipal Code.

Caltrans Traffic Volumes 2020

SoundPLAN Essential 8.1 Manual - SoundPLAN International, LLC

Appendix A:

Field Measurement Data

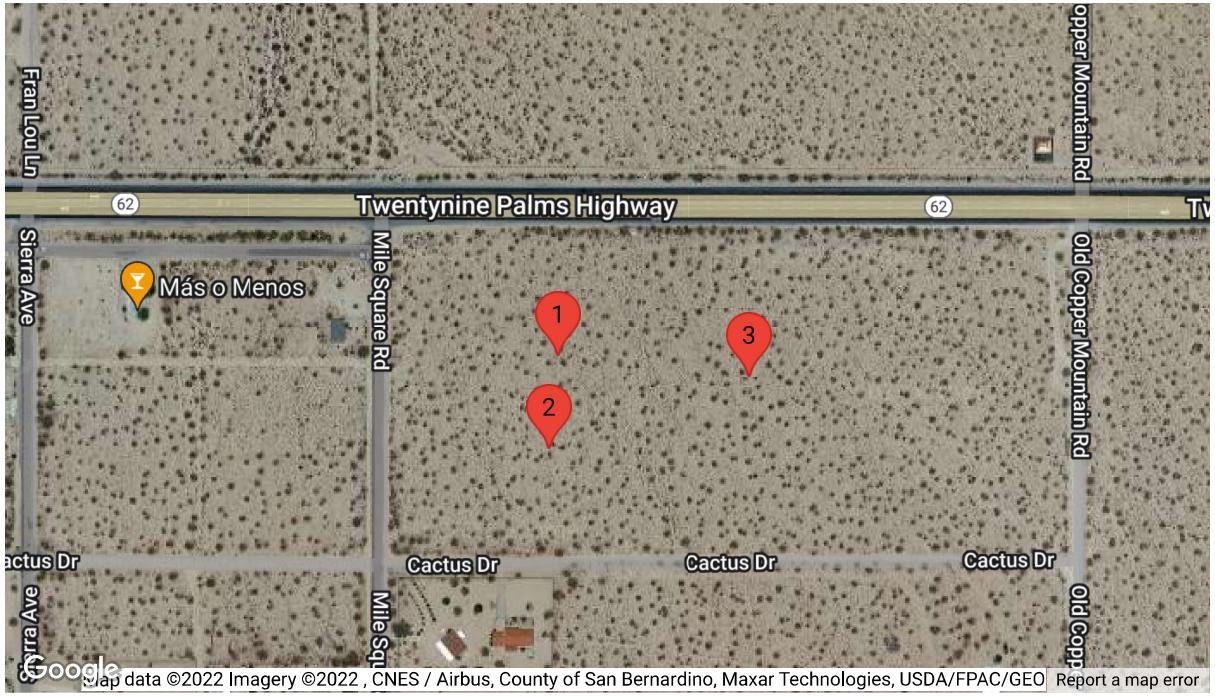
15-Minute Continuous Noise Measurement Datasheet

Project Name:	Cactus Club Hotel Noise
Project: #/Name:	0881-2022-007
Site Address/Location:	Twentynine Palms Hwy & Fran
Date:	11/30/-0001
Field Tech/Engineer:	

Site Observations:

Sunny clear skies, Temps 98F, wind 0-1mph.

Sound Meter:	XL2, NTI	**SN:**	A2A-08562-E0
Settings:	A-weighted, slow, 1-sec, 15-minute interval		
Site Id:	NM1, NM2, NM3		



MD ACOUSTICS

15-Minute Continuous Noise Measurement Datasheet - Cont.

