HERITAGE PARK AT GOYA,
RECORD NUMBER LST23-0023 for APPLICATIONS PAP23-0390,
PEN22-0037, PEN23-0069 and TTM 38702

GOYA AT HERITAGE PARK NOISE IMPACT ANALYSIS

City of Moreno Valley

June 2, 2023

Traffic Engineering ● Transportation Planning ● Parking ● Noise & Vibration
Air Quality ● Global Climate Change ● Health Risk Assessment

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Project No. 19550

TABLE OF CONTENTS

Appendices

List of Tables

List of Figures

EXECUTIVE SUMMARY

The approximately 13.73- gross acre project site is located east of Indian Street and south of the extension of Goya Avenue in the City of Moreno Valley, California. The project site is currently vacant.

The proposed project is a 131 unit single family detached community across 13.7 acres, with homes ranging from 1,874 square feet to 2,140 square feet.. Vehicular access is proposed to be provided by one full access driveway on Indian Street and one full access driveway on Goya Avenue.

Existing Noise Environment

Sensitive receptors that may be affected by project generated noise include the existing single-family residential uses located adjacent to the south, approximately 60 feet to the north, and 355 feet to the east and the church use located approximately 30 feet to the north of the project site.

Noise measurements were collected at six locations to document existing ambient noise levels in the project area (see Figure 5, Table 1, and Table 2).

Construction Noise Impacts

Project construction will not occur outside of the hours outlined in the City of Moreno Valley Municipal Code Sections 8.14.040 and 11.80.030(D)(7). Based on the modeled construction noise levels (see Table 10), construction noise levels are estimated to reach up to 73.9 dBA at the nearest residential property line and 72 dBA at the nearest church property line. Therefore, the project would not exceed City-established standards relating to construction noise. The project impact is less than significant; no mitigation is required.

Notwithstanding the above, best management practices (BMPs) are provided in the Project Description and should be added to project plans and in contract specifications to minimize construction noise emanating from the proposed project.

Mobile Source Noise Impacts

The addition of project trips is not expected to change noise levels more than the applicable threshold along the modeled roadway segments of Indian Street and Emma Lane (see Table 11). Although the project trips exceed applicable thresholds along Goya Avenue, the roadway segment included project design features is consistent with the MoVAL 2040 General Plan. The project impact is less than significant; no mitigation is required.

Mobile Noise Source Impacts to the Proposed Project

The City of Moreno Valley General Plan identifies exterior noise levels up to 65 dBA CNEL as normally acceptable and up to 70 dBA as conditionally acceptable for single-family residential uses. The State of California Building Code sets forth an interior noise standard of 45 dBA CNEL.

Future traffic noise levels associated with Indian Street are expected to reach up to 71 dBA CNEL and up to 72 dBA CNEL at the façade of the first row of residential buildings proposed by the project without mitigation. With construction of a concrete wall six feet in height along the western property line, noise levels are expected to reach up to 64 dBA CNEL at the first floor and up to 72 dBA CNEL at the second floor. A mitigation measure requiring a six-foot concrete wall should be implemented so that exterior noise levels do not exceed the City's exterior noise level criteria of 65 dBA CNEL.

Mitigation Measure 1
A six-foot concrete wall should be constructed as shown on Figure 7, so that exterior noise levels do not exceed the City's exterior noise level criteria of 65 dBA CNEL. The wall should be continuous, solid, without holes or cracks.

Typical residential construction provides approximately 20 dB of exterior to interior noise reduction assuming that the residences will be provided with mechanical ventilation. In order to ensure that interior noise levels do not exceed 45 dBA CNEL, windows and sliding glass doors on the north, west, and south facing facades of the first row of homes from Indian Avenue shall have an STC rating of at least 30.

Mitigation Measure 2
In order to ensure that interior noise levels do not exceed 45 dBA CNEL, windows and sliding glass doors on the north, west, and south facing facades of the first row of homes from Indian Avenue shall have an STC rating of at least 30.

Groundborne Vibration Impacts

With implementation of the vibration related BMP provided in the Project Description, groundborne vibration generated by project construction would not exceed the levels necessary to cause architectural damage to sensitive receptors. In addition, the threshold for annoyance due to vibration could theoretically be exceeded at existing residential receptors to the north and south of the project site, and residents may be temporarily annoyed. However, perceptibility of construction vibration would only occur while vibratory equipment is utilized within 136 feet of existing structures. Furthermore, this impact would only occur during daytime hours and will be temporary. This impact would be less than significant. No mitigation is required.

Air Traffic Impacts

The project site is located within land use compatibility Zones D and E of the March Air Reserve Base/Inland Port Airport. Zone D is within the airport's 55 dBA CNEL noise contour; however, Zone E is beyond the 55 dBA CNEL noise contour for the airport. As the project is a residential use located within an airport land use compatibility zone, information regarding airport proximity and the existence of aircraft overflights must be disclosed to future residents. Therefore, the project would not expose people residing or working in the project area to excessive noise levels associated with airports. The impact would be less than significant; no mitigation is required.

1. INTRODUCTION

This section describes the purpose of this study and the proposed project.

PURPOSE AND OBJECTIVES

The purpose of this report is to provide an assessment of the noise impacts resulting from development of the proposed project and to identify mitigation measures that may be necessary to reduce those impacts. The noise issues related to the proposed land use and development have been evaluated in light of applicable federal, state and local policies, including those of the City of Moreno Valley, in the context of the California Environmental Quality Act (CEQA).

Although this is a technical report, effort has been made to write the report clearly and concisely. A list of acronyms and glossary are provided in Appendix A and Appendix A of this report to assist the reader with technical terms related to noise and vibration analysis.

PROJECT LOCATION

The approximately 13.7-acre project site is located east of Indian Street and south of the extension of Goya Avenue in the City of Moreno Valley, California. The project site is currently vacant. A vicinity map showing the project location is provided on Figure 1.

PROJECT DESCRIPTION

The proposed project is a 131 unit single family detached community across 13.7 acres, with homes ranging from 1,874 square feet to 2,140 square feet. Vehicular access is proposed to be provided by one full access driveway on Indian Street and one full access driveway on Goya Avenue. Figure 2 illustrates the project site plan.

The following best management practices (BMPs) shall be provided on project plans and in contract specifications to minimize construction noise emanating from the proposed project:

1. All equipment, whether fixed or mobile, will be equipped with properly operating and maintained mufflers, consistent with manufacturer standards.
2. All stationary construction equipment will be placed so that emitted noise is directed away from the noise sensitive receptors nearest the project site.
3. As applicable, all equipment shall be shut off and not left in idle when not in use.
4. To the degree possible, equipment staging will be located in areas that create the greatest distance between construction-related noise and vibration sources and existing sensitive receptors.
5. Jackhammers, pneumatic equipment, and all other portable stationary noise sources will be directed away and shielded from existing residences in the vicinity of the project site. Either one-inch plywood or sound blankets can be utilized for this purpose. They should reach up from the ground and block the line of sight between equipment and existing residences. The shielding should be without holes and cracks.
6. No amplified music and/or voice will be allowed on the project site.
7. Haul truck deliveries will not occur outside of the hours presented as exempt for construction per City of Moreno Valley Municipal Code Sections 8.14.040 and 11.80.030(D)(7).
8. The use of vibratory rollers will be limited within 26 feet and large bulldozers within 15 feet of the existing residential structures to the south of the project site.

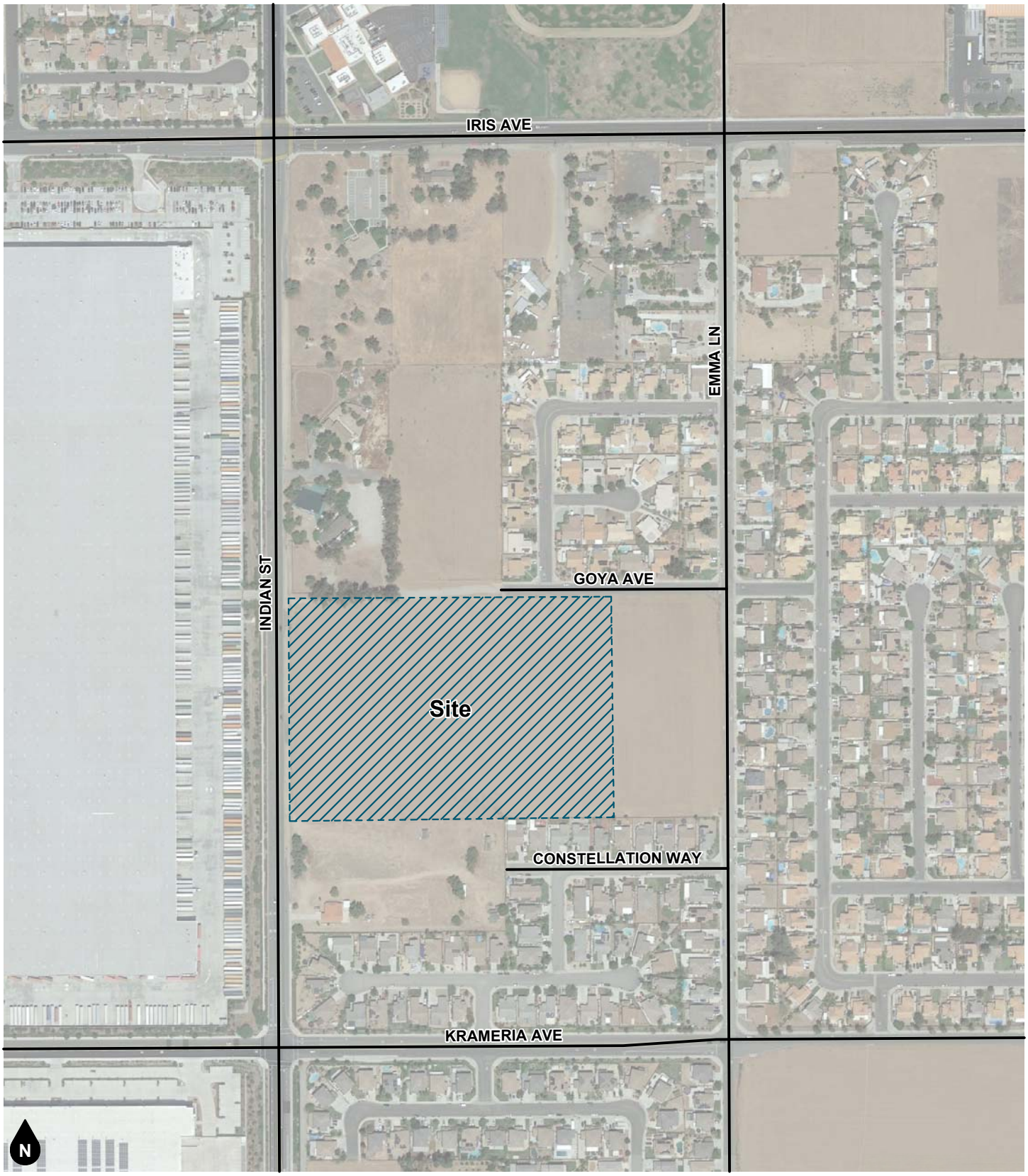


Figure 1
Project Location Map

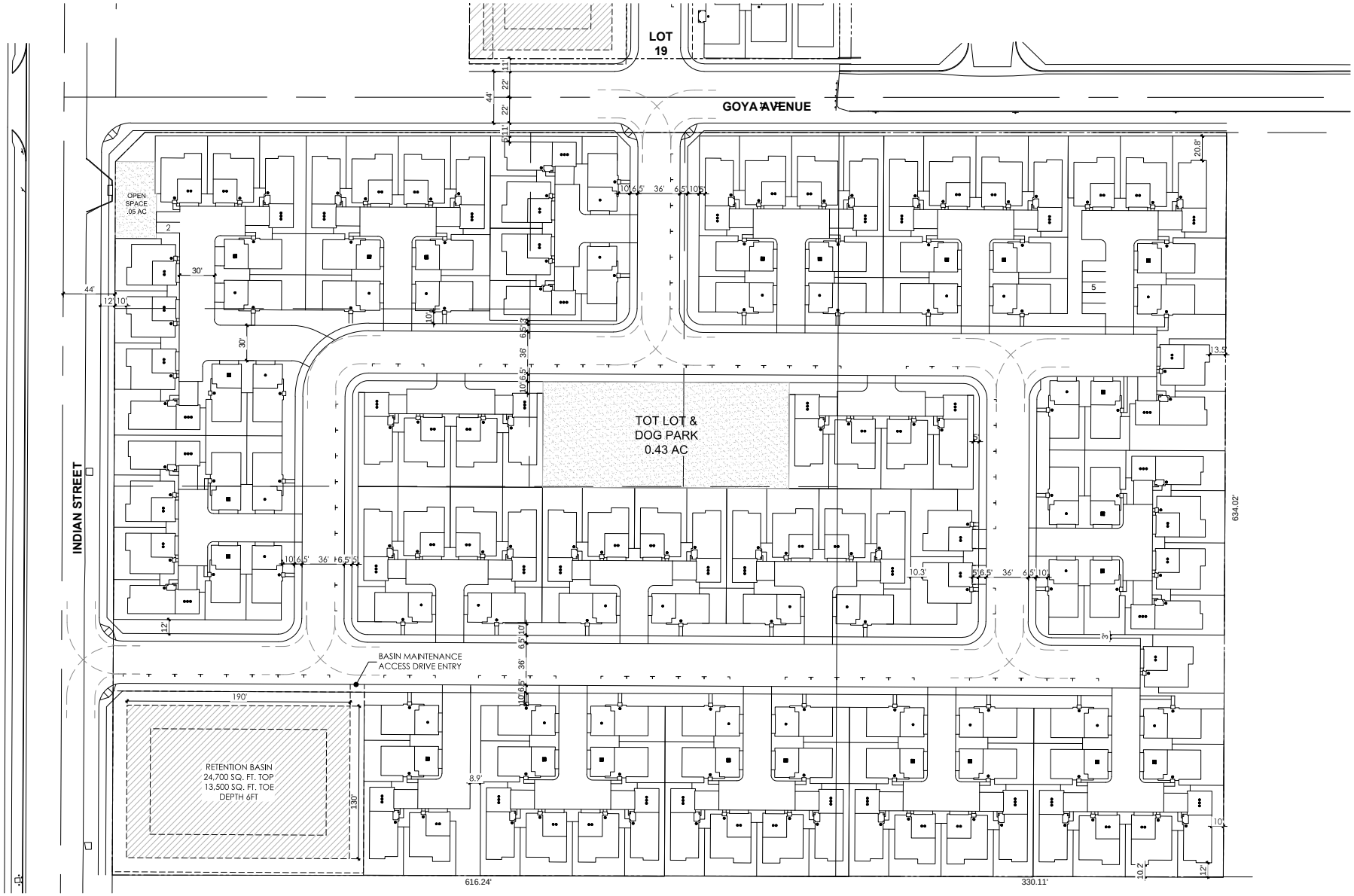


Figure 2
Site Plan

2. NOISE AND VIBRATION FUNDAMENTALS

This section provides an overview of key noise and vibration concepts.

NOISE FUNDAMENTALS

Sound is a pressure wave created by a moving or vibrating source that travels through an elastic medium such as air. Noise is defined as unwanted or objectionable sound. The effects of noise on people can include general annoyance, interference with speech communication, sleep disturbance, and in extreme circumstances, hearing impairment.

Commonly used noise terms are presented in Appendix B. The unit of measurement used to describe a noise level is the decibel (dB). The human ear is not equally sensitive to all frequencies within the sound spectrum. Therefore, the "A-weighted" noise scale, which weights the frequencies to which humans are sensitive, is used for measurements. Noise levels using A-weighted measurements are written dB(A) or dBA.

From the noise source to the receiver, noise changes both in level and frequency spectrum. The most obvious is the decrease in noise as the distance from the source increases. The manner in which noise reduces with distance depends on whether the source is a point or line source as well as ground absorption, atmospheric effects and refraction, and shielding by natural and manmade features. Sound from point sources, such as air conditioning condensers, radiates uniformly outward as it travels away from the source in a spherical pattern. The noise drop-off rate associated with this geometric spreading is 6 dBA per each doubling of the distance (dBA/DD). Transportation noise sources such as roadways are typically analyzed as line sources, since at any given moment the receiver may be impacted by noise from multiple vehicles at various locations along the roadway. Because of the geometry of a line source, the noise drop-off rate associated with the geometric spreading of a line source is 3 dBA/DD.

Decibels are measured on a logarithmic scale, which quantifies sound intensity in a manner similar to the Richter scale used for earthquake magnitudes. Thus, a doubling of the energy of a noise source, such as a doubled traffic volume, would increase the noise levels by 3 dBA; halving of the energy would result in a 3 dBA decrease. Figure 3 shows the relationship of various noise levels to commonly experienced noise events.

Average noise levels over a period of minutes or hours are usually expressed as dBA L_{eq}, or the equivalent noise level for that period of time. For example, $L_{eq(3\text{-}hr)}$ would represent a 3-hour average. When no period is specified, a one-hour average is assumed.

Noise standards for land use compatibility are stated in terms of the Community Noise Equivalent Level (CNEL) and the Day-Night Average Noise Level (DNL). CNEL is a 24-hour weighted average measure of community noise. CNEL is obtained by adding five decibels to sound levels in the evening (7:00 PM to 10:00 PM), and by adding ten decibels to sound levels at night (10:00 PM to 7:00 AM). This weighting accounts for the increased human sensitivity to noise during the evening and nighttime hours. DNL is a very similar 24-hour average measure that weights only the nighttime hours.

It is widely accepted that the average healthy ear can barely perceive changes of 3 dBA; that a change of 5 dBA is readily perceptible, and that an increase (decrease) of 10 dBA sounds twice (half) as loud. This definition is recommended by the California Department of Transportation's Technical Noise Supplement to the Traffic Noise Analysis Protocol (2013).

