APPENDIX E

Noise and Vibration Technical Report

Landers Hotel Project

Noise and Vibration Technical Report

August 2024

Prepared for:

County of San Bernardino
Land Use Services Department
385 N. Arrowhead Avenue
San Bernardino, CA 92415

Prepared by:

Impact Sciences, Inc.
811 W. 7th Street, Suite 200
Los Angeles, CA 90017
Contact: Brett Pomeroy, Associate Principal

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

1.0 INTRODUCTION

The purpose of this report is to evaluate the potential for noise and groundborne vibration impacts associated with the proposed project located along Belfield Boulevard on APN# 0630-031-05 and 0630-031-06 (Project) within San Bernardino County (County). This report includes an evaluation of potential impacts associated with substantial temporary and permanent increases in ambient noise levels in the vicinity of the Project Site; exposure of people in the vicinity of the Project Site to excessive noise or groundborne vibration levels; and whether exposure is in excess of standards established in the County's General Plan or Noise Ordinance. This report has been prepared by Impact Sciences, in support of the environmental documentation being prepared pursuant to the California Environmental Quality Act (CEQA).

1.1 PROJECT LOCATION

The Project Site is located off of Belfield Boulevard (APN# 0630-031-05 and 0630-031-06, "Project Site") within the unincorporated community of Landers in the County of San Bernardino. The Project Site is approximately 5.8 acres, located on the east side of Belfield Boulevard, west of Pipes Wash, north of Chuckawalla Road/Amargon Road, and south of Mirasol Road. The Project Site and the parcels directly north and south of the Project Site are zoned Homestead Valley/Rural Commercial (HV/CR). The parcels west of the Project Site are zoned Homestead Valley/Rural Living (HV/RL) and parcels to the east are zoned Government Land.[1](see **Figure 1, Aerial Photograph of the Project Site**).

1.2 PROJECT DESCRIPTION

The applicant proposes to develop a single-story lodge comprised of 35 guest rooms ("Project"). The main lodge includes a restaurant, bar, and community market, offering coffee and essential food goods to the neighborhood. The lodge's patio includes outdoor dining seats, a pool, hot tub, and spa structure. The spa is a wellness center consisting of a smaller soaking pool, hot tub, sauna, and showers. The pavilion is a structure intended for exercise classes and multipurpose meetings. The Project totals approximately 30,000 square feet of interior space. The Project Site is currently undeveloped vacant commercial land that is occupied by shrubs and four Joshua trees. The Project will not include the removal of any Joshua trees.

For the purpose of analyzing impacts associated with construction activities, this analysis assumes a construction schedule of approximately 12 months with site preparation/grading beginning in 2024. This analysis assumes the Project will be fully operational in 2025. This assumption is conservative and yields

[1] San Bernardino County Land Use Plan, General Plan, Land Use Zoning Districts: F13A, Landers. Available: https://www.sbcounty.gov/uploads/LUS/GeneralPlan/DesertRegion/FI13A_20100422.pdf , accessed May 16, 2023.

the maximum daily impacts. Construction activities associated with the Project would be undertaken in two main steps: (1) grading/foundation preparation and (2) building construction (including paving and architectural coatings). The Project Site is undeveloped and would not require any demolition.

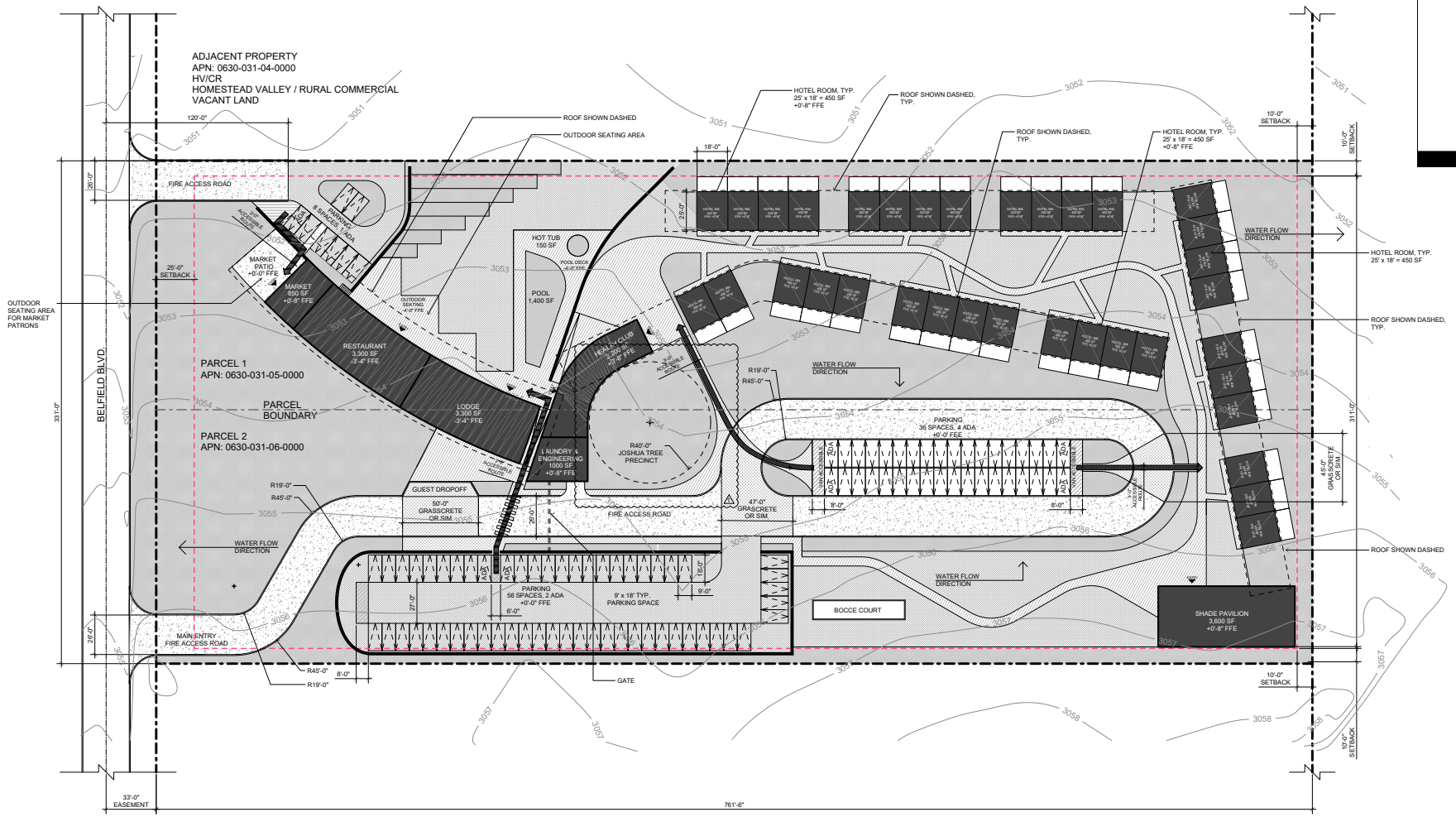
SOURCE: Esri, 2024

FIGURE **1**

IMPACT SCIENCES

Aerial Photograph of the Project Site

1537.007•01/24



SOURCE: West of West, 2024

FIGURE **2**

IMPACT SCIENCES

Project Site Plan

1537.007•08/24

2.0 ENVIRONMENTAL SETTING

2.1 FUNDAMENTALS OF NOISE & VIBRATION

Noise

Noise is usually defined as unwanted sound that is an undesirable byproduct of society's normal day-to-day activities. Sound becomes unwanted when it interferes with normal activities, when it causes actual physical harm, and/or when it has adverse effects on health. Noise is measured on a logarithmic scale of sound pressure level known as a decibel (dB). The human ear does not respond uniformly to sounds at all frequencies. For example, the human ear is less sensitive to low and high frequencies than medium frequencies, which more closely correspond with human speech. In response to the sensitivity of the human ear to different frequencies, the A-weighted noise level (or scale), which corresponds better with people's subjective judgment of sound levels, has been developed. This A-weighted sound level, referenced in units of dB(A), is measured on a logarithmic scale such that a doubling of sound energy results in a 3 dB(A) increase in noise level. Typically, changes in a community noise level of less than 3 dB(A) are not noticed by the human ear.[2] Changes from 3 to 5 dB(A) may be noticed by some individuals who are sensitive to changes in noise. A greater than 5 dB(A) increase is readily noticeable, while the human ear perceives a 10 dB(A) increase in sound level to be a doubling of sound.