Project Name: Cactus Club Hotel Noise

Site Address/Location: Twentynine Palms Hwy & Fran

Site Id: NM1, NM2, NM3

Figure 1: NM1

Figure 2: NM2

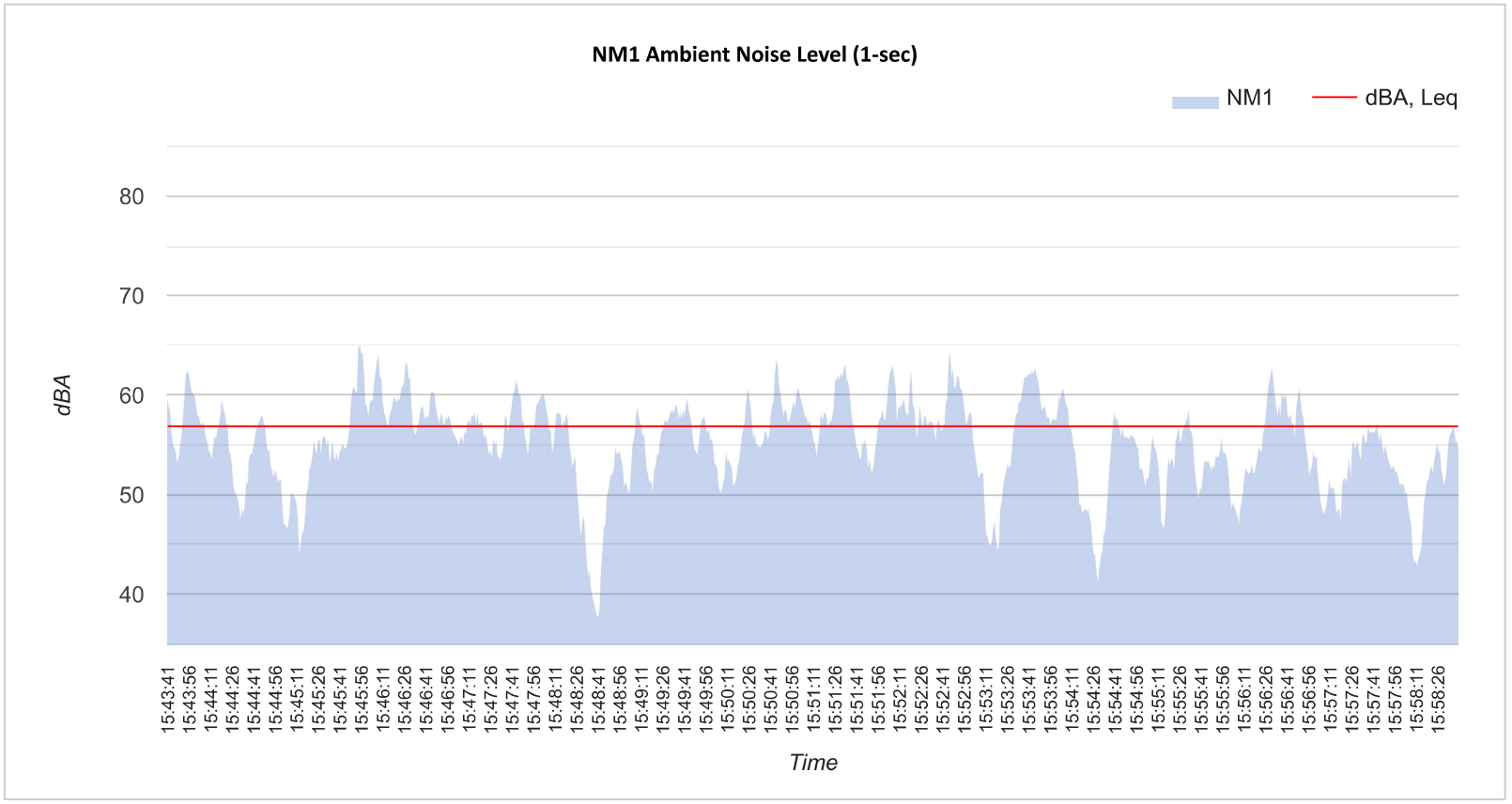
Figure 3: NM3

Table 1: Baseline Noise Measurement Summary

Location	Start	Stop	Leq	Lmax	Lmin	L2	L8	L25	L50	L90
NM1	3:43 PM	3:58 PM	56.9	64.7	37.9	62.5	60.6	57.9	55.6	48.8
NM2	4:01 PM	4:16 PM	54.9	68.9	41.6	61.4	58.1	55	53.2	48.1
NM3	4:17 PM	4:32 PM	55.8	65.4	43.8	61.6	59.2	56.9	54.3	49.2

15-Minute Continuous Noise Measurement Datasheet - Cont.

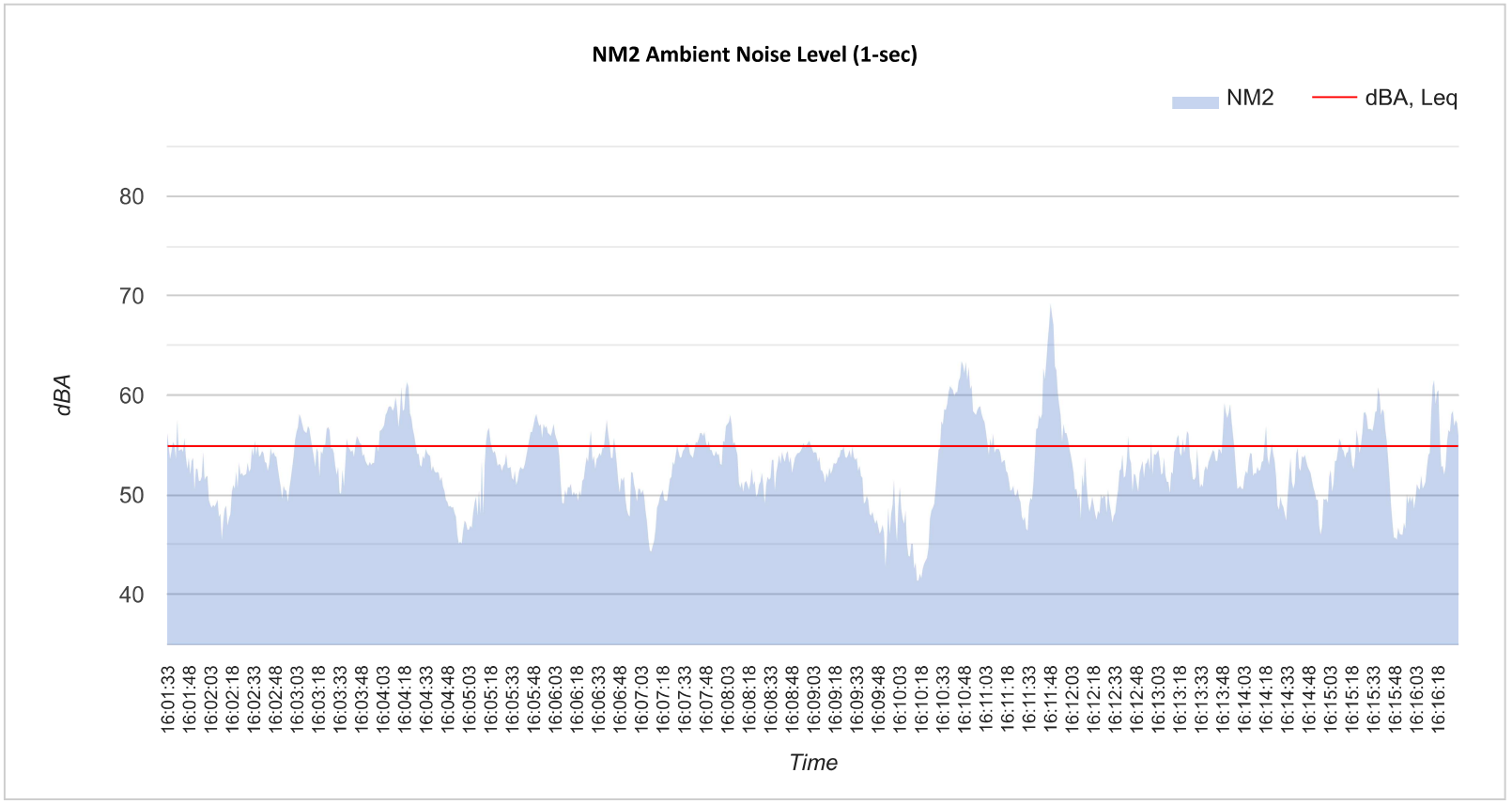
Project Name:	Cactus Club Hotel Noise	**Site Topo:**	Flat desert conditions small hou	**Noise Source(s) w/ Distance:**
Site Address/Location:	Twentynine Palms Hwy & Fran	**Meteorological Cond.:**	98F winds 0-1Mph	West side of site in line with 2 neighboring property lines
Site Id:	NM1	**Ground Type:**	Sandy soil and clay	



MD ACOUSTICS

15-Minute Continuous Noise Measurement Datasheet - Cont.