VIBRATION FUNDAMENTALS

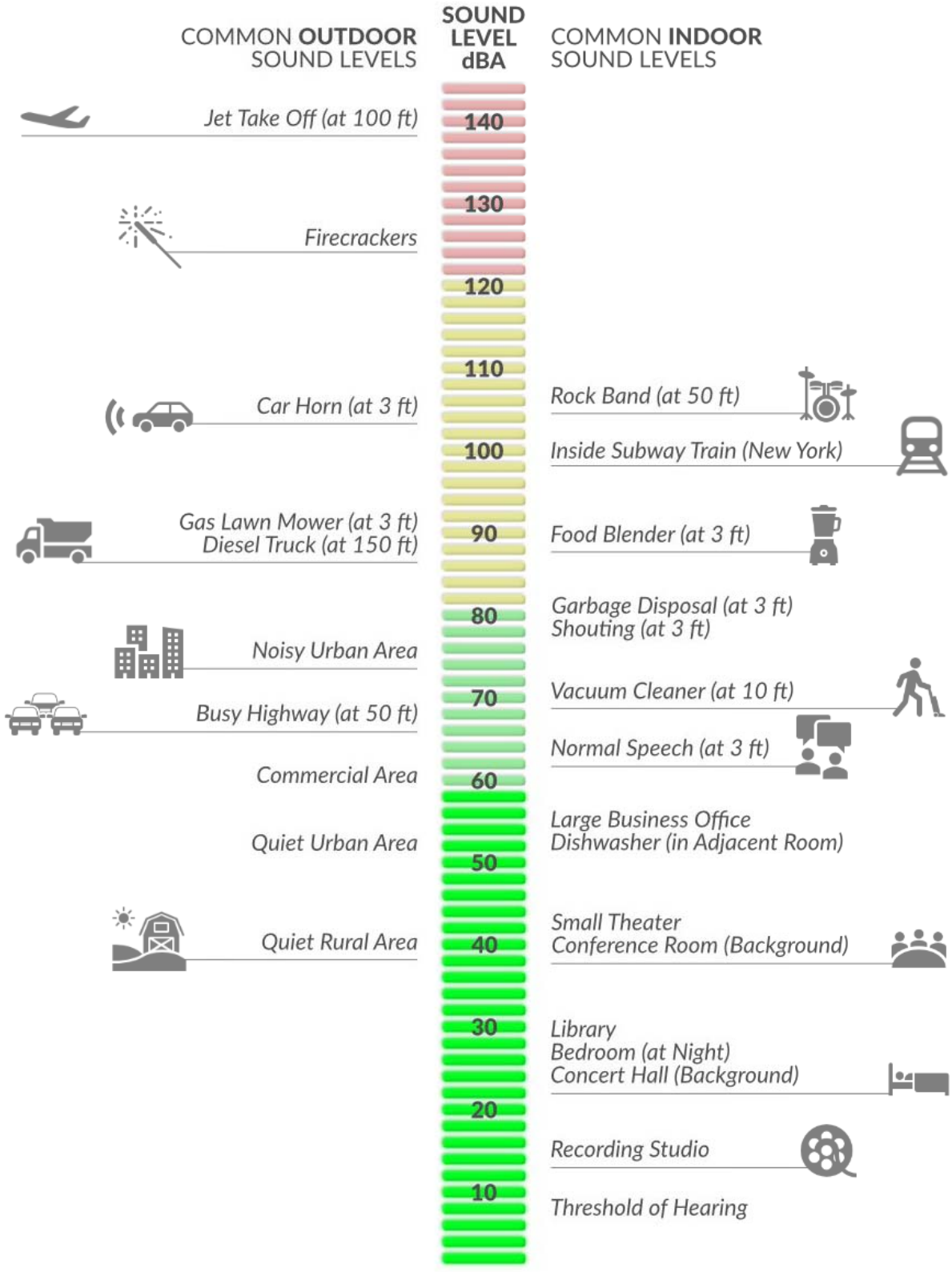
The way in which vibration is transmitted through the earth is called propagation. Propagation of earthborn vibrations is complicated and difficult to predict because of the endless variations in the soil through which waves travel. There are three main types of vibration propagation: surface, compression 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 wave front, similar to ripples produced by throwing a rock into a pool of water. Compression waves, or P-waves, are body waves that carry their energy along an expanding spherical wave front. The particle motion in these waves is longitudinal (i.e., in a "push-pull" fashion). P-waves are analogous to airborne sound waves. Shear waves, or S-waves, are also body waves that carry energy along an expanding spherical wave front. 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 energy is spread over an ever-increasing area such that the energy level striking a given point is reduced with the distance from the energy source. This geometric spreading loss is inversely proportional to the square of the distance. Wave energy is also reduced with distance as a result of material damping in the form of internal friction, soil layering, and void spaces. The amount of attenuation provided by material damping varies with soil type and condition as well as the frequency of the wave.

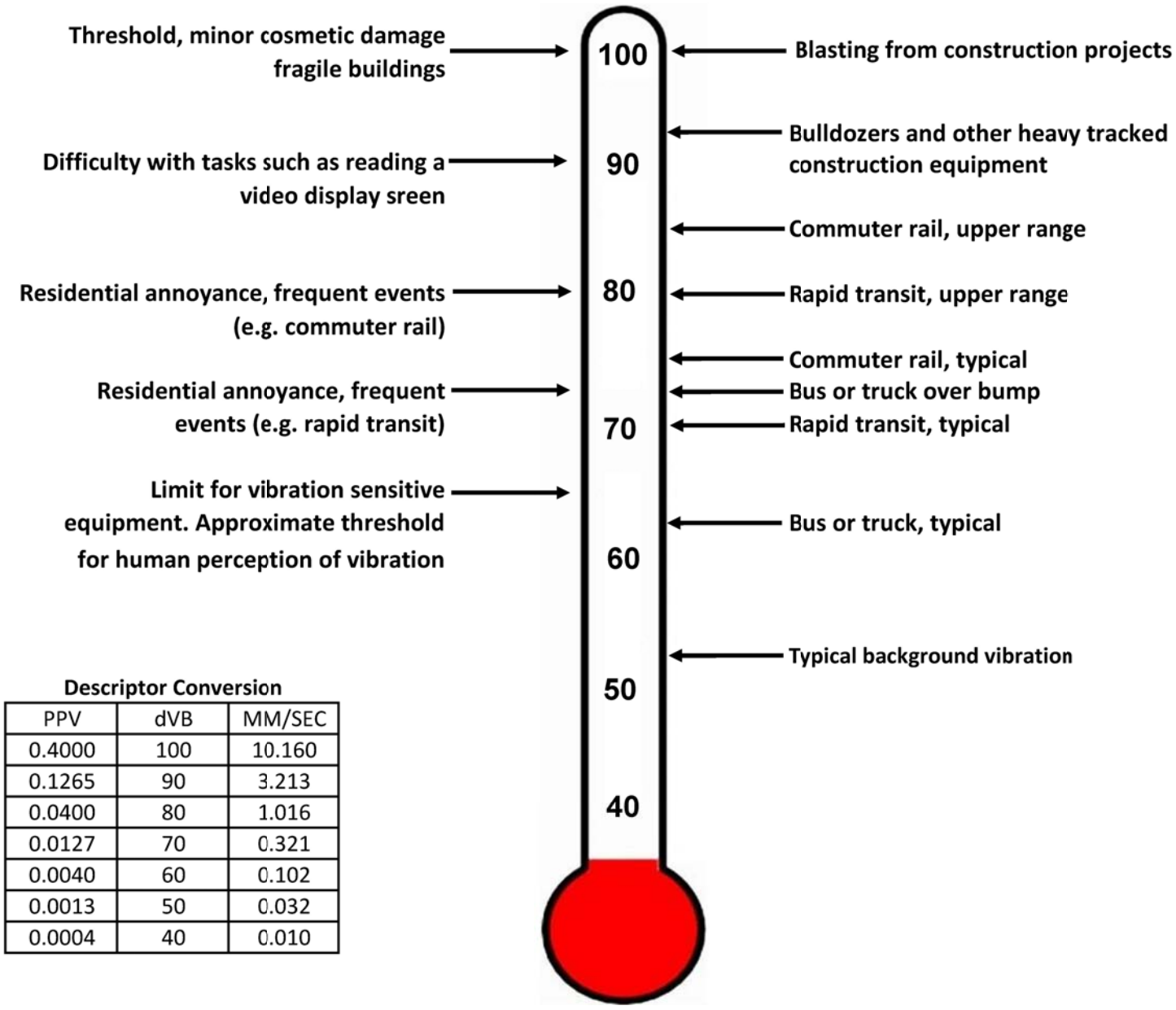
Vibration amplitudes are usually expressed as either peak particle velocity (PPV) or the root mean square (RMS) velocity. The PPV is defined as the maximum instantaneous peak of the vibration signal in inches per second. The RMS of a signal is the average of the squared amplitude of the signal in vibration decibels (VdB), ref one micro-inch per second. The Federal Railroad Administration uses the abbreviation "VdB" for vibration decibels to reduce the potential for confusion with sound decibel.

PPV is appropriate for evaluating the potential of building damage and VdB is commonly used to evaluate human response. Decibel notation acts to compress the range of numbers required in measuring vibration. Similar to the noise descriptors, L_{eq} and L_{max} can be used to describe the average vibration and the maximum vibration level observed during a single vibration measurement interval. Figure 4 illustrates common vibration sources and the human and structural responses to ground-borne vibration. As shown in the figure, the threshold of perception for human response is approximately 65 VdB; however, human response to vibration is not usually substantial unless the vibration exceeds 70 VdB. Vibration tolerance limits for sensitive instruments such as magnetic resonance imaging (MRI) or electron microscopes could be much lower than the human vibration perception threshold.



Based on Policy & Guidance from Federal Aviation Administration

Figure 3
A-Weighted Comparative Sound Levels



Descriptor Conversion

PPV	dVB	MM/SEC
0.4000	100	10.160
0.1265	90	3.213
0.0400	80	1.016
0.0127	70	0.321
0.0040	60	0.102
0.0013	50	0.032
0.0004	40	0.010

Source: FRA, 2012. Federal Railroad Administration High-Speed Ground Transportation Noise and Vibration Impact Assessment. Office of Railroad Policy Development, Washington, D.C. DOT/FRA/ORD-12/15. September.

Figure 4
Typical Levels of Groundborne Vibration

3. EXISTING NOISE ENVIRONMENT

This section describes the existing noise setting in the project vicinity.

EXISTING LAND USES AND SENSITIVE RECEPTORS

The project site is generally bordered by the extension of Goya Avenue to the north; vacant land to the east; single-family residential to the south; and Indian Street to the west of the project site.

The State of California defines sensitive receptors as those land uses that require serenity or are otherwise adversely affected by noise events or conditions. Schools, libraries, churches, hospitals, single and multiple-family residential, including transient lodging, motels and hotel uses make up the majority of these areas.

Sensitive land uses that may be affected by project noise include the property lines of the existing single-family residential uses located adjacent to the south, approximately 60 feet to the north, and 355 feet to the east and the church use located approximately 30 feet to the north of the project site.

AMBIENT NOISE MEASUREMENTS

An American National Standards Institute (ANSI Section S1.4 2014 Class 1) Larson Davis model LxT sound level meter was used to document existing ambient noise levels. In order to document existing ambient noise levels in the project area, five (5) 15-minute daytime noise measurements were taken between 1:22 PM and 3:52 PM on October 11, 2022. In addition, one (1) long-term 24-hour noise measurement was also taken from October 11, 2022 to October 12, 2022. Figure 5 shows the noise measurement location map. Field worksheets and noise measurement worksheets are provided in Appendix C.

As shown on Figure 5, the noise meter was placed at the following locations:

- STNM1: represents the existing noise environment of the single-family residences located to the north of the project site boundary along Smoke Tree Place (16233 Smoke Tree Place, Moreno Valley). The noise meter was placed near the southern side of Smoke Tree Place near the southern property line of the single-family residence.

- STNM2: represents the existing noise environment of the church use located to the north of the project site along Indian Street (16220 Indian Street, Moreno Valley). The noise meter was placed near the northern property line of the project site just south of the southern property line of the church use.

- STNM3: represents the existing noise environment of the single-family residences located to the east of the project site boundary along Emma Lane (16296 Emma Lane, Moreno Valley). The noise meter was placed near the eastern side of Emma Lane near the western property line of the single-family residence.

- STNM4: represents the existing noise environment of the single-family residences located to the south of the project site boundary along Constellation Way (24608 Constellation Way, Moreno Valley). The noise meter was placed near the western terminus of Constellation Way near the southern property line of the single-family residence.

- STNM5: represents the existing noise environment of the single-family residence located to the south of the project site boundary on the eastern side of Indian Street (16410 Indian Street, Moreno Valley). The noise meter was placed near the western property line of the single-family residence along the eastern side of Indian Street.

- LTNM1: represents the existing noise environment of the project site. The noise meter was placed within the northwestern corner of the site near the northern project boundary.

Table 1 provides a summary of the short-term ambient noise data. Table 2 provides hourly interval ambient noise data from the long-term noise measurements. Measured short-term ambient noise levels ranged between 44.9 and 63 dBA L_{eq}. Long-term hourly noise measurement ambient noise levels ranged from 45.2 to 54.8 dBA L_{eq}. The dominant noise source was vehicle traffic associated with Indian Street, Emma Lane, and other surrounding roadways.

Table 1
Short-Term Noise Measurement Summary (dBA)

Daytime Measurements[1,2]								
Site Location	Time Started	Leq	Lmax	Lmin	L(2)	L(8)	L(25)	L(50)
STNM1	1:22 PM	48.6	57.7	42.1	55.3	52.5	48.7	46.6
STNM2	1:52 PM	55.4	67.5	43.8	61.3	59.1	56.3	53.6
STNM3	2:28 PM	61.7	87.2	37.4	63.1	55.0	46.6	42.9
STNM4	2:59 PM	44.9	58.1	38.0	50.4	48.0	45.2	43.2
STNM5	3:37 PM	63.0	79.0	43.0	70.3	68.3	63.9	56.2

Notes:
(1) See Figure 5 for noise measurement locations. Each noise measurement was performed over a 15-minute duration.
(2) Noise measurements performed on October 11, 2022.

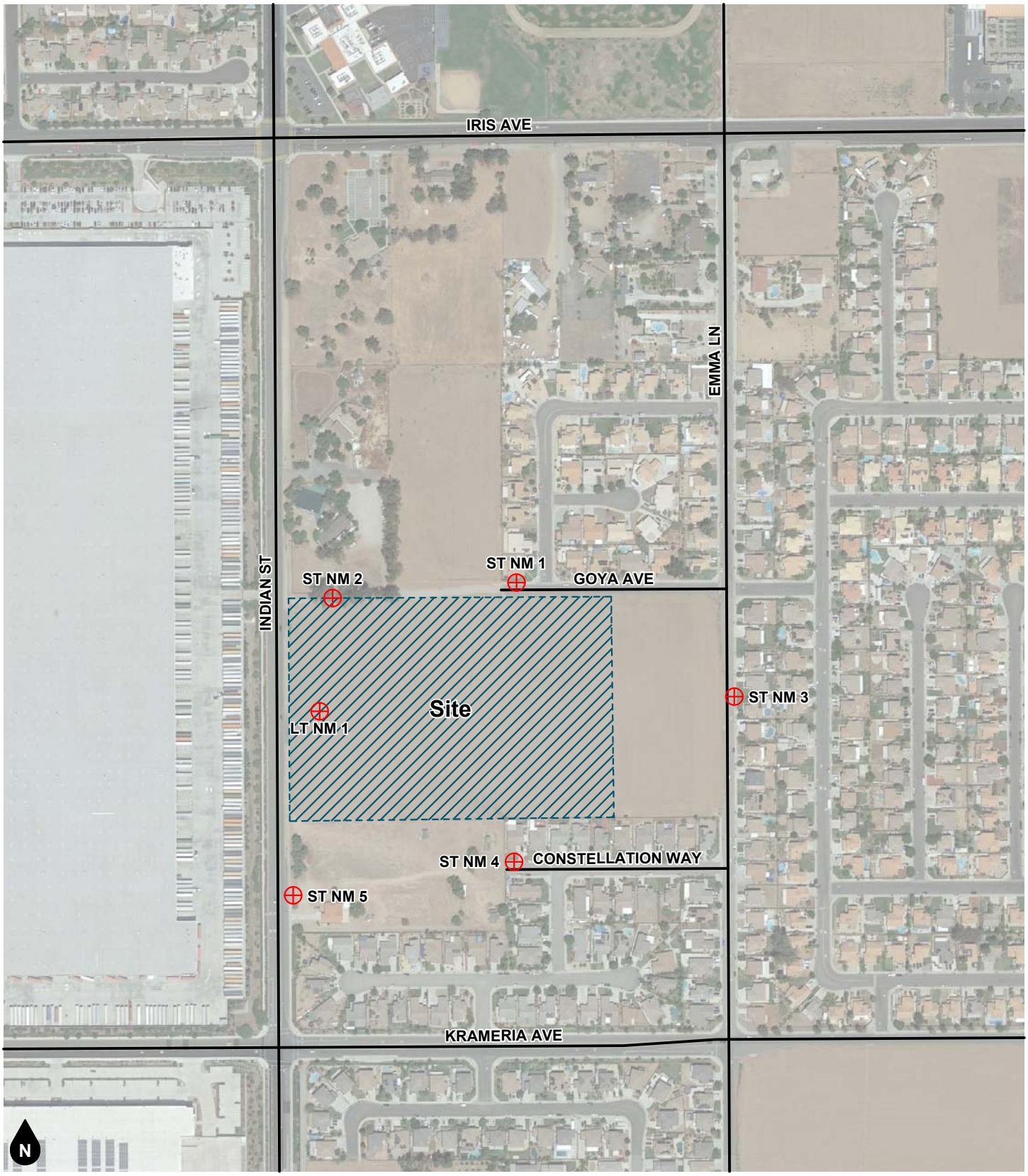
Table 2
Long-Term Noise Measurement Summary (dBA)

24-Hour Ambient Noise								
Hourly Measurements	Time Started	Leq	Lmax	Lmin	L(2)	L(8)	L(25)	L(50)
Overall Summary	7:00 PM	51.4	82.8	35.6	58.5	55.2	51.6	47.4
1	7:00 PM	53.2	67.0	43.7	59.7	56.8	54.0	50.9
2	8:00 PM	52.8	67.7	41.6	60.3	56.4	53.4	50.1
3	9:00 PM	54.2	81.4	42.0	59.6	55.8	52.2	48.3
4	10:00 PM	50.5	66.6	40.2	57.8	54.3	50.3	46.5
5	11:00 PM	45.4	59.3	38.5	52.9	49.8	45.2	42.2
6	12:00 AM	46.0	64.1	37.3	53.4	49.8	45.7	42.6
7	1:00 AM	45.9	63.1	38.7	53.5	49.8	45.0	42.1
8	2:00 AM	45.2	60.8	37.7	53.6	49.6	44.1	41.3
9	3:00 AM	47.5	71.5	35.6	55.3	51.4	45.9	41.5
10	4:00 AM	49.2	65.0	36.9	57.0	53.8	49.3	44.1
11	5:00 AM	51.4	71.7	36.0	58.4	55.4	51.0	46.0
12	6:00 AM	50.6	64.6	37.1	57.5	54.9	51.6	47.3
13	7:00 AM	53.9	67.1	38.7	60.2	57.4	55.2	52.3
14	8:00 AM	51.2	67.1	38.5	57.5	55.3	52.2	48.6
15	9:00 AM	50.1	66.8	39.6	57.1	54.0	50.5	47.0
16	10:00 AM	50.5	64.9	38.5	57.9	54.5	51.1	47.2
17	11:00 AM	49.9	63.4	39.7	56.6	53.7	50.5	47.3
18	12:00 PM	51.2	65.5	37.8	58.6	54.8	52.0	48.9
19	1:00 PM	50.2	65.0	37.3	58.2	54.0	50.6	47.6
20	2:00 PM	50.7	70.6	36.5	56.8	53.8	50.8	47.7
21	3:00 PM	54.8	82.8	40.7	59.3	56.0	53.0	49.8
22	4:00 PM	54.1	73.1	40.9	61.3	57.4	54.4	51.7
23	5:00 PM	53.2	65.5	39.8	60.0	57.1	54.0	51.0
24	6:00 PM	53.2	70.3	41.0	60.4	56.7	53.6	50.4

Notes:

(1) See Figure 5 for noise measurement locations. Noise measurement was performed over a 24-hour duration.