On the A-weighted scale, the range of human hearing extends from approximately 3 to 140 dB(A). **Table 1, A-Weighted Decibel Scale**, provides examples of A-weighted noise levels from common sources. Noise sources occur in two forms: (1) point sources, such as stationary equipment or individual motor vehicles; and (2) line sources, such as a roadway with a large number of point sources (motor vehicles). Sound generated by a point source typically diminishes (attenuates) at a rate of 6 dB(A) for each doubling of distance from the source to the receptor at acoustically "hard" sites and 7.5 dB(A) at acoustically "soft" sites.[3] For example, if a noise source produces a noise level of 89 dB(A) at a reference distance of 50 feet, the noise level would be 83 dB(A) at a distance of 100 feet from the noise source, 77 dB(A) at a distance of 200 feet, and so on. Noise generated by a mobile source will decrease by approximately 3 dB(A) over hard surfaces and 4.5 dB(A) over soft surfaces for each doubling of distance.

---

2 California Department of Transportation (Caltrans), *Technical Noise Supplement to the Traffic Noise Analysis Protocol*, 2013. Available online at: https://dot.ca.gov/-/media/dot-media/programs/environmental-analysis/documents/env/tens-sep2013-a11y.pdf, accessed January 25, 2024..

3 Federal Highway Administration, *Highway Noise Fundamentals*, (1980) 97. Examples of "hard" or reflective sites include asphalt, concrete, and hard and sparsely vegetated soils. Examples of acoustically "soft" or absorptive sites include soft, sand, plowed farmland, grass, crops, heavy ground cover, etc.

Table 1
A-Weighted Decibel Scale

Typical A-Weighted Sound Levels	Sound Level (dB(A), Leq)
Threshold of Pain	140
Jet Takeoff at 100 Meters	125
Jackhammer at 15 Meters	95
Heavy Diesel Truck at 15 Meters	85
Conversation at 1 Meter	60
Soft Whisper at 2 Meters	35

Source: United States Occupational Safety & Health Administration, Noise and Hearing Conservation Technical Manual, 1999.

Sound levels also can be attenuated by man-made or natural barriers (e.g., sound walls, berms, and ridges), as well as elevational differences. Noise is most audible when traveling by direct line-of-sight, an interrupted visual path between the noise source and noise receptor. Barriers, such as walls or buildings that break the line-of-sight between the source and the receiver, can greatly reduce noise levels from the source since sound can only reach the receiver by diffraction. However, if a barrier is not high or long enough to break the line-of-sight from the source to the receiver, its effectiveness is greatly reduced.

Solid walls and berms may reduce noise levels by 5 to 10 dB(A) depending on their height and distance relative to the noise source and the noise receptor.[4] Sound levels may also be attenuated 3 dB(A) by a first row of houses and 1.5 dB(A) for each additional row of houses.[5] The minimum noise attenuation provided by typical structures in California is provided in **Table 2, Building Noise Reduction Factors**.

4 Federal Highway Administration, *Highway Noise Mitigation*, (1980) 18.

5 California Department of Transportation (Caltrans), *Technical Noise Supplement to the Traffic Noise Analysis Protocol*, 2013. Available at: https://dot.ca.gov/-/media/dot-media/programs/environmental-analysis/documents/env/tens-sep2013-a11y.pdf

Table 2
Building Noise Reduction Factors

Building Type	Window Condition	Noise Reduction Due to Exterior of the Structure (dB(A))
All	Open	10
Light Frame	Ordinary Sash (closed)	20
	Storm Windows	25
Masonry	Single Glazed	25
	Double Glazed	35

Source: Federal Highway Administration, Highway Traffic Noise: Analysis and Abatement Guidance. December 2011.

Sound Rating Scales

Various rating scales approximate the human subjective assessment to the "loudness" or "noisiness" of a sound. Noise metrics have been developed to account for additional parameters, such as duration and cumulative effect of multiple events. Noise metrics are categorized as single event metrics and cumulative metrics, as summarized below.

In order to simplify the measurement and computation of sound loudness levels, frequency weighted networks have obtained wide acceptance. The A-weighted scale, discussed above, has become the most prominent of these scales and is widely used in community noise analysis. Its advantages are that it has shown good correlation with community response and is easily measured. The metrics used in this analysis are all based upon the dB(A) scale.

Equivalent Noise Level

Equivalent Noise Level (Leq) is the sound level corresponding to a steady-state A-weighted sound level containing the same total energy as several single event noise exposure level events during a given sample period. Leq is the "acoustic energy" average noise level during the period of the sample. It is based on the observation that the potential for noise annoyance is dependent on the total acoustical energy content of the noise. The equivalent noise level is expressed in units of dB(A). Leq can be measured for any period, but is typically measured for 15 minutes, 1 hour, or 24 hours. Leq for a 1-hour period is used by the Federal Highway Administration (FHWA) for assessing highway noise impacts. Leq for 1 hour is referred to as the Hourly Noise Level (HNL) in the California Airport Noise Regulations and is used to develop Community

Noise Equivalent Level values for aircraft operations. Construction noise levels and ambient noise measurements in this section use the Leq scale.

Community Noise Equivalent Level

Community Noise Equivalent Level (CNEL) is a 24-hour, time-weighted energy average noise level based on the A-weighted decibel. It is a measure of the overall noise experienced during an entire day. The term "time-weighted" refers to the penalties attached to noise events occurring during certain sensitive periods. In the CNEL scale, 5 decibels (dB) are added to measured noise levels occurring between the hours of 7 P.M. and 10 P.M. For measured noise levels occurring between the hours of 10 P.M. and 7 A.M., 10 dB are added. These decibel adjustments are an attempt to account for the higher sensitivity to noise in the evening and nighttime hours and the expected lower ambient noise levels during these periods. Existing and projected future traffic noise levels in this section use the CNEL scale.

Day-Night Average Noise Level

The day-night average sound level (Ldn) is another average noise level over a 24-hour period. Noise levels occurring between the hours of 10 P.M. and 7 A.M. are increased by 10 dB. This noise is weighted to take into account the decrease in community background noise of 10 dB(A) during this period. Noise levels measured using the Ldn scale are typically similar to CNEL measurements.

Adverse Effects of Noise Exposure

Noise is known to have several adverse effects on humans, which has led to laws and standards being set to protect public health and safety, and to ensure compatibility between land uses and activities. Adverse effects of noise on people include hearing loss, communication interference, sleep interference, physiological responses, and annoyance. Each of these potential noise impacts on people is briefly discussed in the following narrative.