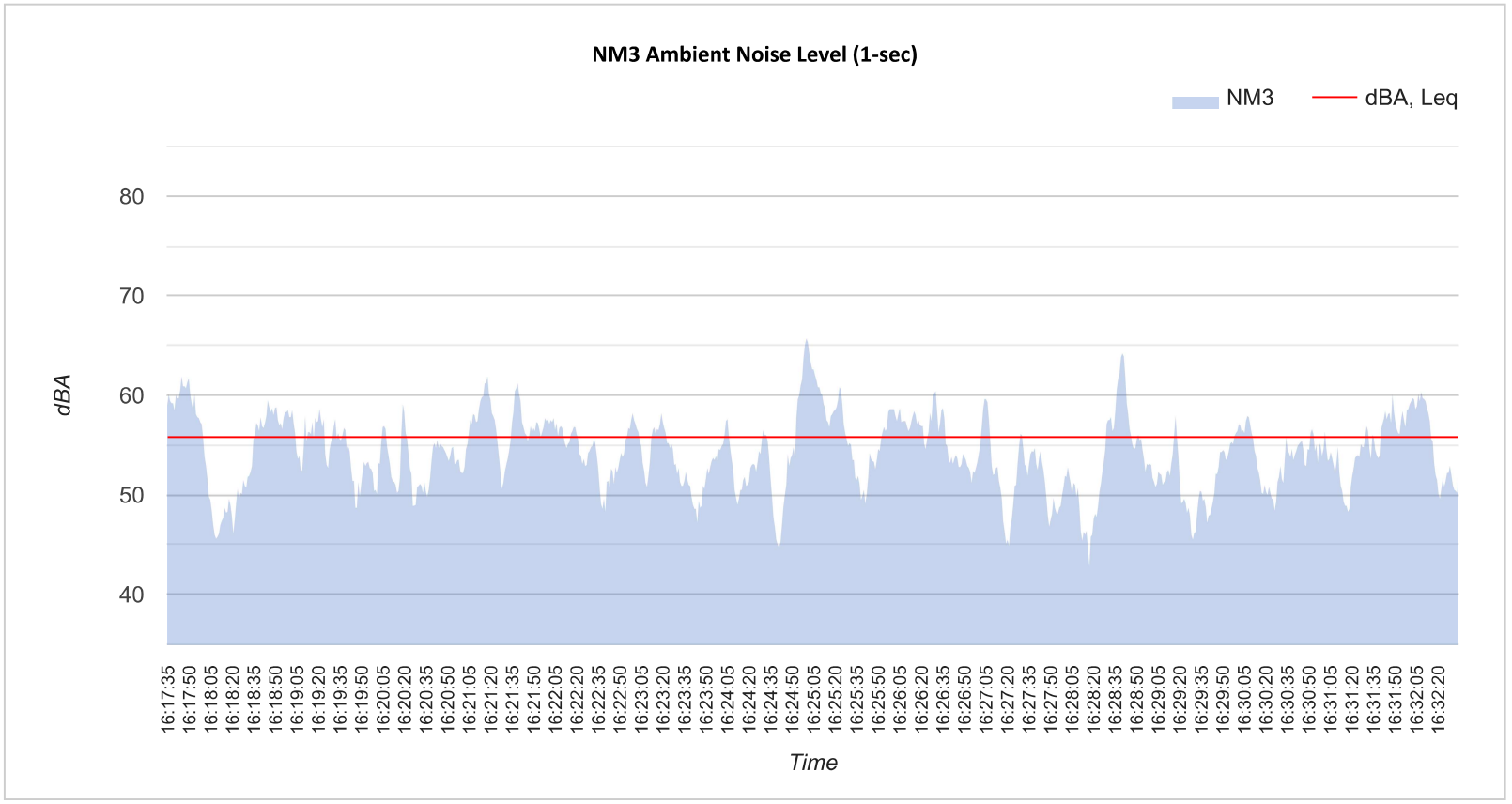
Project Name:	Cactus Club Hotel Noise	**Site Topo:**	Flat desert conditions small hou	**Noise Source(s) w/ Distance:**	
Site Address/Location:	Twentynine Palms Hwy & Fran	**Meteorological Cond.:**	98F winds 0-1Mph	road noise and residential noise	
Site Id:	NM2	**Ground Type:**	Sandy soil and clay		



MD ACOUSTICS

15-Minute Continuous Noise Measurement Datasheet - Cont.

Project Name:	Cactus Club Hotel Noise	**Site Topo:**	Flat desert conditions small hou	**Noise Source(s) w/ Distance:**	
Site Address/Location:	Twentynine Palms Hwy & Fran	**Meteorological Cond.:**	98F winds 0-1Mph		road noise and residential noise
Site Id:	NM3	**Ground Type:**	Sandy soil and clay		



MD ACOUSTICS

Appendix B:

SoundPLAN Noise Modeling Data

Cactus Club Hotel Noise
Contribution spectra - 001: Outdoor SP

Time slice	Sum	25Hz	31.5Hz	40Hz	50Hz	63Hz	80Hz	100Hz	125Hz	160Hz	200Hz	250Hz	315Hz	400Hz	500Hz	630Hz	800Hz	1kHz	1.25kHz	1.6kHz	2kHz	2.5kHz	3.15kHz	4kHz	5kHz	6.3kHz	8kHz	10kHz	12.5kHz	16kHz	20kHz	
	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	
Receiver R1 Fl G Lr,lim dB(A) Leq,d 45.9 dB(A)																																
Leq,d	45.2					31.0			40.5			30.2			35.5			37.7			38.3			35.0			26.7			9.0		
Leq,d	24.9	-23.8	-19.2	-15.3	-2.5	2.3	-3.8	4.0	5.7	4.5	5.6	5.5	7.3	8.4	9.3	13.0	15.0	10.7	12.4	18.2	15.8	16.3	12.5	12.3	8.4	5.5	-3.7	-14.8	-25.3	-40.7	-60.8	
Leq,d	24.6	-26.5	-20.5	-16.5	-3.5	1.5	-4.5	3.5	5.5	4.4	6.4	6.5	8.5	9.5	10.5	14.5	16.4	12.4	14.4	15.7	13.5	14.4	11.0	11.5	8.6	7.1	-0.1	-8.6	-17.1	-29.8	-46.7	
Leq,d	27.1	-24.9	-18.9	-14.9	-1.9	3.1	-2.9	5.2	7.1	6.1	8.1	8.2	10.2	11.2	12.3	16.3	18.3	14.4	16.5	17.9	16.1	17.2	14.4	15.7	13.7	11.9	4.3	-4.6	-12.0	-23.3	-38.3	
Leq,d	27.9	-21.1	-15.3	-11.5	1.2	6.0	-0.2	7.8	9.6	8.5	10.1	10.1	12.0	13.0	14.0	17.9	19.8	15.7	17.6	18.8	16.6	17.4	13.9	14.3	11.4	9.9	2.8	-5.4	-11.8	-21.7	-35.0	
Leq,d	26.4	-25.5	-19.5	-15.5	-2.5	2.5	-3.5	4.6	6.5	5.5	7.5	7.6	9.6	10.6	11.7	15.7	17.7	13.8	15.9	17.3	15.4	16.5	13.7	14.9	12.9	11.0	3.1	-6.1	-13.8	-25.6	-41.2	
Leq,d	23.8	-23.6	-17.8	-14.0	-1.2	3.5	-2.7	5.0	6.7	5.4	6.7	6.6	8.5	9.5	10.4	14.2	16.1	11.9	13.7	14.7	12.3	12.8	9.0	8.7	4.8	1.9	-7.4	-18.7	-29.4	-45.0	-65.5	
Leq,d	25.1	-28.3	-22.3	-18.3	-5.3	-0.3	-6.3	1.8	3.8	2.8	4.9	5.0	7.1	8.3	9.5	13.8	16.1	12.7	15.7	17.7	15.4	15.8	11.9	11.5	7.3	4.0	-6.0	-18.3	-30.5	-48.1	-70.9	
Leq,d	26.6	-25.6	-19.6	-15.6	-2.6	2.4	-3.6	4.4	6.4	5.4	7.4	7.5	9.5	10.6	11.6	15.7	17.7	13.8	16.0	17.5	15.8	17.1	14.7	15.4	11.8	9.3	0.7	-9.7	-19.1	-32.9	-51.2	
Leq,d	32.6	-21.8	-15.7	-11.7	1.3	6.3	0.3	8.5	10.5	9.5	11.6	11.7	13.9	15.1	16.4	20.8	23.4	20.3	23.6	24.7	22.5	23.3	19.8	20.2	17.2	15.6	8.2	-0.2	-7.0	-17.4	-31.3	
Leq,d	27.5	-26.8	-20.8	-16.8	-3.7	1.3	-4.7	3.4	5.4	4.5	6.6	6.8	9.0	10.3	11.7	16.2	18.9	16.2	18.4	19.5	17.3	17.9	14.3	14.4	10.9	8.7	0.3	-9.6	-18.3	-31.4	-48.7	
Receiver R2 Fl G Lr,lim dB(A) Leq,d 38.5 dB(A)																																
Leq,d	34.7					21.2			29.9			16.4			23.5			27.9			28.4			23.7			10.9			-17.8		
Leq,d	17.9	-29.9	-24.7	-20.8	-7.9	-3.0	-9.2	-1.6	0.3	-0.9	-0.1	-0.1	1.9	3.3	4.3	8.1	10.6	6.4	8.2	9.2	6.5	6.6	2.1	0.8	-4.8	-10.3	-23.5	-40.5	-59.2	-85.4		
Leq,d	19.6	-33.7	-27.6	-23.6	-10.6	-5.6	-11.5	-3.5	-1.5	-2.5	-0.4	-0.2	1.9	3.1	4.4	8.8	11.3	8.2	11.0	12.0	9.5	9.7	5.3	4.3	-0.9	-5.8	-18.2	-33.9	-50.8	-74.6		
Leq,d	18.8	-30.0	-24.2	-20.5	-7.7	-3.0	-9.2	-1.4	0.4	-0.8	0.9	0.8	2.7	3.7	4.6	8.5	10.3	6.2	9.7	10.8	8.3	8.5	4.4	3.6	-1.2	-5.5	-16.8	-31.1	-45.9	-66.9	-93.9	