(2) Noise measurement performed from October 11, 2022 to October 12, 2022.



Legend

NM 1 Noise Measurement Location

ST NM Short-Term Noise Measurement

LT NM Long-Term Noise Measurement

Figure 5
Noise Measurement Location Map

4. REGULATORY SETTING

This section documents the regulatory framework and applicable noise standards.

FEDERAL REGULATION

Federal Noise Control Act of 1972

The U.S. Environmental Protection Agency (EPA) Office of Noise Abatement and Control was originally established to coordinate federal noise control activities. After its inception, EPA's Office of Noise Abatement and Control issued the Federal Noise Control Act of 1972, establishing programs and guidelines to identify and address the effects of noise on public health, welfare, and the environment. In response, the EPA published Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety (Levels of Environmental Noise). The Levels of Environmental Noise recommended that the Ldn should not exceed 55 dBA outdoors or 45 dBA indoors to prevent significant activity interference and annoyance in noise-sensitive areas.

In 1981, EPA administrators determined that subjective issues such as noise would be better addressed at lower levels of government. Consequently, in 1982 responsibilities for regulating noise control policies were transferred to State and local governments. However, noise control guidelines and regulations contained in EPA rulings in prior years remain in place by designated Federal agencies, allowing more individualized control for specific issues by designated Federal, State, and local government agencies.

Federal Transit Administration

Ground-borne noise refers to the noise generated by ground-borne vibration. Ground-borne noise that accompanies the building vibration is usually perceptible only inside buildings and typically is only an issue at locations with subway or tunnel operations where there is no airborne noise path or for buildings with substantial sound insulation such as a recording studio.[1] As such, available guidelines from the Federal Transit Administration (FTA) are utilized to assess impacts due to ground-borne vibration. The FTA has adopted vibration standards that are used to evaluate potential building damage impacts related to construction activities. As shown in Table 3, the threshold at which there is a risk to "architectural" damage to reinforced-concrete, steel or timber (no plaster) buildings is a peak particle velocity (PPV) of 0.5, at engineered concrete and masonry (no plaster) buildings a PPV of 0.3, at non-engineered timber and masonry buildings a PPV of 0.2 and at buildings extremely susceptible to vibration damage a PPV of 0.1. The FTA has also adopted standards associated with human annoyance for groundborne vibration impacts for the following three land-use categories:

(1) Vibration Category 1 – High Sensitivity,
(2) Vibration Category 2 – Residential, and
(3) Vibration Category 3 – Institutional.

The FTA defines Category 1 as buildings where vibration would interfere with operations within the building, including vibration-sensitive research and manufacturing facilities, hospitals with vibration-sensitive equipment, and university research operations. Vibration-sensitive equipment includes, but is not limited to, electron microscopes, high-resolution lithographic equipment, and normal optical microscopes. Category 2 refers to all residential land uses and any buildings where people sleep, such as hotels and hospitals. Category 3 refers to institutional land uses such as schools, churches, other institutions, and quiet offices that do not have vibration-sensitive equipment, but still have the potential for activity interference. The vibration criteria associated with human annoyance for these three land-use categories are shown in Table 4. Table 4 shows that 72 VdB is the threshold for annoyance from groundborne vibration at sensitive receptors.

[1] Federal Transit Administration, Transit Noise and Vibration Impact Assessment, May 2018, pp 108, 112.

STATE REGULATIONS

State of California Building Code

Per Title 24 California Building Code the project will be required to be constructed in compliance with Section 1207 of the California Building Code (CBC) noise insulation standards. The following outlines the minimum building requirements for multi-family attached residential dwelling units as it relates to noise isolation for common separating assemblies:

1. Walls, partitions, and floor/ceiling assembly designs must provide a minimum STC of 50, based on lab tests. Field tested assemblies must provide a minimum noise isolation class (NIC) of 45.
2. Floor/ceiling assembly designs must provide for a minimum impact insulation class (IIC) of 50, based on lab tests. Field tested assemblies must provide a minimum FIIC of 45.
3. Penetrations or openings in sound rated assemblies must be sealed, lined, insulated, or otherwise treated to maintain required ratings.
4. Interior noise levels due to exterior sources must not exceed a community noise equivalent level (CNEL) or a day-night level (LDN) of 45 dBA, in any habitable room.

Thus, the design of party walls and floor/ceiling assemblies for multi-family attached residential dwelling units must be based on laboratory tested assemblies which test at a sound transmission class of 50 STC, or better.

In addition to compliance with the State of California Title 12 requirements, the following BMPs have been incorporated into the project description and will be added to the project plans.

State of California General Plan Guidelines 2017

Though not adopted by law, the State of California General Plan Guidelines 2017, published by the California Governor's Office of Planning and Research (OPR) (OPR Guidelines), provides guidance for the compatibility of projects within areas of specific noise exposure. The OPR Guidelines identify the suitability of various types of construction relative to a range of outdoor noise levels and provide each local community some flexibility in setting local noise standards that allow for the variability in community preferences. Findings presented in the Levels of Environmental Noise Document (EPA 1974) influenced the recommendations of the OPR Guidelines, most importantly in the choice of noise exposure metrics (i.e., Ldn or CNEL) and in the upper limits for the normally acceptable outdoor exposure of noise-sensitive uses.

The OPR Guidelines include a Noise and Land Use Compatibility Matrix which identifies acceptable and unacceptable community noise exposure limits for various land use categories. Where the "normally acceptable" range is used, it is defined as the highest noise level that should be considered for the construction of the buildings which do not incorporate any special acoustical treatment or noise mitigation. The "conditionally acceptable" or "normally unacceptable" ranges include conditions calling for detailed acoustical study prior to the construction or operation of the proposed project.

LOCAL REGULATIONS

City of Moreno Valley General Plan

The City of Moreno Valley has adopted their own version of the State Land Use Compatibility Guidelines for land use planning and to assess potential transportation noise impacts to proposed land uses (see Table 5). According to the City's compatibility guidelines, daytime exterior noise levels of up to 65 dBA CNEL are considered to be normally acceptable and up to 70 dBA CNEL are considered to be conditionally acceptable for single-family residential land uses.

The City of Moreno Valley General Plan has also established the following goals and policies in regard to noise which apply to the proposed project.

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

Policies

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

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

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

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

N.1-6: *Require noise buffering, dampening, or active cancellation, on rooftop or other outdoor mechanical equipment located near residences, parks, and other noise sensitive land uses.*

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

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

Policies

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

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

N.2-4: *Collaborate with the March Joint Powers Authority, March Inland Port Airport Authority, Riverside County Airport Land Use Commission, and other responsible agencies to formulate and apply strategies to address noise and safety compatibility protection from airport operations.*

N.2-5: *Encourage residential development heavily impacted by aircraft-related noise to transition to uses that are more compatible.*

City of Moreno Valley Municipal Code

Section 8.14.040 Miscellaneous standards and regulations

Hours of Construction. Any construction within the city shall only be completed between the hours of 7:00 AM 7:00 PM Monday through Friday, excluding holidays, and from 8:00 AM to 4:00 PM on Saturday, unless written approval is obtained from the city building official or city engineer.

Section 9.10.170 Vibration

No vibration shall be permitted which can be felt at or beyond the property line.

Section 11.80.030 Prohibited Acts

A. General Prohibition. It is unlawful and a violation of this chapter to maintain, make, cause, or allow the making of any sound that causes a noise disturbance, as defined in Section 11.80.020.

C. Non-impulsive Sound Decibel Limits. No person shall maintain, create, operate or cause to be operated on private property any source of sound in such a manner as to create any non-impulsive sound which exceeds the limits set forth for the source land use category (as defined in Section 11.80.020) and shown in Table 6 when measured at a distance of two hundred (200) feet or more from the real property line of the source of the sound, if the sound occurs on privately owned property, or from the source of the sound, if the sound occurs on public right-of-way, public space or other publicly owned property. Any source of sound in violation of this subsection shall be deemed prima facie to be a noise disturbance.

D. Specific Prohibitions. In addition to the general prohibitions set out in subsection A of this section, and unless otherwise exempted by the Noise Regulation Chapter of the City's Municipal Code, the following specific acts, or the causing or permitting thereof, are regulated as follows:

7. Construction and Demolition. No person shall operate or cause the operation of any tools or equipment used in construction, drilling, repair, alteration or demolition work between the hours of 8:00 PM and 7:00 AM the following day such that the sound there from creates a noise disturbance, except for emergency work by public service utilities or for other work approved by the city manager or designee. This shall not apply to the use of power tools as provided in subsection (D)(9) of this section.

9. Power Tools. No person shall operate or permit the operation of any mechanically, electrically or gasoline motor-driven tool during nighttime hours so as to cause a noise disturbance across a residential real property boundary.

10. Pumps, Air Conditioners, Air-Handling Equipment and Other Continuously Operating Equipment. Notwithstanding the general prohibitions of subsection, a of the Noise Regulation Chapter of the City's Municipal Code, no person shall operate or permit the operation of any pump, air conditioning, air-handling or other continuously operating motorized equipment in a state of disrepair or in a manner which otherwise creates a noise disturbance distinguishable from normal operating sounds.

Table 3
Construction Vibration Damage Criteria

Building/Structural Category	PPV, in/sec	Approximate Lv*
I. Reinforced-concrete, steel or timber (no plaster)	0.5	102
II. Engineered concrete and masonry (no plaster)	0.3	98
III. Non-engineered timber and masonry buildings	0.2	94
IV. Buildings extemely susceptible to vibration damage	0.1	90

Notes:

Source: Federal Transit Administration (FTA), Transit Noise and Vibration Impact Assessment Manual (September 2018).

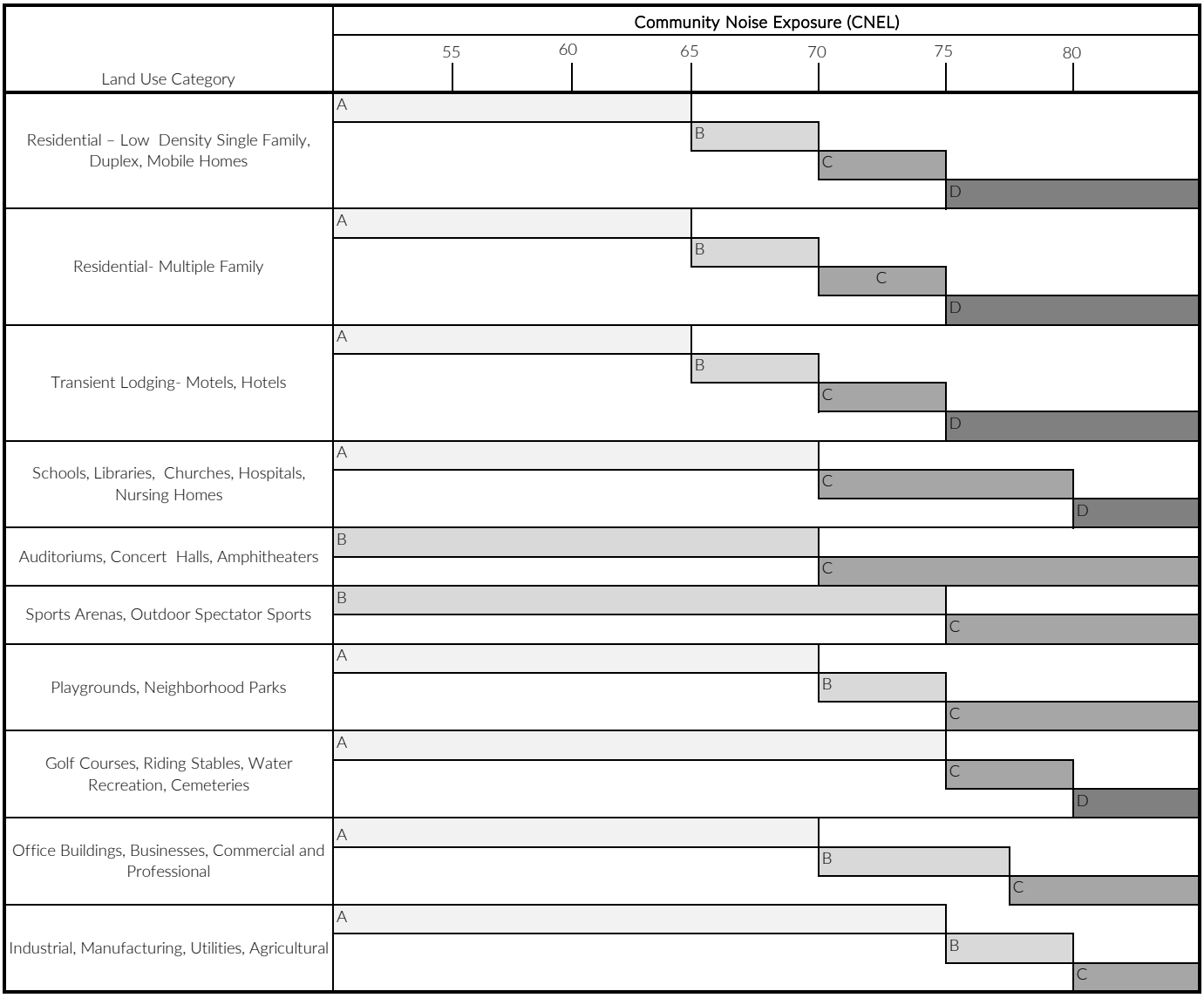
*RMS velocity in decibels, VdB re 1 micro-in/sec

Table 4
Ground-Borne Vibration (GBV) Impact Criteria for General Vibration Assessment

Land Use Category	GBV Impact Levels (VdB re 1 micro-inch/sec)		
	Frequent Events	Occasional Events	Events
Category 1: Buildings where vibration would interfere with interior operations.	65 VdB*	65 VdB*	65 VdB*
Category 2: Residences and buildings where people normally sleep.	72 VdB	75 VdB	80 VdB
Category 3: Institutional land uses with primarily daytime use.	75 VdB	78 VdB	83 VdB

Source:Federal Transit Administration (FTA), Transit Noise and Vibration Impact Assessment Manual (September 2018).
*This criterion limit is based on levels that are acceptable for most moderately sensitive equipment such as optical microscopes. For equipment that is more sensitive, a Detailed Vibration Analysis must be performed.

Table 5
City of Moreno Valley Community Noise Compatibility Matrix



A	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.
B	Conditionally Acceptable:	New construction or development should be undertaken only after a detailed analysis of the noise reduction requirement is made and needed noise insulation features included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning will normally suffice
C	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.
D	Clearly Unacceptable:	New construction or development should generally not be undertaken.

Source: MoVal 2040 General Plan Noise Element Table N-1, 2021.

Table 6
City of Moreno Valley Maximum Sound Levels (in dBA) for Source Land Uses

Residential		Commercial	
Daytime[1]	Nighttime[2]	Daytime[1]	Nighttime[2]
60	55	65	60

Source: City of Moreno Valley Municipal Code, Table 11.80.030-2.

(1) Section 11.80.020 of the City of Moreno Valley Municipal Code defines "Daytime" as 8:00 AM to 10:00 PM of the same day.

(2) Section 11.80.020 of the City of Moreno Valley Municipal Code defines "Nighttime" as 10:01 PM to 7:59 AM of the following day.

5. ANALYTICAL METHODOLOGY AND MODEL PARAMETERS

This section discusses the analysis methodologies used to assess noise impacts.

CONSTRUCTION NOISE MODELING

Construction noise will vary depending on the construction process, type of equipment involved, location of the construction site with respect to sensitive receptors, the schedule proposed to carry out each task (e.g., hours and days of the week) and the duration of the construction work.

Construction noise associated with the proposed project was calculated at the sensitive receptor locations utilizing methodology presented in the Federal Transit Administration (FTA) Transit Noise and Vibration Impact Assessment Manual (2018) together with several key construction parameters, including: distance to each sensitive receiver, equipment usage, percent usage factor, and baseline parameters for the project site. Distances to receptors were based on the acoustical center of the project site.