Hearing Loss

Hearing loss is generally not a community noise concern, even near a major airport or a major freeway. The potential for noise-induced hearing loss is more commonly associated with occupational noise exposures in heavy industry, very noisy work environments with long-term exposure, or certain very loud recreational activities (e.g., target shooting and motorcycle or car racing). The Occupational Safety and Health Administration (OSHA) identifies a noise exposure limit of 90 dB(A) for 8 hours per day to protect from hearing loss (higher limits are allowed for shorter duration exposures). Noise levels in neighborhoods, even in very noisy neighborhoods, are not sufficiently loud enough to cause hearing loss.

Communication Interference

Communication interference is one of the primary concerns in environmental noise. Communication interference includes speech disturbance and intrusion with activities such as watching television. Noise can also interfere with communications such as within school classrooms. Normal conversational speech is in the range of 60 to 65 dB(A) and any noise in this range or louder may interfere with speech.

Sleep Interference

Noise can make it difficult to fall asleep, create momentary disturbances of natural sleep patterns by causing shifts from deep to lighter stages, and cause awakening. Noise may even cause awakening that a person may or may not be able to recall.

Physiological Responses

Physiological responses are those measurable effects of noise on people that are realized as changes in pulse rate, blood pressure, and other physical changes. Studies to determine whether exposure to high noise levels can adversely affect human health have concluded that, while a relationship between noise and health effects seems plausible, there is no empirical evidence of the relationship.

Annoyance

Annoyance is an individual characteristic and can vary widely from person to person. Noise that one person considers tolerable can be unbearable to another of equal hearing capability. The level of annoyance depends both on the characteristics of the noise (including loudness, frequency, time, and duration), and how much activity interference (such as speech interference and sleep interference) results from the noise. However, the level of annoyance is also a function of the attitude of the receiver. Attitudes may also be affected by the relationship between the person affected and the source of noise, and whether attempts have been made to abate the noise.

Vibration

Vibration consists of waves transmitted through solid material. Groundborne vibration propagates from a source through the ground to adjacent buildings by surface waves. Vibration may comprise a single pulse, a series of pulses, or a continuous oscillatory motion. The frequency of a vibrating object describes how rapidly it is oscillating and is measured in hertz (Hz). Most environmental vibrations consist of a composite, or "spectrum" of many frequencies, and are generally classified as broadband or random vibrations. The normal frequency range of most groundborne vibration that can be felt generally starts from a low frequency of less than one Hz to a high of about 200 Hz. Vibration is often measured in terms of the peak

particle velocity (PPV) in inches per second (in/sec) when considering impacts on buildings or other structures, as PPV represents the maximum instantaneous peak of vibration that can stress buildings. Because it is a representation of acute vibration, PPV is often used to measure the temporary impacts of short-term construction activities that could instantaneously damage-built structures. Vibration is often also measured by the root mean squared (RMS) because it best correlates with human perception and response. Specifically, RMS represents "smoothed" vibration levels over an extended period of time and is often used to gauge the long-term chronic impact of a Project's operation on the adjacent environment. RMS amplitude is the average of a signal's squared amplitude. It is most commonly measured in decibel notation (VdB).

Vibration energy attenuates as it travels through the ground, causing the vibration amplitude to decrease with distance away from the source. High frequency vibrations reduce much more rapidly than low frequencies, so that in the far-field from a source, the low frequencies tend to dominate. Soil properties also affect the propagation of vibration. When groundborne vibration interacts with a building, there is usually a ground-to-foundation coupling loss (i.e., the foundation of the structure does not move in sync with the ground vibration), but the vibration can also be amplified by the structural resonances of the walls and floors. Vibration in buildings is typically perceived as rattling of windows or items on shelves, or the motion of building surfaces. At high levels, vibration can result in damage to structures.

Manmade groundborne vibration is generally limited to areas within a few hundred feet of certain types of construction activities, especially pile driving. Road vehicles rarely create enough groundborne vibration to be perceptible to humans unless the road surface is poorly maintained and there are potholes or bumps. If traffic induces perceptible vibration in buildings, such as window rattling or shaking of small loose items (typically caused by heavy trucks in passing), then it is most likely an effect of low-frequency airborne noise or ground characteristics. Human annoyance by vibration is related to the number and duration of events. The more events or the greater the duration, the more annoying it will be to humans.

2.2 NOISE SENSITIVE RECEPTORS

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

residences to the north (286 feet) and the residences to the west across Belfield Boulevard (281 feet). See **Figure 3, Noise Monitoring and Sensitive Receptor Location Map**.

2.3 EXISTING CONDITIONS

Measured Ambient Noise Levels

To establish baseline noise conditions, existing noise levels were monitored at two locations in the vicinity of the Project Site. The locations of where the noise measurements were taken are depicted in **Figure 3, Noise Monitoring and Sensitive Receptor Location Map**. The noise survey was conducted in May 2023 using the Larson Davis SoundTrack LxT (Type 1) sound level meter, which conforms to industry standards set forth in ANSI S1.4-1983 (R2006) – Specification for Sound Level Meters/Type 1. This instrument was calibrated and operated according to the manufacturer's written specifications. At the measurement sites, the microphone was placed at a height of approximately five feet above grade. The results of the measurements are summarized in **Table 3, Existing Noise Levels in the Vicinity of the Project Site**. As shown in **Table 3**, the daytime ambient noise levels ranged from 63.1 dB(A) Leq to 65.8 dB(A) Leq in the vicinity of the Project Site.

Table 3
Existing Noise Levels in the Vicinity of the Project Site

Noise Monitoring Locations	Primary Noise Sources	Noise Levels [dB(A)]		
		Leq	Lmin	Lmax
1. Residence west of the Project Site, Belfield Boulevard	Vehicle Traffic, Neighborhood Activity	65.8	45.6	89.1
2. Project Site	Vehicle Traffic, Neighborhood Activity	63.1	45.6	87.4

*Source: Impact Sciences, Inc., May 2023. See **Appendix A, Noise and Vibration Technical Data**.*

SOURCE: Esri, 2024

FIGURE **3**

IMPACT SCIENCES

Noise Monitoring Locations and Sensitive Receptors

1537.007•01/24

Existing Groundborne Vibration Levels

The main sources of groundborne vibration near the Project Site are heavy-duty vehicular travel (e.g., delivery trucks and transit buses) on local roadways. Trucks and buses typically generate groundborne vibration velocity levels of around 63 VdB at 50 feet, and these levels could reach 72 VdB where trucks and buses pass over bumps in the road.[6] In terms of PPV levels, a heavy-duty vehicle traveling at a distance of 50 feet can result in a vibration level of approximately 0.001 inch per second.

6 Federal Transit Administration, *Transit Noise and Vibration Impact Assessment Manual*, 2018. Available at: https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/research-innovation/118131/transit-noise-and-vibration-impact-assessment-manual-fta-report-no-0123_0.pdf, accessed January 25, 2024..