Leq,d	23.1	-30.7	-24.6	-20.6	-7.6	-2.6	-8.6	-0.5	1.5	0.5	2.7	2.8	5.0	6.2	7.6	12.0	14.6	11.6	14.2	15.3	12.9	13.4	9.4	9.0	4.7	1.2	-9.0	-21.7	-34.3	-52.4	-76.0	
Leq,d	25.0	-26.2	-20.2	-16.2	-3.2	1.7	-4.3	3.8	5.7	4.7	6.7	6.7	8.7	9.7	10.7	14.7	17.2	13.1	15.1	16.3	14.0	14.7	11.2	11.4	8.1	6.2	-1.7	-10.8	-18.5	-30.0	-45.0	
Leq,d	16.6	-33.2	-27.1	-23.2	-10.2	-5.2	-11.2	-3.2	-1.3	-2.3	-0.4	-0.4	1.6	2.5	3.5	7.4	9.1	4.9	6.7	7.7	5.1	5.1	0.6	-0.7	-6.4	-12.1	-25.7	-43.1	-62.5	-89.7		
Leq,d	33.0	-14.4	-8.6	-4.9	7.8	12.6	6.3	14.6	16.3	15.1	16.4	16.3	18.1	19.0	19.8	23.5	25.4	21.1	22.8	23.6	21.1	21.5	17.8	17.9	14.8	13.2	6.2	-1.5	-6.9	-15.3	-26.6	
Leq,d	29.5	-20.0	-14.1	-10.4	2.5	7.3	1.1	9.1	11.0	9.8	11.5	11.5	13.4	14.3	15.2	19.0	20.8	16.6	19.7	20.7	19.1	19.6	16.2	16.2	12.6	10.3	2.1	-7.4	-15.2	-26.4	-41.0	
Leq,d	24.9	-23.3	-17.3	-13.4	-0.5	4.3	-1.8	6.0	7.9	6.7	7.7	7.7	9.5	10.7	11.6	15.3	17.4	13.1	14.8	15.7	13.2	13.6	9.6	9.3	5.3	2.4	-7.0	-18.2	-28.9	-44.3	-64.6	
Leq,d	20.1	-34.1	-28.1	-24.1	-11.0	-6.0	-11.9	-3.8	-1.8	-2.8	-0.6	-0.3	1.9	3.3	4.9	9.5	12.8	8.7	10.4	11.5	8.9	11.5	7.0	5.8	0.5	-4.8	-17.6	-34.0	-51.9	-77.1		
Receiver R3 Fl G Lr,lim dB(A) Leq,d 36.8 dB(A)																																
Leq,d	30.3					18.6			26.0			13.2			18.8			22.4			23.7			19.6			8.5			-18.0		
Leq,d	19.2	-24.3	-18.5	-14.7	-2.0	2.7	-3.6	4.0	5.6	4.1	4.9	4.4	5.8	6.6	6.9	10.2	11.7	6.9	7.9	8.3	5.1	4.8	0.2	-0.7	-5.2	-8.6	-18.2	-29.4	-39.0	-53.1	-71.5	
Leq,d	18.5	-24.3	-18.6	-15.0	-2.3	2.2	-4.2	3.4	4.8	3.3	4.5	3.9	5.2	5.6	5.9	9.0	10.2	5.3	7.8	8.3	5.3	5.2	0.7	-0.3	-4.6	-8.1	-16.8	-26.3	-34.2	-46.2	-62.0	
Leq,d	24.3	-18.8	-13.1	-9.4	3.2	7.8	1.4	9.4	10.9	9.4	10.4	9.9	11.3	11.7	12.1	15.3	16.5	11.7	12.8	13.1	10.1	10.0	5.8	5.4	1.8	-0.2	-7.8	-15.4	-20.6	-29.0	-40.4	
Leq,d	25.9	-15.3	-9.7	-6.2	6.4	10.8	4.3	12.3	13.7	12.0	12.6	11.9	13.1	13.4	13.6	16.7	17.7	12.8	13.8	14.0	10.9	10.9	6.9	7.8	5.2	4.4	-1.7	-8.1	-12.1	-18.8	-28.0	
Leq,d	25.1	-17.3	-14.1	-10.5	2.2	6.8	0.4	8.3	9.9	8.5	9.8	9.5	11.1	12.3	12.8	16.3	17.6	12.9	14.2	14.6	12.5	12.5	8.2	7.7	4.0	1.4	-6.9	-15.9	-22.9	-33.1	-45.9	
Leq,d	17.0	-25.8	-20.1	-16.6	-4.0	0.5	-6.0	1.5	2.9	1.3	2.6	2.1	3.4	3.7	4.0	7.1	8.2	5.9	7.1	7.6	4.4	4.0	-0.9	-1.4	-7.2	-12.1	-22.0	-34.1	-45.2	-61.0	-81.8	
Leq,d	22.6	-24.2	-18.4	-14.6	-1.8	2.9	-3.3	4.4	6.1	4.8	6.1	5.9	7.7	8.7	9.4	13.1	14.9	10.5	12.1	12.8	11.6	11.7	7.5	6.7	2.1	-1.7	-12.1	-24.8	-37.0	-54.2	-76.2	
Leq,d	26.9	-20.5	-14.6	-10.8	2.0	6.7	0.5	8.3	10.0	8.8	10.1	10.0	11.8	12.8	13.6	17.4	19.2	15.0	16.7	17.6	15.2	15.6	11.7	11.6	8.1	5.6	-2.8	-12.6	-21.0	-33.5	-49.9	
Leq,d	32.5	-9.5	-6.1	-2.4	10.2	14.8	8.4	16.6	18.1	16.6	17.5	17.0	18.8	19.6	20.3	23.6	24.9	20.2	21.5	21.9	19.0	19.0	14.9	15.6	12.0	9.9	2.4	-5.6	-10.2	-17.0	-26.4	