The equipment used to calculate the construction noise levels for each phase were based on the assumptions provided in the CalEEMod modeling in the Air Quality, Global Climate Change, and Energy Impact Analysis prepared for the proposed project (Ganddini Group, Inc., 2023). For analysis purposes, the distance measured from the project site to sensitive receptors was assumed to be the acoustical center of the project site to the property line of residential properties with existing residential buildings. Sound emission levels associated with typical construction equipment as well as typical usage factors are provided in Table 7. Construction noise worksheets are provided in Appendix D.

MOBILE SOURCE NOISE MODELING

Future Traffic Noise to Project

The SoundPLAN acoustical modeling software was utilized to model future roadway noise levels at the proposed sensitive receptors (e.g., residences). SoundPLAN is capable of evaluating stationary noise sources (e.g., parking lots, drive-through menus, car wash equipment, vacuums, etc.). The SoundPLAN software utilizes algorithms (based on the inverse square law) to calculate noise level projections. The software allows the user to input specific noise sources, spectral content, sound barriers, building placement, topography, and sensitive receptor locations. In addition to the information provided below, noise modeling input and outputs assumptions are provided in Appendix E.

Indian Street borders the project site to the east. The City of Moreno Valley 2040 Draft General Plan Circulation Element identifies Indian Street as a Minor Arterial with an 88-foot right-of-way. The extension of Goya Avenue borders the site to the north but is not a General Plan roadway of acoustical significance. The General Plan Circulation Element states that the desired maximum roadway capacity on arterials averages between 30,000 to 55,000.

The noisiest traffic conditions occur when the maximum number of vehicles pass at the greatest speed. This scenario usually corresponds to Level of Service C (LOS C) conditions, or about 75% of buildout capacity. The level of service (LOS) C ADT for Indian Street is expected to be approximately 22,250 (City of Moreno Valley 2021). Arterials are expected to handle truck traffic. An auto/medium truck/heavy truck vehicle mix of 92/3/5 and a speed of 45 miles per hour was used for modeling purposes.

Off-Site Project Traffic Noise

Noise from vehicular traffic was projected using a computer program that replicates the FHWA Traffic Noise Prediction Model (FHWA-RD-77-108). The FHWA model arrives at the predicted noise level through a series

of adjustments to the Reference Energy Mean Emission Level (REMEL). Key model parameters and REMEL adjustments are presented below:

- Roadway classification (e.g., freeway, major arterial, arterial, secondary, collector, etc.)
- Roadway active width (distance between the center of the outer most travel lanes on each side of the roadway)
- Average Daily Traffic (ADT) Volumes, Travel Speeds, Percentages of automobiles, medium trucks 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 8 shows the roadway volumes, speeds, and site conditions used in the analysis. The following outlines key adjustments made to the REMEL for project site parameter inputs:

- Vertical and horizontal distances (sensitive receptor distance from noise source)
- Noise barrier vertical and horizontal distances (noise barrier distance from sound source and receptor).
- Traffic noise source spectra
- Topography

Traffic noise levels were calculated at the right-of-way based on distance from the centerline of the analyzed roadway. The modeling is theoretical and does not take into account any existing barriers, structures, and/or topographical features that may further reduce noise levels. Therefore, the modeled noise levels are shown for comparative purposes only to show the difference between with and without project conditions. The traffic noise calculation worksheets are included in Appendix F.

GROUNDBORNE VIBRATION MODELING

Groundborne vibration modeling was performed using vibration propagation equations and construction equipment source levels obtained from the FTA *Transit Noise and Vibration Impact Assessment Manual* (2018). Table 9 shows typical vibration levels associated with commonly used construction equipment based on data from the FTA.

There are several types of construction equipment that can cause vibration levels high enough to annoy persons in the vicinity and/or result in architectural or structural damage to nearby structures and improvements. For example, as shown in Table 9, a vibratory roller could generate up to 0.21 in/sec PPV at and operation of a large bulldozer could generate up to 0.089 PPV at a distance of 25 feet (two of the most vibratory pieces of construction equipment). Groundborne vibration at sensitive receptors associated with this equipment would drop off as the equipment moves away. For example, as the vibratory roller moves further than 100 feet from the sensitive receptors, the vibration associated with it would drop below 0.0026 in/sec PPV. It should be noted that these vibration levels are reference levels and may vary slightly depending upon soil type and specific usage of each piece of equipment.

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

$$PPV_{equipment} = PPV_{ref} (25/D_{rec})^{n}$$

Where: PPV_{ref} = reference PPV at 25ft.
D_{rec} = distance from equipment to receiver in ft.
n = 1.5 (the value related to the attenuation rate through ground)

Groundborne vibration calculations are provided in Appendix G.

Table 7 (1 of 2)
CA/T Equipment Noise Emissions and Acoustical Usage Factor Database

Equipment Description	Impact Device?	Acoustical Use Factor (%)	Spec. Lmax @ 50ft (dBA, slow)	Actual Measured Lmax @ 50ft (dBA, slow)	No. of Actual Data Samples (Count)
All Other Equipment > 5 HP	No	50	85	-N/A-	0
Auger Drill Rig	No	20	85	84	36
Backhoe	No	40	80	78	372
Bar Bender	No	20	80	-N/A-	0
Blasting	Yes	-N/A-	94	-N/A-	0
Boring Jack Power Unit	No	50	80	83	1
Chain Saw	No	20	85	84	46
Clam Shovel (dropping)	Yes	20	93	87	4
Compactor (ground)	No	20	80	83	57
Compressor (air)	No	40	80	78	18
Concrete Batch Plant	No	15	83	-N/A-	0
Concrete Mixer Truck	No	40	85	79	40
Concrete Pump Truck	No	20	82	81	30
Concrete Saw	No	20	90	90	55
Crane	No	16	85	81	405
Dozer	No	40	85	82	55
Drill Rig Truck	No	20	84	79	22
Drum Mixer	No	50	80	80	1
Dump Truck	No	40	84	76	31
Excavator	No	40	85	81	170
Flat Bed Truck	No	40	84	74	4
Forklift[2,3]	No	50	n/a	61	n/a
Front End Loader	No	40	80	79	96
Generator	No	50	82	81	19
Generator (<25KVA, VMS signs)	No	50	70	73	74
Gradall	No	40	85	83	70
Grader	No	40	85	-N/A-	0
Grapple (on backhoe)	No	40	85	87	1
Horizontal Boring Hydr. Jack	No	25	80	82	6
Hydra Break Ram	Yes	10	90	-N/A-	0
Impact Pile Driver	Yes	20	95	101	11
Jackhammer	Yes	20	85	89	133
Man Lift	No	20	85	75	23
Mounted Impact hammer (hoe ram)	Yes	20	90	90	212
Pavement Scarafier	No	20	85	90	2
Paver	No	50	85	77	9
Pickup Truck	No	50	85	77	9
Paving Equipment	No	50	85	77	9
Pneumatic Tools	No	50	85	85	90

Table 7 (2 of 2)
CA/T Equipment Noise Emissions and Acoustical Usage Factor Database

Equipment Description	Impact Device?	Acoustical Use Factor (%)	Spec. Lmax @ 50ft (dBA, slow)	Actual Measured Lmax @ 50ft (dBA, slow)	No. of Actual Data Samples (Count)
Pumps	No	50	77	81	17
Refrigerator Unit	No	100	82	73	3
Rivit Buster/chipping gun	Yes	20	85	79	19
Rock Drill	No	20	85	81	3
Roller	No	20	85	80	16
Sand Blasting (Single Nozzle)	No	20	85	96	9
Scraper	No	40	85	84	12
Shears (on backhoe)	No	40	85	96	5
Slurry Plant	No	100	78	78	1
Slurry Trenching Machine	No	50	82	80	75
Soil Mix Drill Rig	No	50	80	-N/A-	0
Tractor	No	40	84	-N/A-	0
Vacuum Excavator (Vac-truck)	No	40	85	85	149
Vacuum Street Sweeper	No	10	80	82	19
Ventilation Fan	No	100	85	79	13
Vibrating Hopper	No	50	85	87	1
Vibratory Concrete Mixer	No	20	80	80	1
Vibratory Pile Driver	No	20	95	101	44
Warning Horn	No	5	85	83	12
Welder/Torch	No	40	73	74	5

Notes:

(1) Source: FHWA Roadway Construction Noise Model User's Guide January 2006.

(2) Warehouse & Forklift Noise Exposure - NoiseTesting.info Carl Stautins, November 4, 2014 http://www.noisetesting.info/blog/carl-strautins/page-3/

(3) Data provided Leq as measured at the operator. Sound Level at 50 feet is calculated using Inverse Square Law.

Table 8
Project Average Daily Traffic Volumes and Roadway Parameters

Roadway	Segment	Average Daily Traffic Volume[1]		Posted Travel Speeds (MPH)	Site Conditions
		Existing	Existing Plus Project		
Indian Street	Iris Avenue to Goya Avenue	4,400	4,700	45	Soft
	Goya Avenue to Krameria Avenue	4,400	4,700	45	Soft
Goya Avenue	Indian Street to Emma Lane	100	500	25	Soft
Emma Lane	North of Goya Avenue	1,000	1,600	25	Soft
	South of Goya Avenue	400	800	25	Soft

Vehicle Distribution (Light Mix)[2]			
Motor-Vehicle Type	(7 AM-7 PM)	(7 PM-10 PM)	(10 PM-7 AM)
Automobiles	75.56	13.96	10.49
Medium Trucks	48.91	2.17	48.91
Heavy Trucks	47.30	5.41	47.30

Vehicle Distribution (Heavy Mix)[2]			
Motor-Vehicle Type	Daytime % (7 AM-7 PM)	Evening % (7 PM-10 PM)	Night % (10 PM-7 AM)
Automobiles	75.54	14.02	10.43
Medium Trucks	48.00	2.00	50.00
Heavy Trucks	48.00	2.00	50.00

Notes:
(1) Existing and project average daily traffic volumes were obtained fromAppendix D of the *Goya at Heritage Park Traffic Impact Analysis* (Ganddini Group Inc., May 30, 2023).
(2) Existing vehicle percentages are based on the Riverside County Industrial Hygiene Letter for Traffic Noise.

Table 9
Construction Equipment Vibration Source Levels

Equipment		PPV at 25 ft, in/sec	Approximate Lv* at 25 ft
Pile Driver (impact)	upper range	1.518	112
	typical	0.644	104
Pile Driver (sonic)	upper range	0.734	105
	typical	0.170	93
clam shovel drop (slurry wall)		0.202	94
Hydromill (slurry wall)	in soil	0.008	66
	in rock	0.017	75
Vibratory Roller		0.210	94
Hoe Ram		0.089	87
Large Bulldozer		0.089	87
Caisson Drilling		0.089	87
Loaded Trucks		0.076	86
Jackhammer		0.035	79
Small Bulldozer		0.003	58

Source: Federal Transit Administration: Transit Noise and Vibration Impact Assessment Manual, 2018.
*RMS velocity in decibels, VdB re 1 micro-in/sec

6. NOISE AND VIBRATION IMPACTS

This section analyzes the significance of project-related noise and groundborne vibration impacts relative to standards established by the City of Moreno Valley and other applicable agencies in the context of CEQA. Appendix G of the California Environmental Quality Act Guidelines (Title 14, Division 6, Chapter 3 of the California Code of Regulations) includes an environmental checklist that identifies issues upon which findings of significance should be made. The CEQA Environmental Checklist Appendix G, XIII. Noise, requires determination if the project would result in:

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

b) *Generation of excessive groundborne vibration or groundborne noise levels?*

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

NOISE IMPACTS

Would the project result in:

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

Finding: Less Than Significant With Mitigation

In relation to the Environmental Checklist noise issue "a", applicable standards established by the City of Moreno Valley can be categorized into the following areas:

- Construction Noise
- Mobile Source Noise

Construction Noise

Construction noise is regulated within Sections 8.14.040 and 11.80.030(D)(7) of the City of Moreno Valley Municipal Code (see Regulatory Setting section of this report). Accordingly, the project would result in a significant impact if:

- Project construction occurs outside the hours of 7:00 AM to 7:00 PM Monday through Friday, excluding holidays, and from 8:00 AM to 4:00 PM on Saturday; or,

- Project construction occurs within the hours of 8:00 PM and 7:00 AM the following day such that the sound there from creates a noise disturbance; or,

- Project construction noise exceeds 80 dBA L_{eq} for an 8-hour period at residential uses and 85 dBA L_{eq} for an 8-hour period at commercial uses.[2]

[2] The Final Environmental Impact Report (FEIR) for the MoVal 2040 General Plan utilized the Federal Transit Administration (FTA) Transit Noise and Vibration Impact Assessment (2018) criteria to establish construction-related significance thresholds; therefore, this analysis also utilized the FTA construction-related significance thresholds. Per the FTA, daytime construction noise levels should not exceed 80 dBA L_{eq} for an 8-hour period at residential uses and 85 dBA L_{eq} for an 8-hour period at commercial uses.

Project construction noise levels at nearby sensitive receptors were calculated using the FTA methodology. Construction noise modeling worksheets for each phase are provided in Appendix D. Anticipated noise levels during each construction phase are presented in Table 10.

As shown in Table 10, modeled construction noise levels reach up to 71.7 dBA L_{eq} at the nearest residential property line to the north, 72 dBA L_{eq} at the nearest church property line to the north, 73.9 dBA L_{eq} at the nearest residential property line to the south along Indian Street, 73.1 dBA L_{eq} at the nearest residential property line to the south along Constellation Way, and 65.6 dBA L_{eq} at the nearest residential property line to the east of the project site.

Project construction will not occur outside of the hours outlined in Sections 8.14.040 and 11.80.030(D)(7) of the City of Moreno Valley Municipal Code. Based on the modeled construction noise levels (see Table 10), construction noise levels are estimated to reach up to 73.9 dBA at the nearest residential property line and 72 dBA at the nearest church property line. Therefore, the project would not exceed City-established standards relating to construction noise. The project impact is less than significant; no mitigation is required.

Notwithstanding the above, best management practices (BMPs) are provided in the Project Description and should be added to project plans and in contract specifications to minimize construction noise emanating from the proposed project.

Mobile Source Noise

California courts have rejected use of what is effectively a single "absolute noise level" threshold of significance (e.g., exceed 65 dBA CNEL) on the grounds that the use of such a threshold fails to consider the magnitude or severity of increases in noise levels attributable to the project in different environments (see *King and Gardiner Farms, LLC v. County of Kern* (2020) 45 Cal.App.5th 814). California courts have also upheld the use of "ambient plus increment" thresholds for assessing project noise impacts as consistent with CEQA, noting however, that the severity of existing noise levels should not be ignored by incorporating a smaller incremental threshold for areas where existing ambient noise levels were already high (see *Mission Bay Alliance v. Office of Community Investment and Infrastructure* (2016) 6 Cal.App.5th 160).

It is widely accepted that the average healthy human ear can barely perceive changes of 3 dBA in an outdoor environment and that a change of 5 dBA is readily perceptible.[3] Based on the City-established standard provided in Section 4.13 Noise of the Draft Environmental Impact Report for the MoVal 2040: Moreno Valley Comprehensive Plan Update, Housing Element Update, and Climate Action Plan (April 2021), and considering relevant case law, the project would result in a significant impact if:

- The addition of project trips on surrounding roadways causes noise levels to increase by:
  - 5 dBA where the existing ambient noise level is less than or equal to a CNEL of 60 dBA; or,
  - 3 dBA where the existing ambient noise level is a CNEL of 60 dBA to 65 dBA; or
  - 1.5 dBA where the existing ambient noise level is greater than or equal to a 65 dBA CNEL.

Project Operational Mobile Source Noise

Roadway noise levels were calculated at roadways included in the *Goya at Heritage Park Traffic Impact Analysis* (Ganddini Group, Inc., May 30, 2023) based on the FHWA Traffic Noise Prediction Model methodology. During operation, the proposed project is expected to generate approximately 1,235 average daily trips with

[3] California Department of Transportation's *Technical Noise Supplement to the Traffic Noise Analysis Protocol* (2013)

92 trips during the AM peak-hour and 124 trips during the PM peak-hour. Roadway noise levels were calculated for the following scenarios:

- *Existing (without Project)*: This scenario refers to existing year traffic noise conditions.
- *Existing Plus Project*: This scenario refers to existing year plus project traffic noise conditions.

Table 11 shows the change in existing roadway noise levels with the addition of project-generated operational trips. FHWA Traffic Noise Prediction Model calculation worksheets are provided in Appendix F.

As shown in Table 11, modeled existing traffic noise levels range between 46-70 dBA CNEL and the modeled Existing Plus Project traffic noise levels range between 53-70 dBA CNEL at the right-of-way of each study roadway segment.

The existing modeled noise level along Indian Street is approximately 70 dBA CNEL with project generated vehicle trips increasing the existing noise level by approximately 0.28 dBA CNEL. Therefore, project generated increases do not exceed the appropriate threshold criteria for Indian Street of 1.5 dBA CNEL. In addition, the existing modeled noise levels along Emma Lane range between 53 and 57 dBA CNEL with project generated vehicle trips increasing noise levels between 2 to 3 dBA CNEL. Project generated increases do not exceed the appropriate threshold criteria for Emma lane of 5 dBA CNEL.

The existing modeled noise level along Goya Avenue is approximately 46 dBA CNEL and project generated vehicle trips are anticipated to increase noise levels by up to approximately 7 dBA CNEL. Therefore, the modeled increase due to project generated vehicle trips is greater than the appropriate impact criterion of 5 dBA CNEL. However, the modeled existing segment of Goya Avenue from Indian Street to Emma Lane is currently not a through street. The existing segment terminates approximately one-quarter mile west of Emma Lane and therefore, does not extend to Indian Street. As a result, this roadway segment has very low existing average daily vehicle trips. As stated in the Traffic Impact Analysis prepared for the proposed project (Ganddini Group, Inc., May 30, 2023) the project includes the following design features related to Goya Avenue:

- Construct Goya Avenue along the project frontage from Indian Street to the eastern project boundary at its ultimate half-section width, including landscaping and parkway improvements, plus one 12-foot lane for opposing traffic in conjunction with development.
- Indian Street (NS) at Goya Avenue (EW)
  - Install westbound stop control.
  - Westbound: one shared left/right turn lane.