3.0 REGULATORY FRAMEWORK

3.1 FEDERAL REGULATIONS

Occupational Health and Safety Act of 1970

Under the Occupational Safety and Health Act of 1970 (29 U.S.C. §1919 et seq.), the Occupational Safety and Health Administration (OSHA) has adopted regulations designed to protect workers against the effects of occupational noise exposure. These regulations list permissible noise level exposure as a function of the amount of time during which the worker is exposed. The regulations further specify a hearing conservation program that involves monitoring noise to which workers are exposed, ensuring that workers are made aware of overexposure to noise, and periodically testing the workers' hearing to detect any degradation.[7]

Noise Control Act of 1972

Under the authority of the Noise Control Act of 1972, the United States Environmental Protection Agency (U.S. EPA) established noise emission criteria and testing methods published in Parts 201 through 205 of Title 40 of the Code of Federal Regulations (CFR) that apply to some transportation equipment (e.g., interstate rail carriers, medium trucks, and heavy trucks) and construction equipment. In 1974, U.S. EPA issued guidance levels for the protection of public health and welfare in residential areas of an outdoor Ldn of 55 dB(A) and an indoor Ldn of 45 dB(A). These guidance levels are not standards or regulations and were developed without consideration of technical or economic feasibility. There are no federal noise standards that directly regulate environmental noise related to the construction or operation of the Project. Moreover, the federal noise standards are not reflective of urban environments that range by land use, density, proximity to commercial or industrial centers, etc. As such, for purposes of determining acceptable sound levels to determine and evaluate intrusive noise sources and increases, this document utilizes the County of San Bernardino Development Code Noise Regulations, discussed below.

Federal Transit Administration Vibration Standards

There are no federal vibration standards or regulations adopted by any agency that are applicable to evaluating vibration impacts from activities associated with the Project. However, the Federal Transit Administration (FTA) has adopted vibration criteria for use in evaluating vibration impacts from construction activities. The vibration damage criteria adopted by the FTA are shown in **Table 4, Construction Vibration Damage Criteria.**

---

7 United States Department of Labor, *Occupational Safety and Health Act of 1970*. Available online at: https://www.osha.gov/laws-regs/oshact/completeoshact, accessed January 25, 2024..

Table 4
Construction Vibration Damage Criteria

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

Source: FTA, Transit Noise and Vibration Impact Assessment Manual, 2018.

3.2 STATE REGULATIONS

Office of Planning and Research Guidelines for Noise Compatible Land Use

The State of California has not adopted statewide standards for environmental noise, but the Governor's Office of Planning and Research (OPR) has established guidelines for evaluating the compatibility of various land uses as a function of community noise exposure. This is shown in **Table 5, State of California Noise/Land Use Compatibility Matrix** below. California Government Code Section 65302 requires each county and city in the State to prepare and adopt a comprehensive long-range general plan for its physical development, with Section 65302(f) requiring a noise element to be included in the general plan. The noise element must: (1) identify and appraise noise problems in the community; (2) recognize Office of Noise Control guidelines; and (3) analyze and quantify current and projected noise levels.

Table 5
State of California Noise/Land Use Compatibility Matrix

Land Use Category	Community Noise Exposure (dB, L_{dn} or CNEL)						
	55	60	65	70	75	80	
Residential - Low Density Single-Family, Duplex, Mobile Homes							
Residential - Multi-Family							
Transient Lodging - Motels Hotels							
Schools, Libraries, Churches, Hospitals, Nursing Homes							
Auditoriums, Concert Halls, Amphitheaters							
Sports Arena, Outdoor Spectator Sports							
Playgrounds, Neighborhood Parks							
Golf Courses, Riding Stables, Water Recreation, Cemeteries							
Office Buildings, Business Commercial and Professional							
Industrial, Manufacturing, Utilities, Agriculture							

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

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

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

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

Source: California Office of Planning and Research, General Plan Guidelines - Noise Element Guidelines (Appendix C), 2003.

Caltrans Vibration / Groundborne Noise Standards

The State of California has not adopted Statewide standards or regulations for evaluating vibration or groundborne noise impacts from land use development projects. Although the State has not adopted any vibration standard, Caltrans recommends the following vibration thresholds.[8]

The state noise and vibration guidelines are to be used as guidance with respect to planning for noise, not standards and/or regulations to which the County of San Bernardino must adhere.

Table 6
Guideline Vibration Damage Potential Threshold Criteria

Structure and Condition	Maximum PPV (inch/sec)	
	Transient Sources[1]	Continuous/Frequent Intermittent Sources[2]
Extremely fragile historic buildings, ruins, ancient monuments	0.12	0.08
Fragile buildings	0.20	0.10
Historic and some old buildings	0.50	0.25
Older residential structures	0.50	0.30
New residential structures	1.00	0.50
Modern industrial/commercial buildings	2.00	0.50

Source: Table 19, Transportation and Construction Vibration Guidance Manual (Caltrans 2020).
1 Transient sources create a single, isolated vibration event, such as blasting or drop balls.
2 Continuous/frequent intermittent sources include impact pile drivers, pogo-stick compactors, crack-and-seat equipment, vibratory pile drivers, and vibratory compaction equipment.

Title 24, California Code of Regulations

The California Noise Insulation Standards of 1988 (California Code of Regulations Title 24, Section 3501 et seq.) require that interior noise levels from the exterior sources not exceed 45 dB(A) Ldn/community noise equivalent level (CNEL)[9] in any habitable room of a multi-residential use facility (e.g., hotels, motels, dormitories, long-term care facilities, and apartment houses and other dwellings, except detached single-

8 Caltrans, *Transportation and Construction Vibration Guidance Manual*, 2020.

9 Measurements are based on Ldn or CNEL.

family dwellings) with doors and windows closed. Where exterior noise levels exceed 60 dB(A) CNEL/Ldn, an acoustical analysis is required to show that the building construction achieves an interior noise level of 45 dB(A) CNEL/Ldn or less.

3.3 LOCAL PLANS AND POLICIES

County of San Bernardino Noise Standards

Stationary Source Noise

The County Development Code (Development Code) Section 83.01.080, Noise, establishes standards concerning acceptable noise levels for both noise-sensitive land uses and noise-generating land uses. Noise limits based on the receiving land use are shown in **Table 7, Noise Standards for Stationary Noise Sources**. Areas are designated "noise impacted" if exposed to existing or projected future exterior noise levels exceeding these standards.

Table 7
Noise Standards for Stationary Noise Sources

Affected Land Uses (Receiving Noise)	7:00 AM–10:00 PM L_{eq}	10:00 PM–7:00 AM L_{eq}
Residential	55 dBA	45 dBA
Professional Services	55 dBA	55 dBA
Other Commercial	60 dBA	60 dBA
Industrial	70 dBA	70 dBA

Source: County of San Bernardino Development Code, Section 83.01.080

The following adjustments are applicable to the standards in Table 7:

Noise levels at receiving properties may not exceed the standards:

1. For a cumulative period of more than 30 minutes in any hour.

2. Plus 5 dBA for a cumulative period of more than 15 minutes in any hour.

3. Plus 10 dBA for a cumulative period of more than 5 minutes in any hour.

4. Plus 15 dBA for a cumulative period of more than 1 minute in any hour.

5. Plus 20 dBA for any period of time.

If the measured ambient level exceeds any of the first four noise limit categories, 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, the maximum allowable noise level under this category shall be increased to reflect the maximum ambient noise level.

Mobile Source Noise

Table 8 shows the noise standards by receiving-land-use type for exposure to mobile noise sources. Areas are designated "noise impacted" if exposed to existing or projected future exterior noise levels exceeding these standards.

Table 8
Noise Standards for Adjacent Mobile Noise Sources

Land Use		L_{dn} (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 classroom, religious institution, library	45	65
Open Space	Park	N/A	65

Source: County of San Bernardino Development Code, Section 8.01.080
Notes: CNEL = Community Noise Equivalent Level
[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 dBA Ldn (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) Ldn (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.