Cactus Club Hotel Noise
Contribution spectra - 001: Outdoor SP

Time slice	Sum	25Hz	31.5Hz	40Hz	50Hz	63Hz	80Hz	100Hz	125Hz	160Hz	200Hz	250Hz	315Hz	400Hz	500Hz	630Hz	800Hz	1kHz	1.25kHz	1.6kHz	2kHz	2.5kHz	3.15kHz	4kHz	5kHz	6.3kHz	8kHz	10kHz	12.5kHz	16kHz	20kHz	
	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	
Leq,d	14.2	-27.4	-21.8	-18.2	-5.6	-1.0	-7.5	0.0	1.4	-0.2	1.1	0.4	1.7	1.9	2.1	5.2	6.2	1.3	2.2	2.5	-0.8	-1.1	-5.7	-6.5	-9.8	-12.5	-21.2	-31.5	-40.9	-54.8	-73.1	
Receiver R4 Fl G Lr,lim dB(A) Leq,d 37.0 dB(A)																																
Leq,d	34.6					21.5			30.5			18.6			24.0			26.9			27.4			23.6			13.7			-8.6		
Leq,d	28.9	-19.7	-13.8	-9.8	3.1	8.0	2.0	10.1	12.0	10.8	11.9	11.9	13.7	14.9	15.7	19.5	21.5	17.1	18.7	19.5	16.8	17.1	13.2	13.0	9.4	7.3	-0.6	-9.5	-16.6	-27.2	-41.2	
Leq,d	18.7	-23.3	-17.6	-14.0	-1.4	3.1	-3.3	4.2	5.7	4.1	5.2	4.6	5.9	6.3	6.6	9.7	10.9	6.0	7.0	7.3	4.2	3.9	-0.5	-1.2	-5.4	-7.9	-15.7	-24.8	-32.4	-43.9	-59.1	
Leq,d	14.5	-26.8	-21.2	-17.7	-5.2	-0.8	-7.3	0.1	1.5	-0.1	1.1	0.6	1.9	2.2	2.4	5.6	6.7	1.7	2.7	3.0	-0.3	-0.6	-5.4	-6.4	-11.1	-14.2	-23.3	-34.3	-44.5	-59.5	-79.2	
Leq,d	13.1	-28.3	-22.6	-19.1	-6.5	-2.1	-8.5	-1.1	0.3	-1.3	-0.3	-0.9	0.4	0.8	1.0	4.2	5.3	0.4	1.3	1.6	-1.8	-2.2	-7.1	-8.4	-13.5	-17.3	-27.3	-39.6	-51.7	-69.1	-91.8	
Leq,d	9.7	-31.9	-26.3	-22.7	-10.1	-5.6	-12.1	-4.7	-3.2	-4.8	-3.6	-4.1	-2.8	-2.5	-2.3	0.9	1.9	-3.1	-2.1	-2.0	-5.4	-6.2	-11.4	-13.4	-19.4	-25.1	-37.3	-52.8	-69.3	-92.8		
Leq,d	30.1	-15.8	-10.0	-6.2	6.6	11.4	5.2	13.5	15.2	13.9	15.2	14.9	16.5	17.2	17.7	21.1	22.6	17.9	19.2	19.6	16.8	16.8	12.7	12.6	9.1	7.3	0.1	-7.7	-13.3	-21.7	-32.6	
Leq,d	9.2	-32.9	-27.3	-23.6	-11.0	-6.4	-12.8	-5.3	-3.8	-5.3	-4.0	-4.5	-3.2	-2.8	-2.6	0.6	1.6	-3.4	-2.5	-2.5	-6.1	-7.1	-12.9	-15.5	-22.7	-30.3	-45.7	-65.0	-87.0			
Leq,d	10.6	-31.0	-25.3	-21.7	-9.2	-4.7	-11.1	-3.7	-2.3	-3.9	-2.6	-3.2	-1.9	-1.5	-1.3	1.8	2.9	-2.1	-1.2	-1.1	-4.6	-5.5	-10.9	-13.2	-19.7	-26.1	-39.5	-56.5	-75.2			
Leq,d	12.8	-29.3	-23.7	-20.1	-7.5	-2.9	-9.3	-1.7	-0.2	-1.8	-0.4	-1.0	0.3	0.7	0.9	4.0	5.1	0.1	1.0	1.2	-2.1	-2.7	-7.8	-9.5	-15.1	-19.7	-30.9	-44.8	-59.2	-79.8		
Leq,d	22.6	-20.9	-15.1	-11.4	1.3	5.9	-0.4	7.4	8.9	7.4	8.5	8.1	9.5	10.1	10.4	13.7	15.0	10.2	11.3	11.6	8.6	8.5	4.2	3.7	-0.2	-2.6	-10.7	-19.8	-26.3	-36.2	-49.4	

Source group	Source type	Tr. lane	Leq,d dB(A)	A dB	
Receiver R1 Fl G Lr,lim dB(A) Leq,d 45.9 dB(A)					
Default parking lot noise	PLot		45.2	0.0	
Default industrial noise	Point		23.8	0.0	
Default industrial noise	Point		25.1	0.0	
Default industrial noise	Point		26.6	0.0	
Default industrial noise	Point		32.6	0.0	
Default industrial noise	Point		27.5	0.0	
Default industrial noise	Point		24.9	0.0	
Default industrial noise	Point		24.6	0.0	
Default industrial noise	Point		27.1	0.0	
Default industrial noise	Point		27.9	0.0	
Default industrial noise	Point		26.4	0.0	
Receiver R2 Fl G Lr,lim dB(A) Leq,d 38.5 dB(A)					
Default parking lot noise	PLot		34.7	0.0	
Default industrial noise	Point		16.6	0.0	
Default industrial noise	Point		33.0	0.0	
Default industrial noise	Point		29.5	0.0	
Default industrial noise	Point		24.9	0.0	
Default industrial noise	Point		20.1	0.0	
Default industrial noise	Point		17.9	0.0	
Default industrial noise	Point		19.6	0.0	
Default industrial noise	Point		18.8	0.0	
Default industrial noise	Point		23.1	0.0	
Default industrial noise	Point		25.0	0.0	
Receiver R3 Fl G Lr,lim dB(A) Leq,d 36.8 dB(A)					
Default parking lot noise	PLot		30.3	0.0	
Default industrial noise	Point		17.0	0.0	
Default industrial noise	Point		22.6	0.0	
Default industrial noise	Point		26.9	0.0	
Default industrial noise	Point		32.5	0.0	
Default industrial noise	Point		14.2	0.0	
Default industrial noise	Point		19.2	0.0	
Default industrial noise	Point		18.5	0.0	
Default industrial noise	Point		24.3	0.0	
Default industrial noise	Point		25.9	0.0	
Default industrial noise	Point		25.1	0.0	
Receiver R4 Fl G Lr,lim dB(A) Leq,d 37.0 dB(A)					
Default parking lot noise	PLot		34.6	0.0	
Default industrial noise	Point		30.1	0.0	
Default industrial noise	Point		9.2	0.0	
Default industrial noise	Point		10.6	0.0	
Default industrial noise	Point		12.8	0.0	
Default industrial noise	Point		22.6	0.0	
Default industrial noise	Point		28.9	0.0	