Based on these project design features, unlike the existing scenario, the existing plus project scenario includes the entire modeled roadway segment of Goya Avenue from Indian Street to Emma Lane. In addition, the city designates Goya Avenue as a local street. As stated in the MoVAL 2040 General Plan Circulation Element, "the desired roadway capacity on a residential street should not exceed about 2,500 vehicles per day and 200-300 vehicles per hour during peak periods." As shown in Table 8, under the existing plus project scenario the segment of Goya Avenue has only 500 average daily vehicle trips. Furthermore, the modeled existing plus project noise level is approximately 53 dBA CNEL which is below the City's normally acceptable noise level for residential uses (see Table 5). Therefore, the segment of Goya Avenue from Indian Street to Emma Lane is consistent with the findings of the MoVAL 2040 General Plan and potential impacts due to project generated vehicle trips along Goya Avenue is considered less than significant and no mitigation is needed.

The project impact is less than significant; no mitigation is required.

Construction Mobile Source Noise

Construction truck trips would occur throughout the construction period. Given the project site's proximity to the 215 Freeway, it is anticipated that vendor and/or haul truck traffic would take the most direct route to the appropriate freeway ramps.

Indian Street currently handles approximately 4,400 vehicle trips per day in the project vicinity.[4] According to the *Goya at Heritage Park Air Quality, Global Climate Change, and Energy Impact Analysis* (Ganddini Group, Inc., May 2023), the greatest number of construction-related vehicle trips per day would be during building construction at up to approximately 61 vehicle trips per day (47 for worker trips and 14 for vendor trips). Therefore, vehicle traffic generated during project construction is nominal relative to existing roadway volumes and would not result in the doubling of traffic volume necessary to increase noise levels by 3 dBA. The project impact is less than significant; no mitigation is required.

Traffic Noise Impacts to the Proposed Project

The City of Moreno Valley General Plan identifies exterior noise levels up to 65 dBA CNEL as normally acceptable and up to 70 dBA as conditionally acceptable for single-family residential uses (see Table 5). The State of California Building Code sets forth an interior noise standard of 45 dBA CNEL.

As shown on Figures 6 and 7, future traffic noise levels associated with Indian Street are expected to reach up to 71 dBA CNEL and up to 72 dBA CNEL at the façade of the first row of residential buildings proposed by the project without mitigation. With construction of a concrete wall six feet in height (as shown on Figure 7), noise levels are expected to reach up to 64 dBA CNEL at the first floor and up to 72 dBA CNEL at the second floor. A mitigation measure requiring a six-foot concrete wall should be implemented so that exterior noise levels do not exceed the City's exterior noise level criteria of 65 dBA CNEL.

Typical residential construction provides approximately 20 dB of exterior to interior noise reduction assuming that the residences will be provided with mechanical ventilation. In order to ensure that interior noise levels do not exceed 45 dBA CNEL, windows and sliding glass doors on the north, west, and south facing facades of the first row of homes from Indian Avenue shall have an STC rating of at least 30.

Mitigation Measure 1
A six-foot concrete wall should be constructed as shown on Figure 7, so that exterior noise levels do not exceed the City's exterior noise level criteria of 65 dBA CNEL. The wall should be continuous, solid, without holes or cracks.

Mitigation Measure 2
In order to ensure that interior noise levels do not exceed 45 dBA CNEL, windows and sliding glass doors on the north, west, and south facing facades of the first row of homes from Indian Avenue shall have an STC rating of at least 30.

GROUNDBORNE VIBRATION IMPACTS

Would the project result in:

b) Generation of excessive groundborne vibration or groundborne noise levels?

Finding: Less Than Significant

In relation to the Environmental Checklist noise issue "b", the City of Moreno Valley has not established thresholds of significance concerning groundborne vibration. In the absence of City-established thresholds,

[4] The existing average daily traffic volume on Indian Street was obtained from the *Goya at Heritage Park Traffic Impact Analysis* (Ganddini Group Inc., May 30, 2023).

groundborne vibration impacts are based on guidance from the *Federal Transit Administration (FTA) Transit Noise and Vibration Impact Assessment Manual* (FTA, September 2018) (see Regulatory Setting section). Accordingly, the project would result in a significant impact if:

- Groundborne vibration levels generated by the project have the potential to cause architectural damage at nearby buildings by exceeding the following PPV:
  - 0.10 in/sec at buildings extremely susceptible to vibration damage
  - 0.20 in/sec at non-engineered timber and masonry buildings
  - 0.30 in/sec at engineered concrete and masonry (no plaster) buildings
  - 0.50 in/sec at reinforced-concrete, steel or timber (no plaster) buildings
- Groundborne vibration levels generated by the project have the potential to cause annoyance at sensitive receptors by exceeding 72 VdB.

Groundborne vibration modeling worksheets are provided in Appendix G.

Estimated groundborne vibration levels at the nearest sensitive receptors are presented in Table 12. Based on the groundborne vibration modeling, if a vibratory roller is used within 26 feet of an existing structure or if a large bulldozer is used within 15 feet of an existing structure there will be some potential for this equipment to result in architectural damage and significant impacts. A vibration-related best management practice (BMP) is provided in the Project Description that will prevent construction vibration from exceeding architectural damage thresholds, as identified above, at off-site sensitive receptors. Therefore, groundborne vibration generated by project construction would not exceed the levels necessary to cause architectural damage.

Use of vibratory rollers could theoretically exceed the threshold for annoyance due to vibration (72 VdB at offsite residential sensitive uses) at the existing residential receptors to the north and south of the project site, and residents may be temporarily annoyed (Table 12). However, perceptibility of construction vibration would be temporary and would only occur while vibratory equipment is utilized within 136 feet of the existing structures. Furthermore, this impact would only occur during daytime hours and will be temporary. This impact would be less than significant. No mitigation is required.

The most substantial sources of groundborne vibration during post-construction project operations will include the movement of passenger vehicles and trucks on paved and generally smooth surfaces. Loaded trucks generally have a PPV of 0.076 at a distance of 25 feet (Caltrans 2020), which is a substantially lower PPV than that of a vibratory roller (0.210 in/sec PPV at 25 feet). Therefore, groundborne vibration levels generated by project operation would not exceed those modeled for project construction.

AIR TRAFFIC IMPACTS

Would the project result in:

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

Finding: Less than Significant Impact

The closest airport to the project site is the March Air Reserve Base/Inland Port Airport located approximately 0.62 miles to the west of the project site. The City of Moreno Valley 2040 General Plan Map S-7, Airport Land Use Compatibility Zones, shows that the project site is in both Zones D and E. The Riverside County Airport Land Use Commission March Air Reserve Base / Inland Port Airport Land Use Compatibility Plan (ALUCP 2014) states that Zone D is mostly within the 55 dBA CNEL noise contour while Zone E is beyond the 55 dBA CNEL noise contour for the airport. Furthermore, Zones D and E do not have a limit for residential

use. As stated in the ALUCP, as the project is a residential use located within an airport land use compatibility zone, information regarding airport proximity and the existence of aircraft overflights must be disclosed to future residents. Therefore, the proposed project would not expose people residing or working in the area to excessive noise levels. There is no impact, and no mitigation is required.

Table 10
Construction Noise Levels (dBA L_{eq})

Phase	Receptor Location	Existing Ambient Noise Levels (dBA Leq)[2]	Construction Noise Levels (dBA Leq)
Grading/Off-Site Improvements[3]	Residential to North (16233 Smoke Tree Place, Moreno Valley)	48.6	71.7
	Church to North (16220 Indian Street, Moreno Valley)	55.4	72.0
	Residential to South (16410 Indian Street, Moreno Valley)	63.0	73.9
	Residential to South (24608 Constellation Way, Moreno Valley)	44.9	73.1
	Residential to East (16296 Emma Lane, Moreno Valley)	61.7	65.6
Building Construction	Residential to North (16233 Smoke Tree Place, Moreno Valley)	48.6	67.8
	Church to North (16220 Indian Street, Moreno Valley)	55.4	68.0
	Residential to South (16410 Indian Street, Moreno Valley)	63.0	69.9
	Residential to South (24608 Constellation Way, Moreno Valley)	44.9	69.1
	Residential to East (16296 Emma Lane, Moreno Valley)	61.7	61.6
Paving	Residential to North (16233 Smoke Tree Place, Moreno Valley)	48.6	63.3
	Church to North (16220 Indian Street, Moreno Valley)	55.4	63.5
	Residential to South (16410 Indian Street, Moreno Valley)	63.0	65.5
	Residential to South (24608 Constellation Way, Moreno Valley)	44.9	64.6
	Residential to East (16296 Emma Lane, Moreno Valley)	61.7	57.1
Architectural Coating	Residential to North (16233 Smoke Tree Place, Moreno Valley)	48.6	55.8
	Church to North (16220 Indian Street, Moreno Valley)	55.4	56.1
	Residential to South (16410 Indian Street, Moreno Valley)	63.0	58.0
	Residential to South (24608 Constellation Way, Moreno Valley)	44.9	57.2
	Residential to East (16296 Emma Lane, Moreno Valley)	61.7	49.7

Notes:

(1) Construction noise worksheets are provided in Appendix D.

(2) Per measured existing ambient noise levels (see Table 1). STNM1 was used for residential receptors to the north, STNM2 was used for church receptors to the north, STNM5 was used for residential receptors to the south (along Indian Street), STNM4 was used for residential receptors to the south (along Constellation Way), and STNM3 was used for residential receptors to the east of the project site.

(3) The Air Quality, Global Climate Change, and Energy Impact Analysis prepared for the proposed project (Ganddini Group, Inc. 2023) assumed the off-site roadway improvements along Goya Ave would overlap with the grading phase of the proposed project. Therefore, to be conservative and consistent, the loudest equipment phase (grading) of the off-site improvements was combined with the equipment anticipated during grading of the proposed project to produce a worst-case construction noise level during grading.

Table 11
Increase in Existing Noise Levels Along Roadways as a Result of Project (dBA CNEL)

Roadway	Segment	Distance from roadway centerline to right-of-way (feet)[2]	Modeled Noise Levels (dBA CNEL)[1]				
			Existing Without Project at right-of-way	Existing Plus Project at right-of-way	Change in Noise Level	Exceeds Standards[3]	Increase of 5 dB or More?
Indian Street	Iris Avenue to Goya Avenue	44	69.90	70.18	0.28	Yes	No
	Goya Avenue to Krameria Avenue	44	69.90	70.18	0.28	Yes	No
Goya Avenue	Indian Street to Emma Lane	33	45.90	52.89	6.99	No	Yes
Emma Lane	North of Goya Avenue	25	57.11	59.15	2.04	No	No
	South of Goya Avenue	25	53.13	56.14	3.01	No	No

Notes:

(1) Exterior noise levels calculated 5 feet above pad elevation, perpendicular to subject roadway.

(2) Right of way per the City of Moreno Valley General Plan Final Program EIR (July 2006) and/or Google Earth imagery (2021).

(3) Per the City of Moreno Valley normally acceptable standard for single-family detached residential dwelling units (see Table 5).

Table 12
Construction Vibration Levels at the Nearest Receptors

Receptor Location	Distance from Property Line to Nearest Structure (feet)	Equipment	Vibration Level[1]	Threshold Exceeded?[2]	Vibration Level with Best Management Practices[1,3]	Threshold Exceeded with Best Management Practices?[2,3]
Architectural Damage Analysis						
Residential to North (16233 Smoke Tree Place, Moreno Valley)	75	Vibratory Roller	0.040	No	-	-
	75	Large Bulldozer	0.017	No	-	-
Church to North (16220 Indian Street, Moreno Valley)	168	Vibratory Roller	0.012	No	-	-
	168	Large Bulldozer	0.005	No	-	-
Residential to South (16410 Indian Street, Moreno Valley)	238	Vibratory Roller	0.007	No	-	-
	238	Large Bulldozer	0.003	No	-	-
Residential to South (24608 Constellation Way, Moreno Valley)	5	Vibratory Roller	2.348	Yes	0.198	No
	5	Large Bulldozer	0.995	Yes	0.191	No
Residential to East (16296 Emma Lane, Moreno Valley)	375	Vibratory Roller	0.004	No	-	-
	375	Large Bulldozer	0.002	No	-	-
Annoyance Analysis						
Residential to North (16233 Smoke Tree Place, Moreno Valley)	75	Vibratory Roller	80	Yes	-	-
	75	Large Bulldozer	73	Yes	-	-
Church to North (16220 Indian Street, Moreno Valley)	166	Vibratory Roller	69	No	-	-
	166	Large Bulldozer	62	No	-	-
Residential to South (16410 Indian Street, Moreno Valley)	238	Vibratory Roller	65	No	-	-
	238	Large Bulldozer	58	No	-	-
Residential to South (24608 Constellation Way, Moreno Valley)	5	Vibratory Roller	115	Yes	-	-
	5	Large Bulldozer	102	Yes	-	-
Residential to East (16296 Emma Lane, Moreno Valley)	375	Vibratory Roller	59	No	-	-
	375	Large Bulldozer	52	No	-	-

Notes:

(1) Vibration levels are provided in PPV in/sec for architectural damage and VdB for annoyance.

(2) The FTA identifies the threshold at which there is a risk to "architectural" damage to non-engineered timber and masonry buildings as a PPV of 0.2 in/sec (see Table 3). In addition, the FTA identifies a vibration annoyance threshold of 72 VdB for residential uses and 75 VdB for chuch uses (see Table 4). Per the FTA Transit Noise and VIbration Impact Assessment Manual (September 2018), commercial uses are not considered vibration-sensitive land uses; therefore, the annoyance threshold does not apply to commercial uses.

(3) Best management practices for architectural damage include limiting the use of vibratory rollers, or other similar vibratory equipment, within 26 feet and large bulldozers within 15 feet of residential structures to the south of the project site.

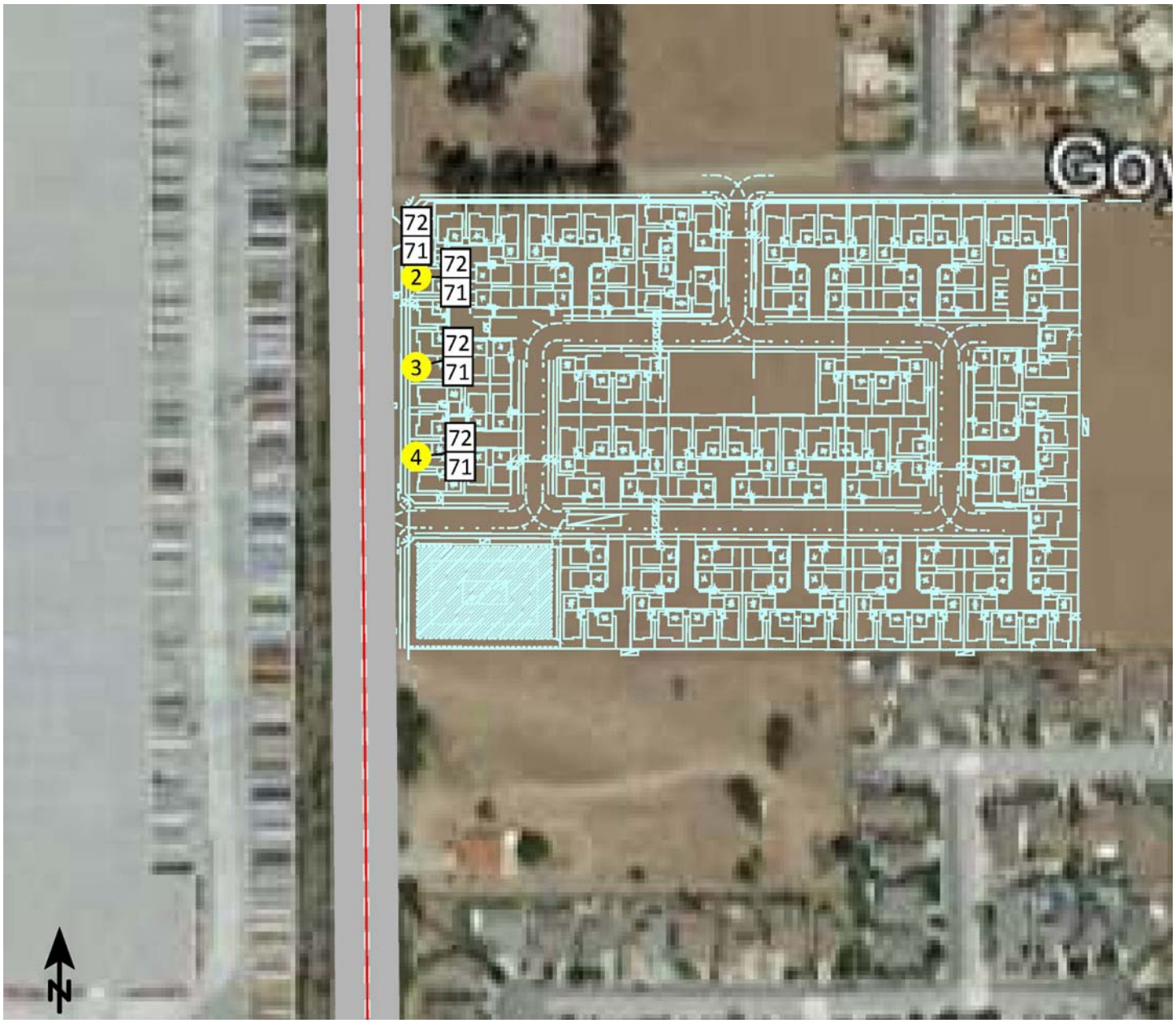


Figure 6
Future Traffic Noise Levels (dBA CNEL) - Unmitigated

Figure 7
Future Traffic Noise Levels (dBA CNEL) - Mitigated

CUMULATIVE NOISE IMPACTS

Noise by definition is a localized phenomenon and drastically reduces as distance from the source increases. As a result, only project and growth in the general area of the project site would contribute to cumulative noise impacts. Noise impacts are localized in nature and decrease with distance. Cumulative construction noise impacts have the potential to occur when multiple construction projects in the local area generate noise within the same time frame and contribute to the local ambient noise environment. It is expected that, as with the project, the related projects would implement BMPs, or similar mitigation measures, which would minimize any noise-related nuisances during construction.