The Development Code also has noise level standards for other structures, as summarized in **Table 9**. In addition, the average of the maximum levels of the loudest intrusive sounds during a 24-hour period shall not exceed an interior sound level of 65 dBA.

Table 9
Noise Standards for Other Structures

Typical Uses	12-Hour Equivalent Interior Sound Level (dBA Ldn)[1]
Educational, Institutions, Libraries, Meeting Facilities, etc.	45 dBA
General Office, Reception, etc.	50 dBA
Retail Stores, Restaurants, etc.	55 dBA
Other Areas for Manufacturing, Assembly, Testing, Warehousing, etc.	65 dBA

Source: County of San Bernardino Development Code, Section 83.01.080
[1] *Note that there is an inherent mismatch between the specified 12-hour sound level and the L_{dn} level, which is, by definition, a 24-hour noise metric.*

Exemptions

Under Development Code Section 83.01.080, the County exempts construction activities from 7AM to 7PM, except on Sundays and federal holidays; motor vehicles not under the control of the commercial or industrial use; and emergency equipment, vehicles, and devices.

Vibration

Development Code Section 83.01.090 prohibits vibration that can be felt without the aid of instruments or produces a particle velocity greater than or equal to two-tenths inches per second peak particle velocity (i.e., 0.20 in/sec PPV) at or beyond the lot line of the source. Exceptions are made for temporary construction, maintenance, repair, or demolition activities between 7:00 AM and 7:00 PM, except Sundays and federal holidays, and motor vehicles not under control of commercial or industrial use.

County of San Bernardino General Plan

The County of San Bernardino General Plan (General Plan) contains a Hazards Element outlining the County's policies and programs aiming to achieve and maintain noise levels compatible with various types of land uses. The noise objectives and policies from the General Plan that are relevant to the Project are listed below:

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-2.8 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.

4.0 NOISE ANALYSIS

4.1 THRESHOLDS OF SIGNIFICANCE

In accordance with Appendix G of the *State CEQA Guidelines*, impacts would be considered significant if the Project results in:

- Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the Project Site in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies;
- Generation of excessive ground-borne vibration or ground-borne noise levels; and
- 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.

The *State CEQA Guidelines* do not define the levels at which groundborne vibration or groundborne noises are considered "excessive." Thus, in terms of construction-related vibration impacts on buildings, the adopted guidelines and recommendations by the FTA to limit groundborne vibration based on the age and/or condition of the structures that are located in close proximity to construction activity as well as Development Code Section 83.01.090 are used in this analysis to evaluate potential groundborne vibration impacts. Based on the FTA criteria, construction impacts relative to groundborne vibration would be considered significant if the following were to occur:

- Project construction activities would cause a PPV groundborne vibration level to exceed 0.5 inches per second at any building that is constructed with reinforced-concrete, steel, or timber;
- Project construction activities would cause a PPV groundborne vibration level to exceed 0.3 inches per second at any engineered concrete and masonry buildings;
- Project construction activities would cause a PPV groundborne vibration level to exceed 0.2 inches per second at any non-engineered timber and masonry buildings; or
- Project construction activities would cause a PPV ground-borne vibration level to exceed 0.12 inches per second at any historical building or building that is extremely susceptible to vibration damage.

Based on the County code, construction impacts relative to groundborne vibration would be considered significant if the following were to occur:

- Vibration can be felt without the aid of instruments or produces a particle velocity greater than or equal to two-tenths inches per second peak particle velocity (i.e., 0.20 in/sec PPV) at or beyond the lot line of the source unless the activities are for temporary construction, maintenance, repair, or demolition activities between 7:00 AM and 7:00 PM, except Sundays and federal holidays, and motor vehicles not under control of commercial or industrial use.

The *State CEQA Guidelines* do not define the levels at which noise would be considered substantial increases. Thus, for purposes of this analysis, the Project would normally have a significant impact on noise levels from project operations if the project causes the ambient noise level measured at the property line of affected uses to increase by 3 dB(A) if the total ambient noise levels without the Project exceed the County's General Plan exterior noise standards, or any 5 dB(A) or greater noise increase when total ambient noise levels without the Project are within the County's exterior noise standards.

4.2 METHODOLOGY

Noise levels associated with Project-related construction activities were calculated using the FHWA Roadway Construction Noise Model (RCNM). Noise levels were also compared to the County of San Bernardino's Development Code (SBDC), which includes provisions regarding construction noise levels. Specifically, SBDC Section 83.01.080, the County exempts construction activities from 7AM to 7PM except on Sundays and federal holidays; motor vehicles not under the control of the commercial or industrial use; and emergency equipment, vehicles, and devices. As the Project would comply with the daytime construction hours established in the SBDC, this analysis also uses the FTA's general construction noise criteria of 90 dB(A) Leq (1-hour)[10] to provide additional context for the Project's potential to generate daytime construction noise impacts.

An analysis of traffic noise was conducted to determine if the Project would have a perceptible increase in traffic-related noise. Studies have shown that a 3 dB(A) increase in sound level pressure is barely detectable by the human ear. A 3 dB(A) increase in roadway noise levels requires an approximate doubling of roadway traffic volume, assuming that travel speeds and fleet mix remain constant.[11]

The Project's potential to result in significant noise impacts from on-site operational noise sources was assessed by identifying sources of on-site noise sources and considering the impact that they could produce given the nature of the source (i.e., loudness and whether noise would be produced during daytime or

---

10 Federal Transit Administration, *Transit Noise and Vibration Impact Assessment Manual*, Table 7-2 (General Assessment Construction Noise Criteria), September 2018.

11 California Department of Transportation (Caltrans), *Technical Noise Supplement to the Traffic Noise Analysis Protocol*, 2013. Available online at: https://dot.ca.gov/-/media/dot-media/programs/environmental-analysis/documents/env/tens-sep2013-a11y.pdf

more-sensitive nighttime hours), distances to nearby sensitive receptors, surrounding ambient noise levels, the presence of similar noise sources in the vicinity, and maximum allowable noise levels permitted by the SBDC.

4.3 IMPACT ANALYSIS

Impact NOI-1 **Would the Proposed Project result in generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the Project Site in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies? *(Less than Significant).***

Construction Impacts

Construction of the Project would require the use of heavy equipment for grading/site preparation, installation of utilities, building fabrication, and finishing. Construction activities would also involve the use of smaller power tools, generators, and other sources of noise. During each stage of construction, several types of equipment potentially could be operating concurrently and noise levels would vary based on the amount of equipment in operation and the location of the activity. The Federal Highway Administration's (FHWA) Roadway Construction Noise Model (RCNM) has compiled data regarding the noise-generating characteristics of specific types of construction equipment and typical construction activities.

With the use of the RCNM, as detailed in **Appendix A** to this report,[12] the construction noise levels forecasted for the sensitive receptors are presented in **Table 10, Estimated Exterior Construction Noise at Sensitive Receptors.** Noise levels would diminish notably with distance from the construction site at a rate of 6 dB(A) per doubling of distance (noise from stationary or point sources is reduced by about 6 dB(A) for every doubling of distance at acoustically hard locations). For example, a noise level of 86 dB(A) Leq measured at 50 feet from the noise source to the receptor would decline to 80 dB(A) Leq at 100 feet from the source to the receptor and fall by another 6 dB(A) Leq to 74 dB(A) Leq at 200 feet from the source to the receptor. These noise attenuation rates assume a flat and unobstructed distance between the noise generator and the receptor. Intervening structures and vegetation would further attenuate (reduce) the noise. Furthermore, it should be noted that increases in noise levels at sensitive receptors during construction would be intermittent and temporary and would not generate continuously high noise levels. In addition, the construction noise experienced at sensitive receptors during the initial periods of

12 Project construction noise levels were calculated based on the Project's anticipated mix of construction equipment with the FHWA RCNM Version 1.1.

construction (i.e., site preparation/grading/foundations) typically would be reduced in the later construction periods (i.e., interior building construction).