Source group	Source type	Tr. lane	Leq,d dB(A)	A dB	
Default industrial noise	Point		18.7	0.0	
Default industrial noise	Point		14.5	0.0	
Default industrial noise	Point		13.1	0.0	
Default industrial noise	Point		9.7	0.0	

Cactus Club Hotel Noise
Octave spectra of the sources in dB(A) - 001: Outdoor SP

Name	Source type	l or A	Li	R'w	L'w	Lw	KI	KT	LwMax	DO-Wall	Time histogram	Emission spectrum	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	16kHz
		m,m²	dB(A)	dB	dB(A)	dB(A)	dB	dB	dB(A)	dB			dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
Parking	PLot	2674.62			56.4	90.7	0.0	0.0		0	.3 event per hr	Typical spectrum	74.0	85.6	78.1	82.6	82.7	83.1	80.4	74.2	61.4
HVAC	Point				78.0	78.0	0.0	0.0		0	100%/24h	HVAC: 67.7dB @ 3ft - Carrier 50TFQ0006 -	55.1	63.6	66.0	70.3	72.6	72.2	69.2	64.3	52.0
HVAC	Point				78.0	78.0	0.0	0.0		0	100%/24h	HVAC: 67.7dB @ 3ft - Carrier 50TFQ0006 -	55.1	63.6	66.0	70.3	72.6	72.2	69.2	64.3	52.0
HVAC	Point				78.0	78.0	0.0	0.0		0	100%/24h	HVAC: 67.7dB @ 3ft - Carrier 50TFQ0006 -	55.1	63.6	66.0	70.3	72.6	72.2	69.2	64.3	52.0
HVAC	Point				78.0	78.0	0.0	0.0		0	100%/24h	HVAC: 67.7dB @ 3ft - Carrier 50TFQ0006 -	55.1	63.6	66.0	70.3	72.6	72.2	69.2	64.3	52.0
HVAC	Point				78.0	78.0	0.0	0.0		0	100%/24h	HVAC: 67.7dB @ 3ft - Carrier 50TFQ0006 -	55.1	63.6	66.0	70.3	72.6	72.2	69.2	64.3	52.0
HVAC	Point				80.0	80.0	0.0	0.0		0	100%/24h	HVAC: 67.7dB @ 3ft - Carrier 50TFQ0006 -	57.1	65.6	68.0	72.3	74.6	74.2	71.2	66.3	54.0
HVAC	Point				80.0	80.0	0.0	0.0		0	100%/24h	HVAC: 67.7dB @ 3ft - Carrier 50TFQ0006 -	57.1	65.6	68.0	72.3	74.6	74.2	71.2	66.3	54.0
HVAC	Point				80.0	80.0	0.0	0.0		0	100%/24h	HVAC: 67.7dB @ 3ft - Carrier 50TFQ0006 -	57.1	65.6	68.0	72.3	74.6	74.2	71.2	66.3	54.0
HVAC	Point				80.0	80.0	0.0	0.0		0	100%/24h	HVAC: 67.7dB @ 3ft - Carrier 50TFQ0006 -	57.1	65.6	68.0	72.3	74.6	74.2	71.2	66.3	54.0
HVAC	Point				78.0	78.0	0.0	0.0		0	100%/24h	HVAC: 67.7dB @ 3ft - Carrier 50TFQ0006 -	55.1	63.6	66.0	70.3	72.6	72.2	69.2	64.3	52.0

Appendix C:

FHWA Roadway Noise Modeling Worksheets

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

PROJECT: Cactus Club Hotel
ROADWAY: Twentynine Palms Highway
LOCATION: Mile Square Road

JOB #: 0881-2022-07
DATE: 14-Aug-23
ENGINEER R. Edelman

NOISE INPUT DATA Existing

ROADWAY CONDITIONS

ADT =	15,000	
SPEED =	65	
PK HR % =	10	
NEAR LANE/FAR LANE DI	48	
ROAD ELEVATION =	0.0	
GRADE =	0.0	%
PK HR VOL =	1,500	

RECEIVER INPUT DATA

RECEIVER DISTANCE =	200	
DIST C/L TO WALL =	30	
RECEIVER HEIGHT =	5.0	
WALL DISTANCE FROM RECEIVEF	0	
PAD ELEVATION =	0.0	
ROADWAY VIEW: LF ANGLE=	-90	
RT ANGLE=	90	
DF ANGLE=	180	

SITE CONDITIONS

AUTOMOBILES =	10	
MEDIUM TRUCKS =	10	(10 = HARD SITE, 15 = SOFT SITE)
HEAVY TRUCKS =	10	

WALL INFORMATION

HTH WALL	0.0	
AMBIENT=	0.0	
BARRIER =	0	(0 = WALL, 1 = BERM)

VEHICLE MIX DATA

VEHICLE TYPE	DAY	EVENING	NIGHT	DAILY
AUTOMOBILES	0.755	0.140	0.105	0.9410
MEDIUM TRUCK	0.489	0.022	0.489	0.0372
HEAVY TRUCKS	0.473	0.054	0.473	0.0218

MISC. VEHICLE INFO

VEHICLE TYPE	HEIGHT	SLE DISTANCE	GRADE ADJUSTMENT
AUTOMOBILES	2.0	198.58	- -
MEDIUM TRUCKS	4.0	198.56	- -
HEAVY TRUCKS	8.0	198.58	0.00

NOISE OUTPUT DATA

NOISE IMPACTS (WITHOUT TOPO OR BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	67.5	65.5	64.2	58.2	66.6	67.3
MEDIUM TRUCKS	59.7	55.8	48.3	57.0	63.2	63.2
HEAVY TRUCKS	60.9	56.8	53.4	58.1	64.3	64.4
NOISE LEVELS (dBA)	68.9	66.5	64.7	62.6	69.7	70.1

NOISE IMPACTS (WITH TOPO AND BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	67.5	65.5	64.2	58.2	66.6	67.3
MEDIUM TRUCKS	59.7	55.8	48.3	57.0	63.2	63.2
HEAVY TRUCKS	60.9	56.8	53.4	58.1	64.3	64.4
NOISE LEVELS (dBA)	68.9	66.5	64.7	62.6	69.7	70.1