Cumulative Construction Noise

There is a project proposed, South of Iris (TTM38458), located just north of the proposed project site between Iris Avenue and Goya Street. It is possible that construction of that project could occur at the same time as construction of the proposed project. This could result in the extension of the overall construction period and potential annoyance to sensitive receptors. As stated in the Air Quality, Global Climate Change, and Energy Impact Analyses (Air Quality Studies) prepared for the proposed projects, construction of the South of Iris Project is estimated to begin in early 2023 taking approximately 2.5 years to complete while the proposed project is estimated to begin no sooner than December 2024 taking approximately 2 years to complete.[5] The estimated construction timelines and equipment provide in the Air Quality Studies and utilized in the project-related construction noise impact analyses for both of these projects have been provided below.

- Goya at Heritage Park (proposed project):

Phase	Number of Days	Start Date	End Date	Equipment
Grading & Off-Site Improvements	37	12/1/2024	1/21/2025	2- Excavators
				2- Grader
				2 - Rubber Tired Dozer
				3 - Tractors/Loaders/Backhoes
				2 - Scrapers
Building Construction	415	1/22/2025	8/25/2026	1 - Crane
				3 - Forklifts
				1 - Generator Set
				1 - Welders
				3 - Tractors/Loaders/Backhoes
Paving	37	8/24/2026	10/13/2026	2 – Paving Equipment
				2 - Pavers
				2 - Rollers
Architectural Coating	37	10/12/2026	12/1/2026	1 – Air Compressor

[5] South of Iris Project Air Quality, Global Climate Change, and Energy Impact Analysis (Ganddini Group, May 13, 2022) and Goya at Heritage Park Air Quality, Global Climate Change, and Energy Impact Analysis (Ganddini Group, 2023).

- South of Iris:

Phase	Number of Days	Start Date	End Date	Equipment
Grading	46	1/1/2023	3/6/2023	1- Excavator
				1 - Grader
				1 - Rubber Tired Dozer
				3 - Tractors/Loaders/Backhoes
Building Construction	516	3/7/2023	2/25/2025	1 - Crane
				3 - Forklifts
				1 - Generator Set
				3 - Tractors/Loaders/Backhoes
				1 - Welder
Paving	45	2/26/2025	4/29/2025	2 – Paving Equipment
				2 - Pavers
				2 - Rollers
Architectural Coating	45	4/30/2025	7/1/2025	1 - Air Compressor

The following includes a list of the nearest sensitive receptors and their associated distances to the proposed project as well as the South of Iris Project:

- Single-family residence located adjacent to the south of the proposed project site boundary and 702 feet south of the project site boundary of the South of Iris Project (16410 Indian Street, Moreno Valley).
- Single-family residences located adjacent to the south of the proposed project site boundary and 702 feet southeast of the project site boundary of the South of Iris Project (16410 Constellation Way, Moreno Valley).
- Single-family residences located approximately 60 feet to the north of the proposed project site boundary and adjacent to the eastern project site boundary of the South of Iris Project (16235 Smoke Tree Place, Moreno Valley).
- The church use located approximately 30 feet to the north of the proposed project site boundary and adjacent to the western project site boundary of the South of Iris Project (16220 Indian Street, Moreno Valley).

As shown in the information provided above, it is anticipated that building construction of the proposed project could overlap with the building construction, paving, and architectural coating phases of the South of Iris Project. However, construction activities at both sites will be required to meet City Code requirements limiting construction activities to between the hours of 7:00 AM and 7:00 PM Monday through Friday and 8:00 AM and 4:00 PM on Saturdays. Furthermore, the Final Environmental Impact Report (FEIR) for the MoVal 2040 General Plan utilized the Federal Transit Administration (FTA) Transit Noise and Vibration Impact Assessment (2018) criteria to establish construction-related significance thresholds; therefore, both projects have also been assessed against the FTA thresholds. Per the FTA, daytime construction noise levels should not exceed 80 dBA L_{eq} for an 8-hour period at residential uses and 85 dBA L_{eq} for an 8-hour period at commercial uses. As shown in the construction noise modeling conducted for both projects, construction noise will not exceed the FTA thresholds. Furthermore, due to the nature of construction activity (i.e., distances from equipment to sensitive receptors can vary throughout a construction phase as construction equipment moves throughout a project site), it would be speculative to say anything more than that combined noise levels could reach up to 80 dBA L_{eq} at the nearest sensitive receptor property lines. Cumulative noise would also be required to comply with the allowed hours of operation presented in City of Moreno Valley Municipal Code Sections 8.14.040 and 11.80.030(D)(7). Furthermore, the specific BMPs to be implemented

by each project would further reduce construction equipment noise and have been provided in the Introduction section of this report for the proposed project and the Introduction section of the Noise Impact Analysis prepared for the South of Iris Project (Ganddini Group, Inc., 2022).

It should also be noted that, it is unlikely that project construction activities would be close enough to the same receptor at the same time another project was undergoing construction to cause an exceedance of City standards. Therefore, cumulative noise would not result in a substantial increase in noise levels at sensitive receptors and would not be significant. No mitigation is required.

Cumulative Project Operational Noise

Existing measured noise levels at sensitive receptors in the project vicinity range between 44.9 and 63 dBA L_{eq} (see Table 1). The proposed project as well as the nearby South of Iris project are that of proposed residential uses. The existing uses in the project area include residential, industrial, church, and school uses. Therefore, as the projects are compatible with the existing residential uses in the project area, it can be assumed that operational noise would not be noticeable above existing noise levels. Cumulative impacts associated with project operation would not be significant. No mitigation is required.

CUMULATIVE GROUNDBORNE VIBRATION

Because groundborne vibration drops off rapidly with distance from the source, it is highly unlikely that vibration waves created on the project site would combine with vibration waves generated on a nearby construction site and result in a cumulative impact. The proposed project would not contribute to a cumulative groundborne vibration impact. No mitigation is required.

7. REFERENCES

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Environmental Protection Agency

1974 "Information on Levels of Environmental Noise Requisite to Protect Public Health And Welfare with an Adequate Margin of Safety," EPA/ONAC 550/9-74-004, March 1974.

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2006 Transit Noise and Vibration Impact Assessment. Typical Construction Equipment Vibration Emissions. FTAVA-90-1003-06.

2018 Transit Noise and Vibration Impact Assessment Manual. Typical Construction Equipment Vibration Emissions.

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2021 City of Moreno Valley General Plan 2040. June 15.

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Riverside, County of

2001 General Plan, Chapter 4, Figure C-3 "Link Volume Capacities/Level of Service for Riverside County Roadways".

2009 County of Riverside Industrial Hygiene Guidelines for Determining and Mitigating Traffic Noise Impacts to Residential Structures and County.

U.S. Department of Transportation

2006 FHWA Roadway Construction Noise Model User's Guide. January.

APPENDICES

Appendix A List of Acronyms
Appendix B Definitions of Acoustical Terms
Appendix C Noise Measurement Field Worksheets
Appendix D Construction Noise Model Worksheets
Appendix E SoundPLAN Worksheets
Appendix F FHWA Traffic Noise Worksheets
Appendix G Vibration Worksheets

APPENDIX A

LIST OF ACRONYMS

Term	Definition
ADT	Average Daily Traffic
ANSI	American National Standard Institute
CEQA	California Environmental Quality Act
CNEL	Community Noise Equivalent Level
D/E/N	Day / Evening / Night
dB	Decibel
dBA or dB(A)	Decibel "A-Weighted"
dBA/DD	Decibel per Double Distance
dBA L_{eq}	Average Noise Level over a Period of Time
EPA	Environmental Protection Agency
FHWA	Federal Highway Administration
L_{02},L_{08},L_{50},L_{90}	A-weighted Noise Levels at 2 percent, 8 percent, 50 percent, and 90 percent, respectively, of the time period
DNL	Day-Night Average Noise Level
$L_{eq(x)}$	Equivalent Noise Level for '"x" period of time
L_{eq}	Equivalent Noise Level
L_{max}	Maximum Level of Noise (measured using a sound level meter)
L_{min}	Minimum Level of Noise (measured using a sound level meter)
Lp	Sound Pressure Level
LOS C	Level of Service C
Lw	Sound Power Level
OPR	California Governor's Office of Planning and Research
PPV	Peak Particle Velocities
RCNM	Road Construction Noise Model
REMEL	Reference Energy Mean Emission Level
RMS	Root Mean Square

APPENDIX B

DEFINITIONS OF ACOUSTICAL TERMS

Term	Definition
Ambient Noise Level	The all-encompassing noise environment associated with a given environment, at a specified time, usually a composite of sound from many sources, at many directions, near and far, in which usually no particular sound is dominant.
A-Weighted Sound Level, dBA	The sound level obtained by use of A-weighting. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear.
CNEL	Community Noise Equivalent Level. CNEL is a weighted 24-hour noise level that is obtained by adding five decibels to sound levels in the evening (7:00 PM to 10:00 PM), and by adding ten decibels to sound levels at night (10:00 PM to 7:00 AM). This weighting accounts for the increased human sensitivity to noise during the evening and nighttime hours.
Decibel, dB	A logarithmic unit of noise level measurement that relates the energy of a noise source to that of a constant reference level; the number of decibels is 10 times the logarithm (to the base 10) of this ratio.
DNL, Ldn	Day Night Level. The DNL, or Ldn is a weighted 24-hour noise level that is obtained by adding ten decibels to sound levels at night (10:00 PM to 7:00 AM). This weighting accounts for the increased human sensitivity to noise during the nighttime hours.
Equivalent Continuous Noise Level, L_{eq}	A level of steady state sound that in a stated time period, and a stated location, has the same A-weighted sound energy as the time-varying sound.
Fast/Slow Meter Response	The fast and slow meter responses are different settings on a sound level meter. The fast response setting takes a measurement every 100 milliseconds, while a slow setting takes one every second.
Frequency, Hertz	In a function periodic in time, the number of times that the quantity repeats itself in one second (i.e., the number of cycles per second).
L_{02}, L_{08}, L_{50}, L_{90}	The A-weighted noise levels that are equaled or exceeded by a fluctuating sound level, 2 percent, 8 percent, 50 percent, and 90 percent of a stated time period, respectively.
L_{max}, L_{min}	Lmax is the RMS (root mean squared) maximum level of a noise source or environment measured on a sound level meter, during a designated time interval, using fast meter response. Lmin is the minimum level.
Offensive/ Offending/Intrusive Noise	The noise that intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of sound depends on its amplitude, duration, frequency, and time of occurrence, and tonal information content as well as the prevailing ambient noise level.
Root Mean Square (RMS)	A measure of the magnitude of a varying noise source quantity. The name derives from the calculation of the square root of the mean of the squares of the values. It can be calculated from either a series of lone values or a continuous varying function.

APPENDIX C

NOISE MEASUREMENT FIELD WORKSHEETS

Noise Measurement
Field Data

Project Name: Goya at Heritage Park, Moreno Valley **Date:** October 11, 2022

Project #: 19550

Noise Measurement #: STNM1 Run Time: 15 minutes (1 x 15 minutes) **Technician:** Ian Edward Gallagher

Nearest Address or Cross Street: 16233 Smoke Tree Pl, Moreno Valley CA 92551

Site Description (Type of Existing Land Use and any other notable features): STNM1 Site: Measurement taken along southern boundary of Goya Avenue near the western terminus of the existing pavement. Adjacent: Goya Road to north w/ single-family residential further north/nrtheast, vacant land to south, and vacant project site to southwest. Indian St (running N-S) ~685 ft west & warehouse ~750' W of STNM1.

Weather: Mostly cloudy, 20% precipitation. Sunset: 6:22 PM **Settings:** SLOW FAST

Temperature: 71 deg F **Wind:** 8 mph **Humidity:** 67% **Terrain:** Flat

Start Time: 1:22 PM **End Time:** 1:37 PM **Run Time:**

Leq: 48.6 dB **Primary Noise Source:** Traffic ambiance from vehicles traveling along Indian Street ~750 ft W of STNM1.

Lmax 57.7 dB Traffimc ambiance from vehicles on other roads.

L2 55.3 dB **Secondary Noise Sources:** Some residential ambiance. Overhead air traffic. Bird song. Leaf rustle due to 8mph

L8 52.5 dB breeze.

L25 48.7 dB

L50 46.6 dB

NOISE METER:	SoundTrack LXT Class 1	**CALIBRATOR:**	Larson Davis CA 250
MAKE:	Larson Davis	**MAKE:**	Larson Davis
MODEL:	LXT1	**MODEL:**	CA 250
SERIAL NUMBER:	3099	**SERIAL NUMBER:**	2723
FACTORY CALIBRATION DATE:	11/17/2021	**FACTORY CALIBRATION DATE:**	11/18/2021
FIELD CALIBRATION DATE:	10/11/2022		

Noise Measurement
Field Data

PHOTOS:

STNM1 looking N across Goya Ave towards S side of residence 16233 Smoke Tree Pl, Moreno Valley.

STNM1 looking ENE across Goya Avenue towards Smoke Tree Pl intersection.

Summary	
File Name on Meter	LxT_Data.109.s
File Name on PC	LxT_0003099-20221011 132229-LxT_Data.109.ldbin
Serial Number	0003099
Model	SoundTrack LxT®
Firmware Version	2.404
User	Ian Edward Gallagher
Location	STNM133°53'4.85"N 117°13'57.05"W
Job Description	15 minute noise measurement (1 x15 minutes)
Note	Ganddini Project 19550 Goya at Heritage Park, Moreno Valley

Measurement	
Start	2022-10-11 13:22:29
Stop	2022-10-11 13:37:29
Duration	00:15:00.0
Run Time	00:15:00.0
Pause	00:00:00.0
Pre-Calibration	2022-10-11 13:22:03
Post-Calibration	None

Overall Settings	
RMS Weight	A Weighting
Peak Weight	A Weighting
Detector	Slow
Preamplifier	PRMLxT1L
Microphone Correction	Off
Integration Method	Linear
OBA Range	Normal
OBA Bandwidth	1/1 and 1/3
OBA Frequency Weighting	C Weighting
OBA Max Spectrum	At LMax
Overload	124.3 dB

Results			
LA_{eq}		48.6	
LAE		78.1	
EA		7.215	µPa²h
EA8		230.864	µPa²h
EA40		1.154	mPa²h
$LA_{peak\ (max)}$	2022-10-11 13:22:43	85.2	dB
LAS_{max}	2022-10-11 13:24:37	57.7	dB
LAS_{min}	2022-10-11 13:28:58	42.1	dB

		Statistics	
LC_{eq}	63.7 dB	**LA2.00**	55.3 dB
LA_{eq}	48.6 dB	**LA8.00**	52.5 dB
LC_{eq} - LA_{eq}	15.1 dB	**LA25.00**	48.7 dB
LAI_{eq}	50.4 dB	**LA50.00**	46.6 dB
LA_{eq}	48.6 dB	**LA66.60**	45.6 dB
LAI_{eq} - LA_{eq}	1.8 dB	**LA90.00**	44.2 dB
Overload Count	0		

Measurement Report

Report Summary

Meter's File Name	LxT_Data.109.s	Computer's File Name	LxT_0003099-20221011 132229-LxT_Data.109.ldbin
Meter	LxT1 0003099		
Firmware	2.404		
User	Ian Edward Gallagher	Location	STNM133°53'4.85"N 117°13'57.05"W
Job Description	15 minute noise measurement (1 x15 minutes)		
Note	Ganddini Project 19550 Goya at Heritage Park, Moreno Valley		
Start Time	2022-10-11 13:22:29	Duration	0:15:00.0
End Time	2022-10-11 13:37:29	Run Time	0:15:00.0
Pause Time	0:00:00.0		

Results

Overall Metrics

LA_{eq}	48.6 dB		
LAE	78.1 dB	SEA	--- dB
EA	7.2 µPa²h	LAFTM5	52.0 dB
EA8	230.9 µPa²h		
EA40	1.2 mPa²h		
LA_{peak}	85.2 dB	2022-10-11 13:22:43	
LAS_{max}	57.7 dB	2022-10-11 13:24:37	
LAS_{min}	42.1 dB	2022-10-11 13:28:58	
LA_{eq}	48.6 dB		
LC_{eq}	63.7 dB	LC_{eq} - LA_{eq}	15.1 dB
LAI_{eq}	50.4 dB	LAI_{eq} - LA_{eq}	1.8 dB

Exceedances	Count	Duration
LAS > 65.0 dB	0	0:00:00.0
LAS > 85.0 dB	0	0:00:00.0
LApeak > 135.0 dB	0	0:00:00.0
LApeak > 137.0 dB	0	0:00:00.0
LApeak > 140.0 dB	0	0:00:00.0