Table 10
Estimated Exterior Construction Noise at Sensitive Receptors

Sensitive Land Uses[a]	Distance to Project Site (feet)	Estimated Construction Noise Levels [dB(A) Leq]	Exceed FTA 90 dB(A) 1-Hour Leq Criteria?
1. Residences to the north	286	67.5	No
2. Residences to the west across Belfield Boulevard	281	67.7	No

[a] *See **Figure 3** for locations of sensitive receptors.*
[b] *Consistent with FTA methodology, these calculations are based on distances from the center of the site to the receptors. See **Appendix A** to this report.*

Temporary construction, maintenance, repair, and demolition activities are exempt from the SBDC regulations regarding noise so long as the temporary construction does not take place between the hours of 7:00 p.m. and 7:00 a.m., or on Sundays and federal holidays. As the Project would comply with the daytime construction hours established in the SBDC, this analysis also uses the FTA's general construction noise criteria of 90 dB(A) Leq (1-hour) to provide additional context for the Project's potential to generate daytime construction noise impacts. While construction activity would increase noise levels in the vicinity of the Project Site (see **Table 10)**, the Project's construction activities would not exceed the FTA's general construction noise criteria of 90 dB(A) Leq (1-hour) at any sensitive receptors. Furthermore, Project construction would not occur during restricted periods, and thus, the Project would be consistent with the criteria set forth in the SBDC. As such, construction noise impacts would be ***less than significant*** and no mitigation is required.

Operational Impacts

Permanent Operational Traffic Noise

Based on the traffic analysis contained therein, the Project is anticipated to generate an average of approximately 97 daily vehicle trips.[13] Based on this data, the Project's estimated 97 daily trips would generate a noise level of 44.3 dBA Leq. This is less than the 65.8 dBA Leq measured ambient noise level, as shown in **Appendix A**, measured on Belfield Boulevard. This is within the 60 dBA Leq commercial noise standard and the 55 dBA Leq residential noise standard outlined in Section 83.01.080 of the SBDC.

13 CR Associates., *VMT Assessment*, July 31, 2024

Additionally, the Project is consistent with the surrounding land uses, which currently generate mobile noise sources typical of a rural commercial and rural residential neighborhood. As such, any noise increase would be imperceptible, and impacts would be ***less than significant***.

Stationary Noise Sources

As part of the Project, new mechanical equipment, HVAC units, and exhaust fans could be installed on or near the proposed new structures. Although the operation of this equipment would generate noise, the design of these on-site HVAC units and exhaust fans would be required to comply with the regulations of the SBDC. Specifically, per Section 8.01.080, the exterior noise level when measured at the property line shall not exceed 60 dB(A). As such, compliance with Section 8.01.080 of the SBDC and other applicable regulations would ensure noise from stationary sources would be ***less than significant***.

Impact NOI-2 **Would the Proposed Project result in the generation of excessive groundborne vibration or groundborne noise levels? *(Less than Significant).***

The FTA provides ground-born vibration impact criteria with respect to building damage during construction activities. PPV, expressed in inches per second, is used to measure building vibration damage. Construction vibration damage criteria are assessed based on structural category (e.g., reinforced-concrete, steel, or timber). FTA guidelines consider 0.2 inch/sec PPV to be the significant impact level for non-engineered timber and masonry buildings. Structures or buildings constructed of reinforced concrete, steel, or timber have a vibration damage criterion of 0.5 inch/sec PPV pursuant to FTA guidelines. Although the nearby structures appear to be constructed of reinforced concrete, steel, or timber, this analysis conservatively applies the 0.2 inch/sec PPV threshold typically applied to non-engineered timber and masonry buildings.

The vibration levels at nearby structures are shown below in **Table 11, Vibration Levels at Off-Site Structures from Project Construction.**

Table 11
Vibration Levels at Off-Site Structures from Project Construction

Sensitive Uses Off-Site[a]	Distance to Project Site (ft.)	Vibration Threshold (PPV)	Estimated PPV (in/sec)
1. Residences to the North	286	0.2 in/sec	0.002
2. Residences to the West	281	0.2 in/sec	0.002

[a] *See **Figure 3** for locations of off-site structures.*
[b] *These calculations are based on distance from the site boundary to the structures. See **Appendix A** to this report.*

The vibration velocities predicted to occur at the nearest off-site structures would be 0.002 in/sec PPV. As shown in **Table 11**, Project construction vibration levels would not have the potential to exceed the standard 0.2 in/sec threshold established by the FTA. This impact would be ***less than significant***.

Impact NOI-3 **For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport, would the project expose people residing or working in the project area to excessive noise levels? *(Less than Significant).***

The Project Site is not located within the vicinity of a private airstrip or an airport land use plan and is not located within 2 miles of a public airport or public-use airport. The closest airport, the Valley Vista Airport, is located approximately 11.9 miles northeast of the Project Site. Therefore, no impacts with respect to airstrip or airport related noise would occur and no further analysis is required.

5.0 REFERENCES

California Department of Transportation (Caltrans). *Technical Noise Supplement to the Traffic Noise Analysis Protocol.* 2013. Available at: https://dot.ca.gov/-/media/dot-media/programs/environmental-analysis/documents/env/tens-sep2013-a11y.pdf

Caltrans, *Transportation and Construction Vibration Guidance Manual*, 2020.

County of San Bernardino, Development Code, Available at: https://codelibrary.amlegal.com/codes/sanbernardino/latest/sanberncty_ca/0-0-0-169172, accessed January 25, 2024.

CR Associates., *VMT Assessment*, July 31, 2024

Federal Highway Administration. *Highway Noise Fundamentals*. (1980) 97.

Federal Highway Administration. *Highway Noise Mitigation*. (1980) 18.

Federal Highway Administration. *Highway Traffic Noise: Analysis and Abatement Guidance*. December 2011.

Federal Transit Administration. *Transit Noise and Vibration Impact Assessment Manual.* 2018. Available online at: https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/research-innovation/118131/transit-noise-and-vibration-impact-assessment-manual-fta-report-no-0123_0.pdf, accessed January 25, 2024.

Impact Sciences. *CalEEMod Output for the Mikasa Luxury Villas Residential Development Project.* 2023.

United States Department of Labor. *Occupational Safety and Health Act of 1970.* Available online at: https://www.osha.gov/laws-regs/oshact/completeoshact, accessed January 25, 2024.

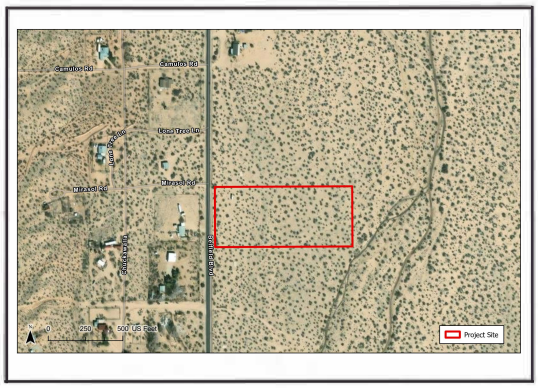
United States Occupational Safety & Health Administration. *Noise and Hearing Conservation Technical Manual*. 1999.