NOISE CONTOUR (FT)				
NOISE LEVELS	70 dBA	65 dBA	60 dBA	55 dBA
CNEL	203	642	2031	6423
LDN	187	592	1873	5922

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

PROJECT: Cactus Club Hotel
ROADWAY: Twentynine Palms Highway
LOCATION: Mile Square Road

JOB #: 0881-2022-07
DATE: 14-Aug-23
ENGINEER R. Edelman

NOISE INPUT DATA Existing + Project

ROADWAY CONDITIONS

ADT =	15,478	
SPEED =	65	
PK HR % =	10	
NEAR LANE/FAR LANE DI	48	
ROAD ELEVATION =	0.0	
GRADE =	0.0	%
PK HR VOL =	1,548	

RECEIVER INPUT DATA

RECEIVER DISTANCE =	200	
DIST C/L TO WALL =	30	
RECEIVER HEIGHT =	5.0	
WALL DISTANCE FROM RECEIVEF	0	
PAD ELEVATION =	0.0	
ROADWAY VIEW: LF ANGLE=	-90	
RT ANGLE=	90	
DF ANGLE=	180	

SITE CONDITIONS

AUTOMOBILES =	10	
MEDIUM TRUCKS =	10	(10 = HARD SITE, 15 = SOFT SITE)
HEAVY TRUCKS =	10	

WALL INFORMATION

HTH WALL	0.0	
AMBIENT=	0.0	
BARRIER =	0	(0 = WALL, 1 = BERM)

VEHICLE MIX DATA

VEHICLE TYPE	DAY	EVENING	NIGHT	DAILY
AUTOMOBILES	0.755	0.140	0.105	0.9410
MEDIUM TRUCK	0.489	0.022	0.489	0.0372
HEAVY TRUCKS	0.473	0.054	0.473	0.0218

MISC. VEHICLE INFO

VEHICLE TYPE	HEIGHT	SLE DISTANCE	GRADE ADJUSTMENT
AUTOMOBILES	2.0	198.58	- -
MEDIUM TRUCKS	4.0	198.56	- -
HEAVY TRUCKS	8.0	198.58	0.00

NOISE OUTPUT DATA

NOISE IMPACTS (WITHOUT TOPO OR BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	67.7	65.7	64.4	58.3	66.8	67.4
MEDIUM TRUCKS	59.8	55.9	48.5	57.2	63.3	63.4
HEAVY TRUCKS	61.0	57.0	53.6	58.2	64.4	64.5
NOISE LEVELS (dBA)	69.1	66.6	64.8	62.7	69.9	70.2

NOISE IMPACTS (WITH TOPO AND BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	67.7	65.7	64.4	58.3	66.8	67.4
MEDIUM TRUCKS	59.8	55.9	48.5	57.2	63.3	63.4
HEAVY TRUCKS	61.0	57.0	53.6	58.2	64.4	64.5
NOISE LEVELS (dBA)	69.1	66.6	64.8	62.7	69.9	70.2

NOISE CONTOUR (FT)				
NOISE LEVELS	70 dBA	65 dBA	60 dBA	55 dBA
CNEL	210	663	2096	6628
LDN	193	611	1932	6111

Appendix D:

Construction Noise Modeling Output

Receptor - Residence to the Southwest

Construction Phase Equipment Item	# of Items	Item Lmax at 50 feet, dBA[1]	Edge of Site to Receptor, feet	Center of Site to Receptor, feet	Item Usage Percent[1]	Ground Factor[2]	Usage Factor	Receptor Item Lmax, dBA	Recptor. Item Leq, dBA
SITE PREP									
Tractor	4	84	400	560	40	0.66	0.40	60.0	52.1
Dozer	3	82	400	560	40	0.66	0.40	58.0	50.1
							Log Sum	60.0	59.8
GRADE									
Excavator	1	81	400	560	40	0.66	0.40	57.0	49.1
Grader	1	85	400	560	40	0.66	0.40	61.0	53.1
Dozer	1	82	400	560	40	0.66	0.40	58.0	50.1
Tractor	3	84	400	560	40	0.66	0.40	60.0	52.1
								61.0	55.9
BUILD									
Crane	1	81	400	560	16	0.66	0.16	57.0	45.1
Man lift	3	75	400	560	20	0.66	0.20	51.0	40.1
Generator	1	81	400	560	50	0.66	0.50	57.0	50.1
Tractor	3	84	400	560	40	0.66	0.40	60.0	52.1
Welder/Torch	1	74	400	560	40	0.66	0.40	50.0	42.1
								60.0	52.2
PAVE									
Paver	1	77	400	560	50	0.66	0.50	53.0	46.1
Concrete Mixer Truck	2	79	400	560	40	0.66	0.40	55.0	47.1
Tractor	1	84	400	560	40	0.66	0.40	60.0	52.1
Pavement Scarifier	2	90	400	560	20	0.66	0.20	66.0	55.1
Roller	2	80	400	560	20	0.66	0.20	56.0	45.1
								66.0	60.1
ARCH COAT									
Compressor (air)	1	78	400	560	40	0.66	0.40	54.0	46.1
								54.0	46.1

[1]FHWA Construction Noise Handbook: Table 9.1 RCNM Default Noise Emission Reference Levels and Usage Factors

VIBRATION LEVEL IMPACT

Project:	Cactus Club Hotel	Date: 8/14/23
Source:	Large Bulldozer	
Scenario:	Unmitigated	
Location:	Southwest residences	
Address:	Twentynine Palms Highway	

PPV = PPVref(25/D)^n (in/sec)

DATA INPUT

Equipment = Type	1	Vibratory Roller	INPUT SECTION IN BLUE
PPVref =	0.21	Reference PPV (in/sec) at 25 ft.	
D =	400.00	Distance from Equipment to Receiver (ft)	
n =	1.10	Vibration attenuation rate through the ground	

Note: Based on reference equations from Vibration Guidance Manual, California Department of Transportation, 2006, pgs 38-43.

DATA OUT RESULTS

PPV =	**0.010**	IN/SEC	OUTPUT IN RED