Community Noise	LDN	LDay	LNight
	--- dB	--- dB	0.0 dB

	LDEN	LDay	LEve	LNight
	--- dB	--- dB	--- dB	--- dB

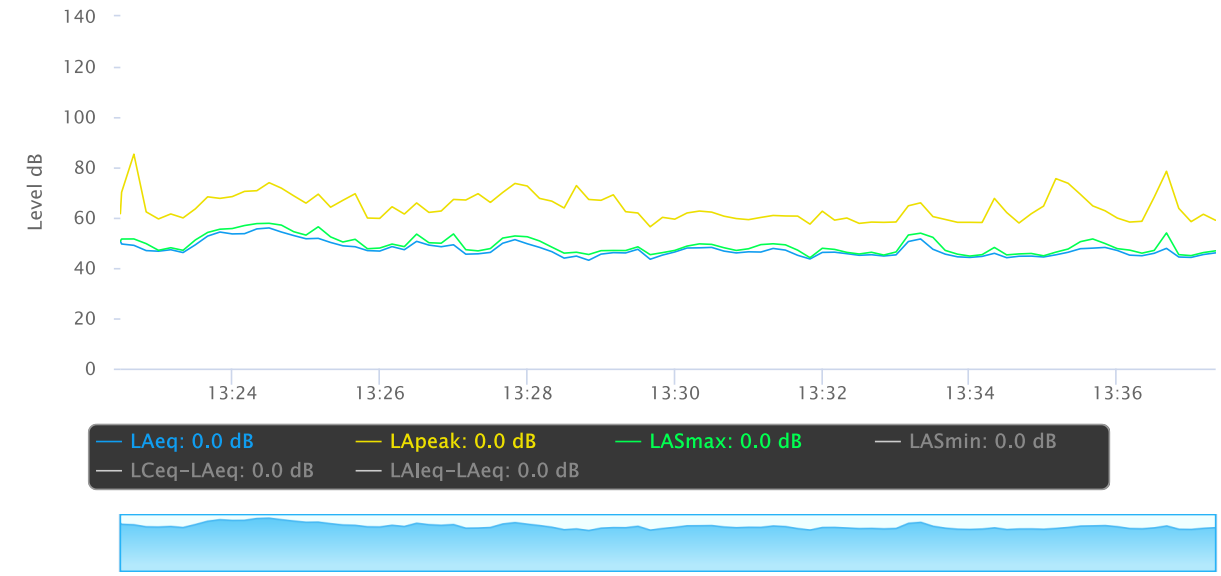
Any Data	A		C		Z	
	Level	Time Stamp	Level	Time Stamp	Level	Time Stamp
L_{eq}	48.6 dB		63.7 dB		--- dB	
$L_{S(max)}$	57.7 dB	2022-10-11 13:24:37	--- dB		--- dB	
$L_{S(min)}$	42.1 dB	2022-10-11 13:28:58	--- dB		--- dB	
$L_{Peak(max)}$	85.2 dB	2022-10-11 13:22:43	--- dB		--- dB	

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

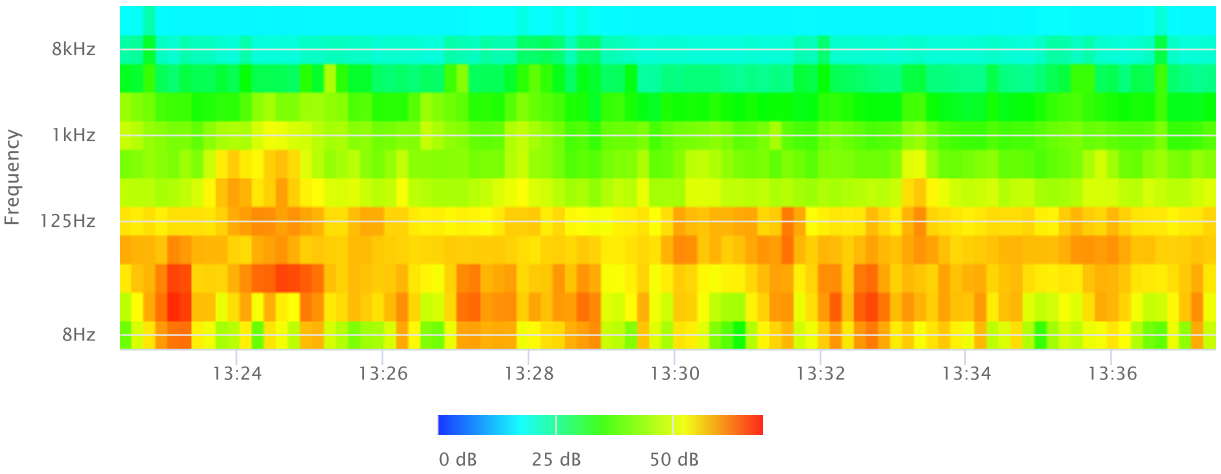
Statistics

LAS 2.0	55.3 dB
LAS 8.0	52.5 dB
LAS 25.0	48.7 dB
LAS 50.0	46.6 dB
LAS 66.6	45.6 dB
LAS 90.0	44.2 dB

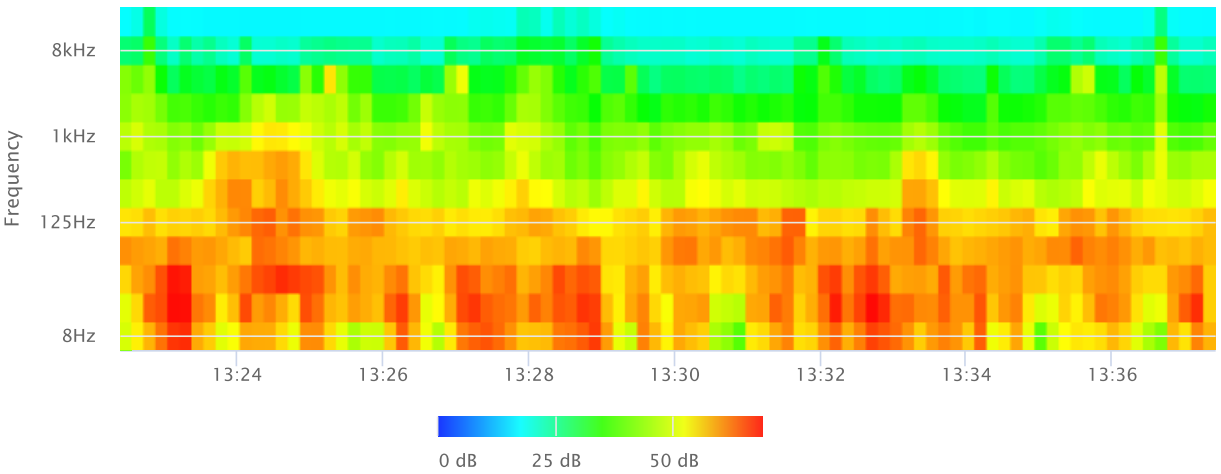
Time History



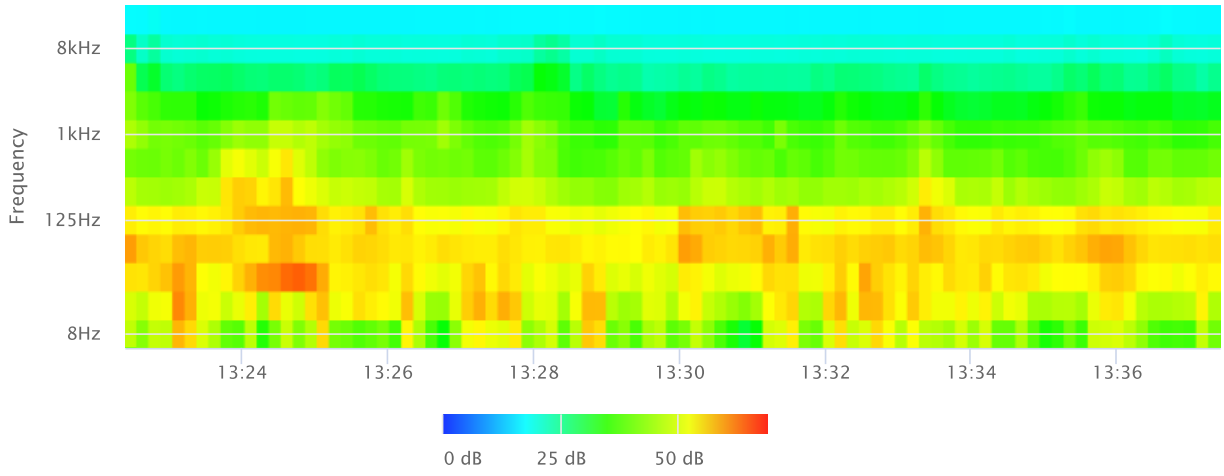
OBA 1/1 Leq



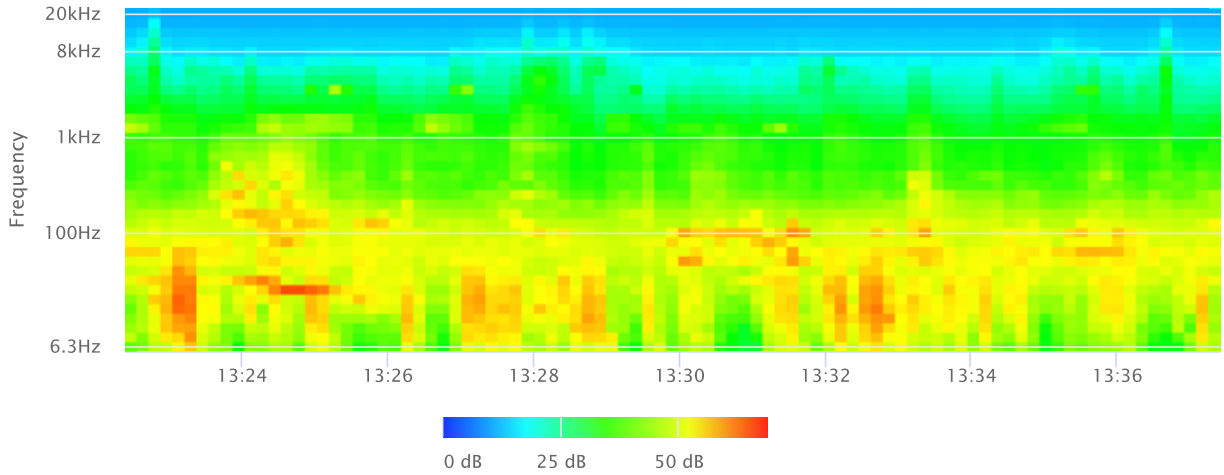
OBA 1/1 Lmax



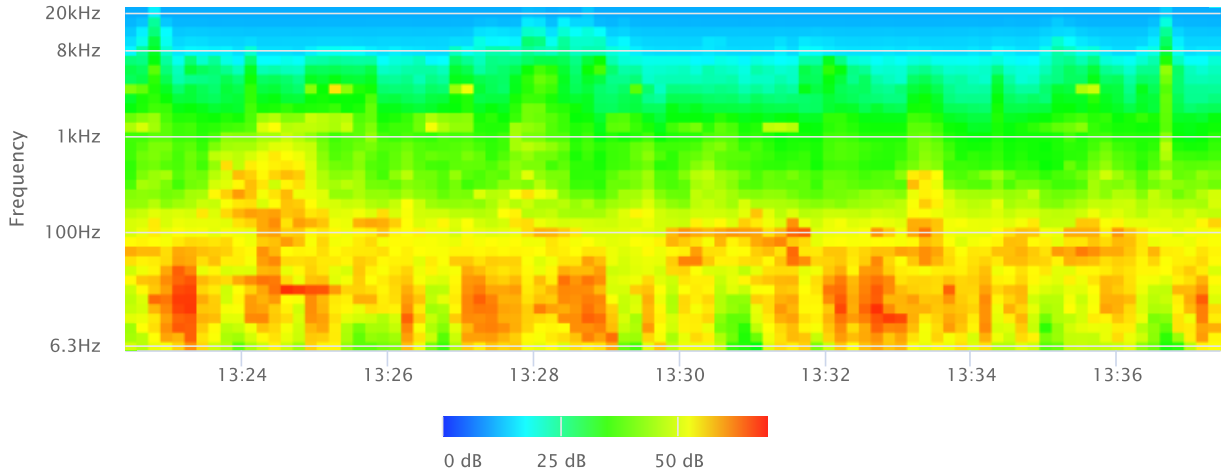
OBA 1/1 Lmin



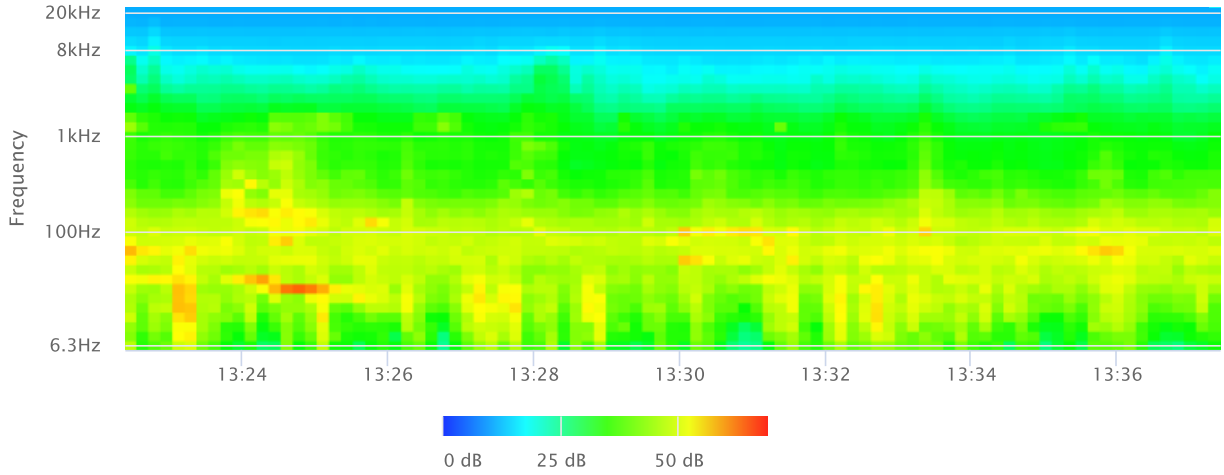
OBA 1/3 Leq



OBA 1/3 Lmax



OBA 1/3 Lmin


20kHz
8kHz
1kHz
100Hz
6.3Hz
Frequency
13:24
13:26
13:28
13:30
13:32
13:34
13:36
0 dB
25 dB
50 dB

Noise Measurement
Field Data

Project Name: Goya at Heritage Park, Moreno Valley **Date:** October 11, 2022

Project #: 19550

Noise Measurement #: STNM2 Run Time: 15 minutes (1 x 15 minutes) **Technician:** Ian Edward Gallagher

Nearest Address or Cross Street: 16220 Indian Street, Moreno Valley CA 92551

Site Description (Type of Existing Land Use and any other notable features): STNM2 Site: Measurement taken just S of property 16220 Indian Street near the northern project site boundary. Adjacent: Residnetial/church & vacant land to north, vacant project site to south, Indian St (running N-S) to west & warehouse ~185 ft W STNM2.

Weather: Mostly cloudy, 20% precipitation. Sunset: 6:22 PM **Settings:** SLOW FAST

Temperature: 71 deg F **Wind:** 8 mph **Humidity:** 67% **Terrain:** Flat

Start Time: 1:52 PM **End Time:** 2:07 PM **Run Time:**

Leq: 55.4 dB **Primary Noise Source:** Traffic from the 83 vehicles traveling along Indian Street ~180 ft W of STNM2.

Lmax 67.5 dB Traffic ambiance from vehicles on other roads.

L2 61.3 dB **Secondary Noise Sources:** Some residential ambiance. Overhead air traffic. Bird song Leaf rustle due to 8mph

L8 59.1 dB breeze.

L25 56.3 dB

L50 53.6 dB

NOISE METER:	SoundTrack LXT Class 1	**CALIBRATOR:**	Larson Davis CA 250
MAKE:	Larson Davis	**MAKE:**	Larson Davis
MODEL:	LXT1	**MODEL:**	CA 250
SERIAL NUMBER:	3099	**SERIAL NUMBER:**	2723
FACTORY CALIBRATION DATE:	11/17/2021	**FACTORY CALIBRATION DATE:**	11/18/2021
FIELD CALIBRATION DATE:	10/11/2022		

Noise Measurement
Field Data

PHOTOS:

STNM2 looking N towards missionary church 16220 Indian Street, Moreno Valley.

STNM2 looking W across Indian Street towards warehouse.