APPENDIX A

Noise and Vibration Technical Data

NOISE MONITORING FIELD REPORT

Site Map



Project Name: Landers Hotel

Monitoring Location: Residences West, Bobfield Blvd

Date: 5/19/23 Site Number: 1

Measured By: Annalie Sarrieddine

Measurement Start Time: 11:55 AM

Measurement End Time: 12:10 PM

Total Measurement Time: 15 min.

Noise Meter Model: Larson Davis Soundtrack Calibration: 94.0 (dBA)

LxT Meter Setting: A-Weighted Sound Level

(SLOW) Session File Name: LxtData_229

Primary Noise Sources: Vehicle Traffic, Neighborhood Activity

Data Summary

Noise Scale	Noise Level (dBA)
L_{eq}	65.8
L_{max}	84.1
L_{min}	45.6

Other Noise Sources During Monitoring

1. _____ Time: _____
2. _____ Time: _____
3. _____ Time: _____
4. _____ Time: _____
5. _____ Time: _____

Additional Notes:

IMPACT SCIENCES

Measurement Report

Report Summary

Meter's File Name	LxT_Data.239.s	Computer's File Name	LxT_0005667-20230519 115500-LxT_Data.239.ldbin
Meter	LxT1 0005667	Firmware	2.302
User		Location	
Job Description			
Note			

Start Time	2023-05-19 11:55:00	Duration	0:15:00.0		
End Time	2023-05-19 12:10:00	Run Time	0:15:00.0	Pause Time	0:00:00.0
Pre-Calibration	2023-05-19 10:27:09	Post-Calibration	None	Calibration Deviation	---

Results

Overall Metrics

LA_{eq}	65.8 dB		
LAE	95.3 dB	SEA	--- dB
EA	380.2 µPa²h		
EA8	12.2 mPa²h		
EA40	60.8 mPa²h		
LA_{peak}	108.4 dB	2023-05-19 12:09:29	
LAS_{max}	89.1 dB	2023-05-19 12:09:29	
LAS_{min}	45.6 dB	2023-05-19 11:59:54	
LA_{eq}	65.8 dB		
LC_{eq}	80.0 dB	LC_{eq} - LA_{eq}	14.2 dB
LAI_{eq}	71.7 dB	LAI_{eq} - LA_{eq}	5.9 dB

Exceedances

	Count	Duration
LAS > 85.0 dB	1	0:00:02.0
LAS > 115.0 dB	0	0:00:00.0
LApk > 135.0 dB	0	0:00:00.0
LApk > 137.0 dB	0	0:00:00.0
LApk > 140.0 dB	0	0:00:00.0

Community Noise

L_{DN}	L_{Day}	L_{Night}
--- dB	--- dB	0.0 dB

L_{DEN}	L_{Day}	L_{Eve}	L_{Night}
--- dB	--- dB	--- dB	--- dB

Any Data

	A		C		Z	
	Level	Time Stamp	Level	Time Stamp	Level	Time Stamp
L_{eq}	65.8 dB		80.0 dB		--- dB	
$L_{S(max)}$	89.1 dB	2023-05-19 12:09:29	--- dB	None	--- dB	None
$L_{S(min)}$	45.6 dB	2023-05-19 11:59:54	--- dB	None	--- dB	None
$L_{Peak(max)}$	108.4 dB	2023-05-19 12:09:29	--- dB	None	--- dB	None

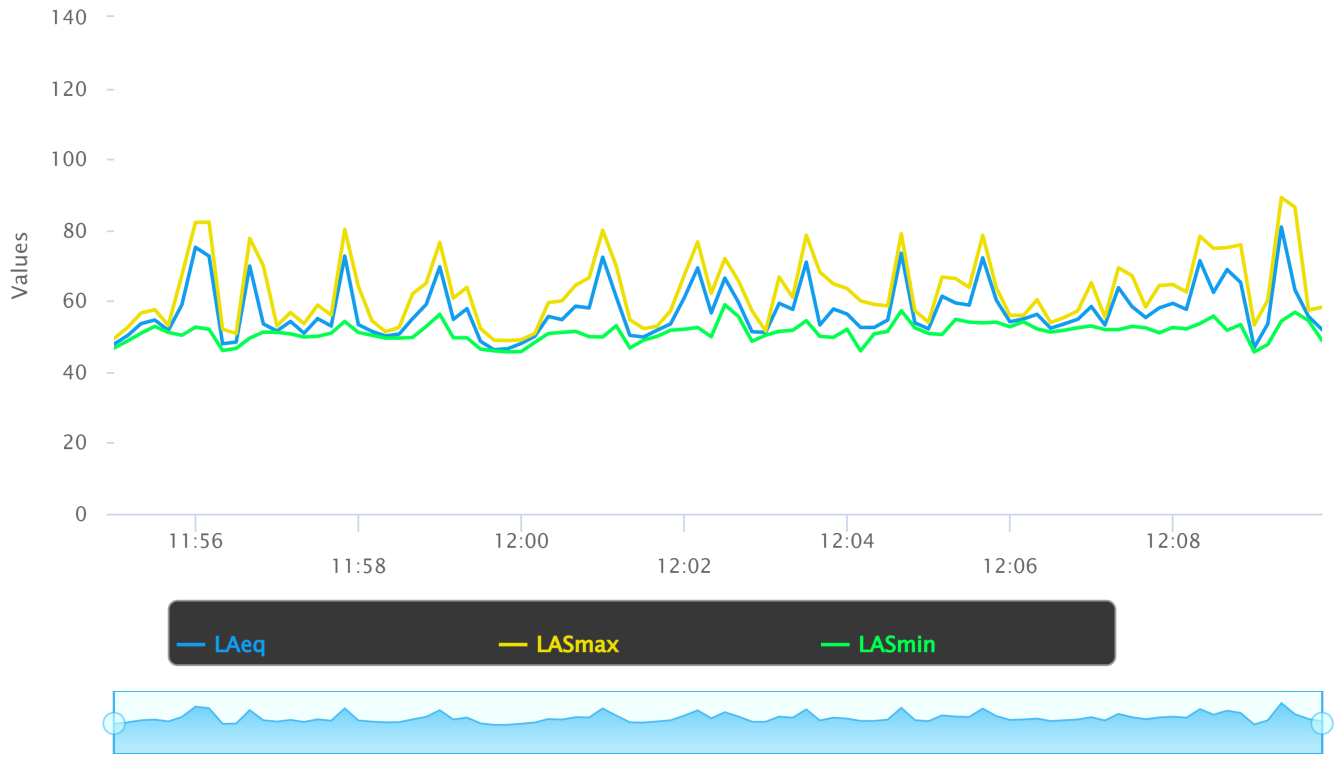
Overloads

Count	Duration	OBA Count	OBA Duration
0	0:00:00.0	0	0:00:00.0

Statistics

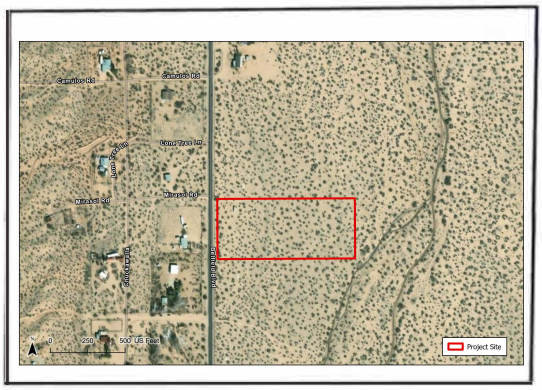
LAS 0.0	--- dB
LAS 0.0	--- dB
LAS 10.0	65.1 dB
LAS 33.3	56.3 dB
LAS 66.7	51.9 dB
LAS 90.0	49.1 dB

Time History



NOISE MONITORING FIELD REPORT

Site Map



Project Name: Landers Hotel

Monitoring Location: Project Site

Date: 5/19/23 Site Number: 2

Measured By: Annalie Sarrieddine

Measurement Start Time: 12:16 PM

Measurement End Time: 12:31 PM

Total Measurement Time: 15 min.

Noise Meter Model: Larson Davis Soundtrack Calibration: 94.0 (dBA)

LxT Meter Setting: A-Weighted Sound Level

(SLOW) Session File Name: LxT Data. 240

Primary Noise Sources: Vehicle Traffic, Neighborhood Activity

Data Summary

Noise Scale	Noise Level (dBA)
L_{eq}	63.1
L_{max}	87.4
L_{min}	45.6

Other Noise Sources During Monitoring

1. _____ Time: _____
2. _____ Time: _____
3. _____ Time: _____
4. _____ Time: _____
5. _____ Time: _____

Additional Notes:

_____

_____

_____

_____

_____

IMPACT SCIENCES

Measurement Report

Report Summary

Meter's File Name	LxT_Data.240.s	Computer's File Name	LxT_0005667-20230519 121604-LxT_Data.240.ldbin
Meter	LxT1 0005667	Firmware	2.302
User		Location	
Job Description			
Note			

Start Time	2023-05-19 12:16:04	Duration	0:15:00.0		
End Time	2023-05-19 12:31:04	Run Time	0:15:00.0	Pause Time	0:00:00.0
Pre-Calibration	2023-05-19 10:27:09	Post-Calibration	None	Calibration Deviation	---

Results

Overall Metrics

LA_{eq}	63.1 dB		
LAE	92.6 dB	SEA	--- dB
EA	204.2 µPa²h		
EA8	6.5 mPa²h		
EA40	32.7 mPa²h		
LA_{peak}	103.2 dB	2023-05-19 12:18:28	
LAS_{max}	87.4 dB	2023-05-19 12:18:28	
LAS_{min}	45.6 dB	2023-05-19 12:23:48	
LA_{eq}	63.1 dB		
LC_{eq}	77.0 dB	LC_{eq} - LA_{eq}	13.9 dB
LAI_{eq}	69.6 dB	LAI_{eq} - LA_{eq}	6.5 dB

Exceedances

	Count	Duration
LAS > 85.0 dB	1	0:00:01.6
LAS > 115.0 dB	0	0:00:00.0
LApk > 135.0 dB	0	0:00:00.0
LApk > 137.0 dB	0	0:00:00.0
LApk > 140.0 dB	0	0:00:00.0

Community Noise

L_{DN}	L_{Day}	L_{Night}
--- dB	--- dB	0.0 dB

L_{DEN}	L_{Day}	L_{Eve}	L_{Night}
--- dB	--- dB	--- dB	--- dB

Any Data

	A		C		Z	
	Level	Time Stamp	Level	Time Stamp	Level	Time Stamp
L_{eq}	63.1 dB		77.0 dB		--- dB	
$L_{S(max)}$	87.4 dB	2023-05-19 12:18:28	--- dB	None	--- dB	None
$L_{S(min)}$	45.6 dB	2023-05-19 12:23:48	--- dB	None	--- dB	None
$L_{Peak(max)}$	103.2 dB	2023-05-19 12:18:28	--- dB	None	--- dB	None

Overloads

Count	Duration	OBA Count	OBA Duration
0	0:00:00.0	0	0:00:00.0

Statistics

LAS 0.0	--- dB
LAS 0.0	--- dB
LAS 10.0	58.3 dB
LAS 33.3	52.7 dB
LAS 66.7	50.4 dB
LAS 90.0	46.8 dB

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 1/31/2024
Case Description: Landers Hotel Project (Grading)

---- Receptor #1 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Residences to the West across	Residential	60	60	60

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Grader	No	40	85		281	0
Dozer	No	40		81.7	281	0

Results

Calculated (dBA)

Equipment	*Lmax	Leq
Grader	70	66
Dozer	66.7	62.7
Total	70	67.7

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Residences to the North	Residential	60	60	60

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Grader	No	40	85		286	0
Dozer	No	40		81.7	286	0

Results

Calculated (dBA)

Equipment	*Lmax	Leq
Grader	69.9	65.9
Dozer	66.5	62.5
Total	69.9	67.5

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 1/31/2024
Case Description: Landers Hotel Project (Construction)

---- Receptor #1 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Residences to the West across Belfield	Residential	60	60	60

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Backhoe	No	40		77.6	281	0
Generator	No	50		80.6	281	0

Results

Calculated (dBA)

Equipment		*Lmax	Leq
Backhoe		62.6	58.6
Generator		65.6	62.6
	Total	65.6	64.1

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Residences to the North	Residential	60	60	60

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Backhoe	No	40		77.6	286	0
Generator	No	50		80.6	286	0

Results

Calculated (dBA)

Equipment		*Lmax	Leq
Backhoe		62.4	58.4
Generator		65.5	62.5
	Total	69.9	67.5

*Calculated Lmax is the Loudest value.

Landers Hotel Project			Residences to the North
Ref=	Reference vibration level (PPV)		
RefD=	Reference distance for Reference vibration level (Feet)		
	Vibration PPV		
	Ref=	0.089	Based on type of equipment
	RefD=	25	
	D=	286	Distance from equipment to sensitive receptor
	Equip=	0.002	
	Annoyance VdB		
	Ref=	87	Based on type of equipment
	RefD=	25	
	D=	286	Distance from equipment to sensitive receptor
	Equip=	55	

Peak demolition vibration based on utilizing a large bulldozer.

Source: FTA Tranist Noise and Vibration Impact Assessment, 2006.

Landers Hotel Project

Ref=	Reference vibration level (PPV)		Residences to the West
RefD=	Reference distance for Reference vibration level (Feet)		

Vibration PPV

Ref=	0.089	Based on type of equipment
RefD=	25	
D=	281	Distance from equipment to sensitive receptor
Equip=	0.002	

Annoyance VdB

Ref=	87	Based on type of equipment
RefD=	25	
D=	281	Distance from equipment to sensitive receptor
Equip=	55	

Peak demolition vibration based on utilizing a large bulldozer.

Source: FTA Tranist Noise and Vibration Impact Assessment, 2006.

TRAFFIC NOISE LEVELS

Project Name: Landers Hotel Project

Background Information

Model Description:	FHWA Highway Noise Prediction Model with California Vehicle Noise (CALVENO) Emission Levels.
Analysis Scenario(s):	Existing
Source of Traffic Volumes:	Transportation Analysis (Landers Hotel, CR Associates, July 31, 2024)
Community Noise Descriptor:	X

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

Traffic Noise Levels

Analysis Condition Roadway Name Roadway Segment	Lanes	Median Width	ADT Volume	Design Speed (mph)	Dist. from Center to Receptor[1]	Alpha Factor	Barrier Attn. dB(A)	Vehicle Mix Medium Trucks	Vehicle Mix Heavy Trucks	24-Hour dB(A) Ldn
Existing Traffic Noise										
Belfield Blvd	2	10	97	35	50	0	0	1.8%	0.7%	44.3