Summary	
File Name on Meter	LxT_Data.110.s
File Name on PC	LxT_0003099-20221011 135207-LxT_Data.110.ldbin
Serial Number	3099
Model	SoundTrack LxT®
Firmware Version	2.404
User	Ian Edward Gallagher
Location	STNM2 33°53'4.71"N 117°14'3.97"W
Job Description	15 minute noise measurement (1 x 15 minutes)
Note	Ganddini Project 19550 South of Goya at Heritage Park, Moreno

Measurement	
Start	2022-10-11 13:52:07
Stop	2022-10-11 14:07:07
Duration	00:15:00.0
Run Time	00:15:00.0
Pause	00:00:00.0
Pre-Calibration	2022-10-11 13:51:18
Post-Calibration	None

Overall Settings	
RMS Weight	A Weighting
Peak Weight	A Weighting
Detector	Slow
Preamplifier	PRMLxT1L
Microphone Correction	Off
Integration Method	Linear
OBA Range	Normal
OBA Bandwidth	1/1 and 1/3
OBA Frequency Weighting	C Weighting
OBA Max Spectrum	At LMax
Overload	123.2 dB

Results			
LA_{eq}	55.4		
LAE	84.9		
EA	34.64974 µPa²h		
EA8	1.108792 mPa²h		
EA40	5.543959 mPa²h		
$LA_{peak\ (max)}$	2022-10-11 13:54:13	82.0 dB	
LAS_{max}	2022-10-11 14:06:51	67.5 dB	
LAS_{min}	2022-10-11 13:53:17	43.8 dB	

		Statistics	
LC_{eq}	65.4 dB	**LA2.00**	61.3 dB
LA_{eq}	55.4 dB	**LA8.00**	59.1 dB
LC_{eq} - LA_{eq}	10.0 dB	**LA25.00**	56.8 dB
LAI_{eq}	56.6 dB	**LA50.00**	53.6 dB
LA_{eq}	55.4 dB	**LA66.60**	50.7 dB
LAI_{eq} - LA_{eq}	1.2 dB	**LA90.00**	46.6 dB
Overload Count	0		

Measurement Report

Report Summary

Meter's File Name	LxT_Data.110.s	Computer's File Name	LxT_0003099-20221011 135207-LxT_Data.110.ldbin
Meter	LxT1 0003099		
Firmware	2.404		
User	Ian Edward Gallagher	Location	STNM2 33°53'4.71"N 117°14'3.97"W
Job Description	15 minute noise measurement (1 x 15 minutes)		
Note	Ganddini Project 19550 Goya at Heritage Park, Moreno Valley		
Start Time	2022-10-11 13:52:07	Duration	0:15:00.0
End Time	2022-10-11 14:07:07	Run Time	0:15:00.0
Pause Time	0:00:00.0		

Results

Overall Metrics

LA_{eq}	55.4 dB		
LAE	84.9 dB	SEA	--- dB
EA	34.6 µPa²h	LAFTM5	58.8 dB
EA8	1.1 mPa²h		
EA40	5.5 mPa²h		
LA_{peak}	82.0 dB	2022-10-11 13:54:13	
LAS_{max}	67.5 dB	2022-10-11 14:06:51	
LAS_{min}	43.8 dB	2022-10-11 13:53:17	
LA_{eq}	55.4 dB		
LC_{eq}	65.4 dB	LC_{eq} - LA_{eq}	10.0 dB
LAI_{eq}	56.6 dB	LAI_{eq} - LA_{eq}	1.2 dB

Exceedances

	Count	Duration
LAS > 65.0 dB	1	0:00:04.3
LAS > 85.0 dB	0	0:00:00.0
LApeak > 135.0 dB	0	0:00:00.0
LApeak > 137.0 dB	0	0:00:00.0
LApeak > 140.0 dB	0	0:00:00.0

Community Noise

LDN	LDay	LNight
--- dB	--- dB	0.0 dB

LDEN	LDay	LEve	LNight
--- dB	--- dB	--- dB	--- dB

Any Data

	A		C		Z	
	Level	Time Stamp	Level	Time Stamp	Level	Time Stamp
L_{eq}	55.4 dB		65.4 dB		--- dB	
$L_{S(max)}$	67.5 dB	2022-10-11 14:06:51	--- dB		--- dB	
$L_{S(min)}$	43.8 dB	2022-10-11 13:53:17	--- dB		--- dB	
$L_{Peak(max)}$	82.0 dB	2022-10-11 13:54:13	--- dB		--- dB	

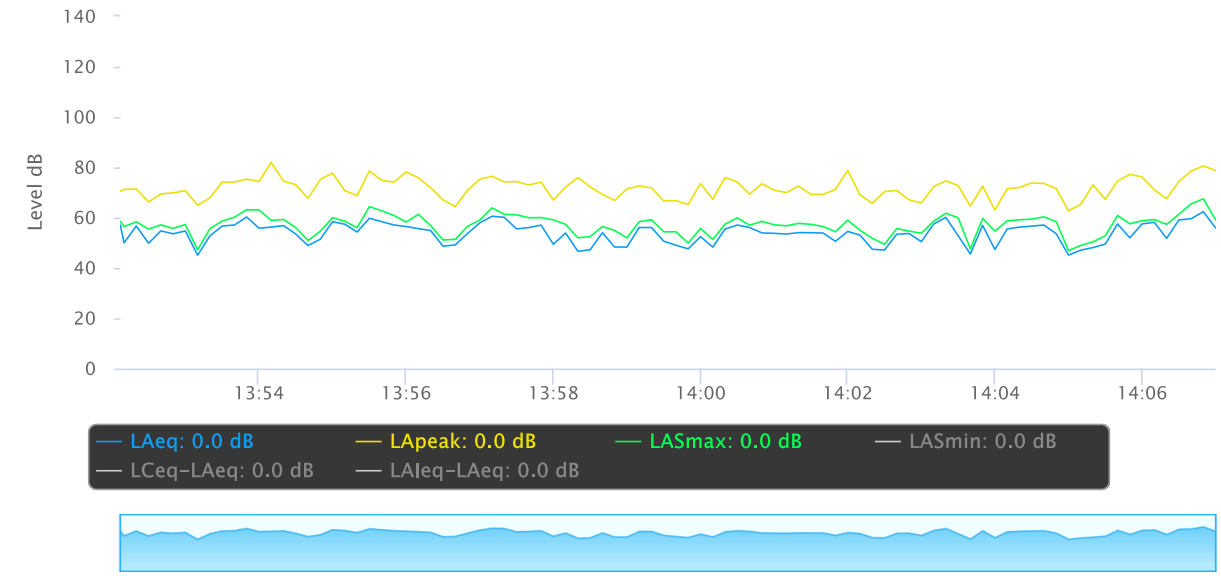
Overloads

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

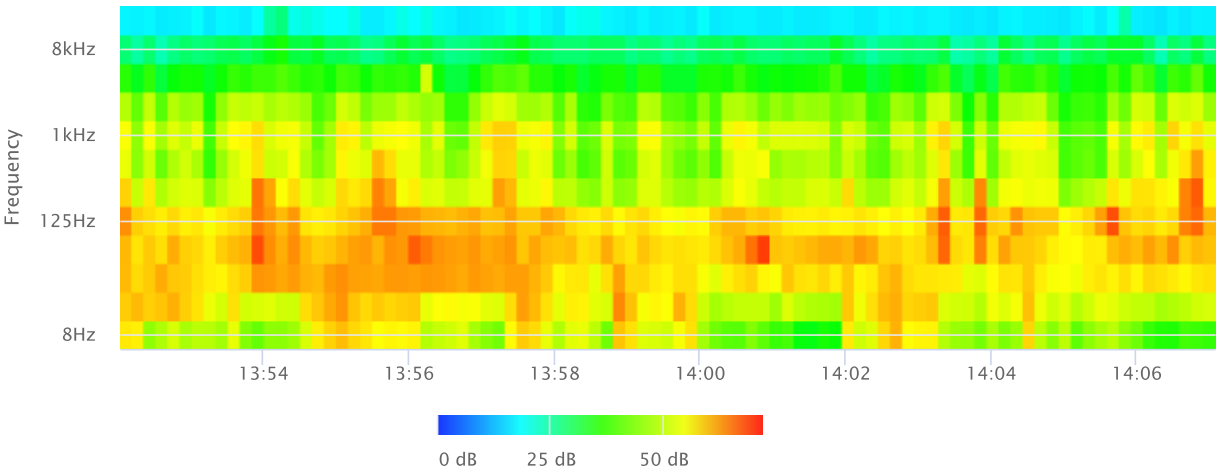
Statistics

LAS 2.0	61.3 dB
LAS 8.0	59.1 dB
LAS 25.0	56.8 dB
LAS 50.0	53.6 dB
LAS 66.6	50.7 dB
LAS 90.0	46.6 dB

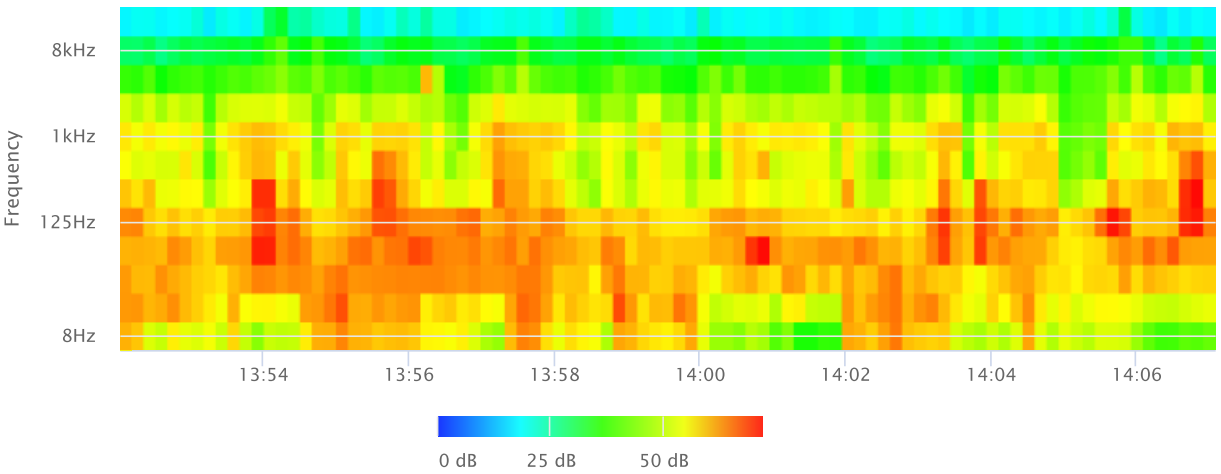
Time History



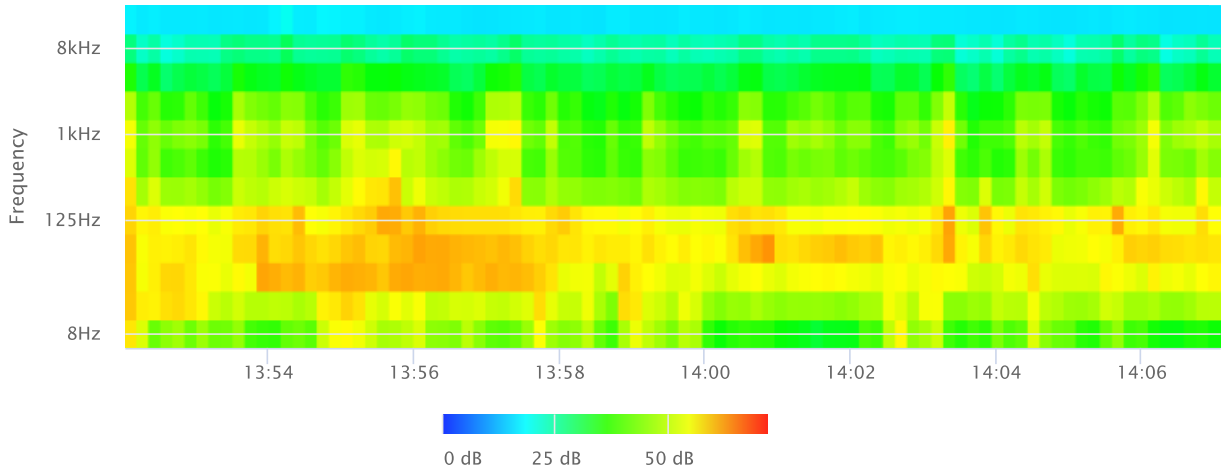
OBA 1/1 Leq



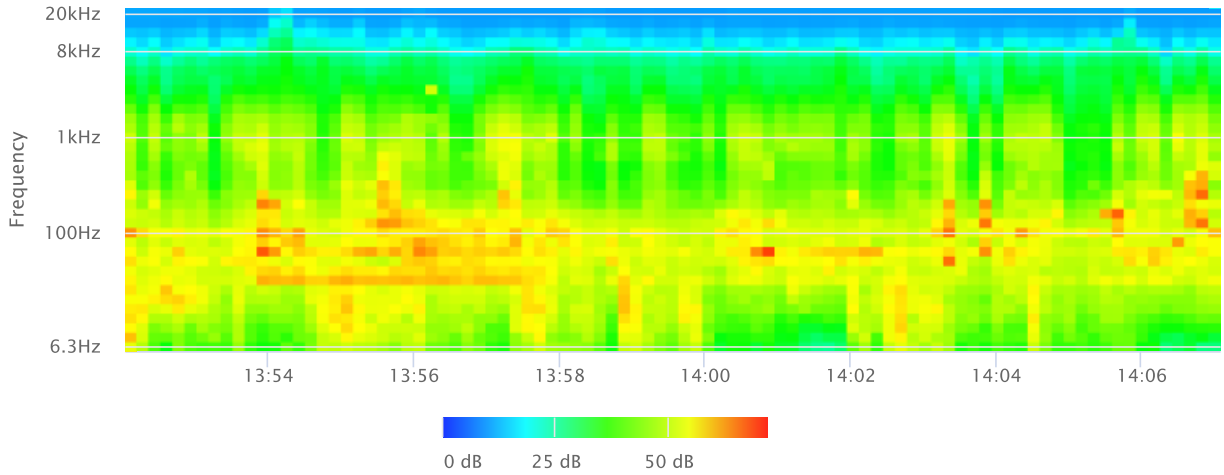
OBA 1/1 Lmax



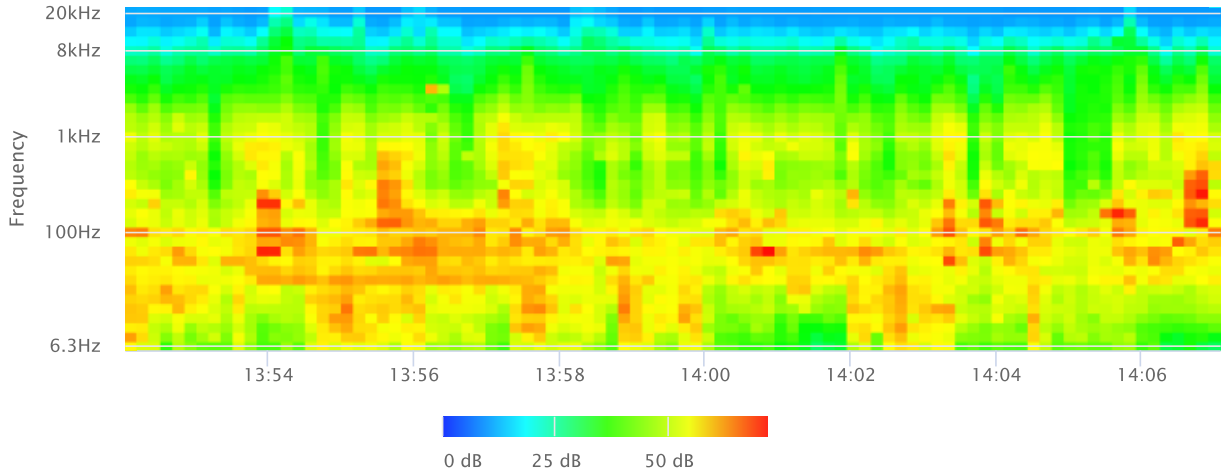
OBA 1/1 Lmin



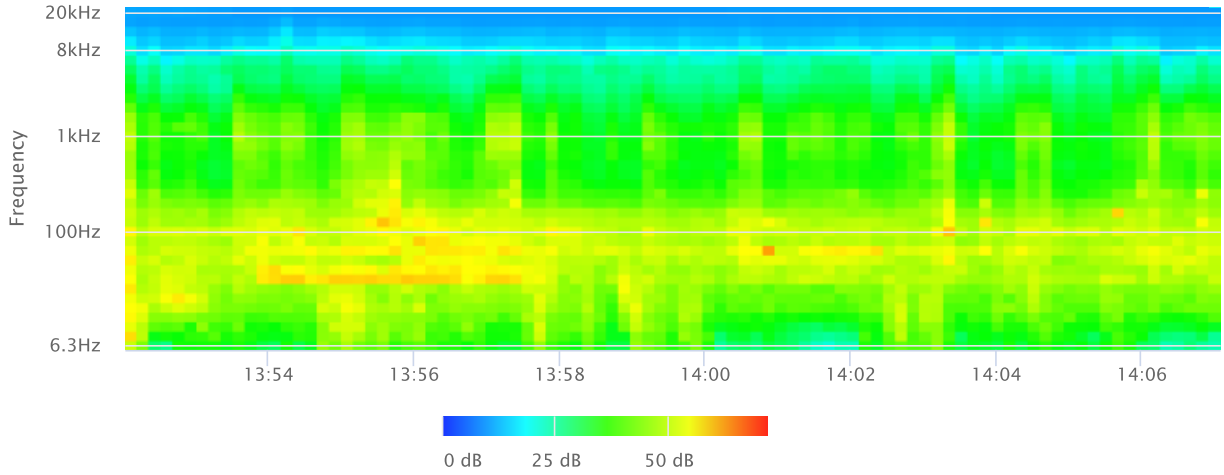
OBA 1/3 Leq



OBA 1/3 Lmax



OBA 1/3 Lmin


20kHz
8kHz
1kHz
100Hz
6.3Hz
Frequency
13:54
13:56
13:58
14:00
14:02
14:04
14:06
0 dB
25 dB
50 dB

Noise Measurement
Field Data

Project Name: Goya at Heritage Park, Moreno Valley **Date:** October 11, 2022

Project #: 19550

Noise Measurement #: STNM3 Run Time: 15 minutes (1 x 15 minutes) **Technician:** Ian Edward Gallagher

Nearest Address or Cross Street: 16296 Emma Lane, Moreno Valley CA 92551

Site Description (Type of Existing Land Use and any other notable features): STNM3 Site: Measurement taken on eastern side of Emma Lane just west of residence

16296 Emma Lane, Moreno Valley. Adjacent: Residential to east & NE/SE, Emma Lane to west with vacant land further west.

Weather: Mostly cloudy, 20% precipitation. Sunset: 6:22 PM **Settings:** SLOW FAST

Temperature: 71 deg F **Wind:** 8 mph **Humidity:** 67% **Terrain:** Flat

Start Time: 2:28 PM **End Time:** 2:43 PM **Run Time:**

Leq: 61.7 dB

Lmax 87.2 dB

L2 63.1 dB

L8 55.0 dB

L25 46.6 dB

L50 42.9 dB

Primary Noise Source: Traffic noise from the 10 vehicles passing microphone traveling along Emma Lane.

Traffic ambiance from vehicles traveling along Indian Street ~1,350 ft W of STNM3.

Secondary Noise Sources: Some residential ambiance. Overhead air traffic. Bird song. Leaf rustle due to 8mph breeze.

NOISE METER:	SoundTrack LXT Class 1	**CALIBRATOR:**	Larson Davis CA 250
MAKE:	Larson Davis	**MAKE:**	Larson Davis
MODEL:	LXT1	**MODEL:**	CA 250
SERIAL NUMBER:	3099	**SERIAL NUMBER:**	2723
FACTORY CALIBRATION DATE:	11/17/2021	**FACTORY CALIBRATION DATE:**	11/18/2021
FIELD CALIBRATION DATE:	10/11/2022		

Noise Measurement
Field Data

PHOTOS:

STNM3 looking looking NE across front yard of residence 16296 Emma Lane, Moreno Valley.

STNM3 looking W across Emma Lane & vacant land twoard project site.

Summary	
File Name on Meter	LxT_Data.111.s
File Name on PC	LxT_0003099-20221011 142801-LxT_Data.111.ldbin
Serial Number	3099
Model	SoundTrack LxT®
Firmware Version	2.404
User	Ian Edward Gallagher
Location	STNM3 33°53'2.10"N 117°13'49.72"W
Job Description	15 minute noise measurement (1 x 15 minutes)
Note	Ganddini Project 19550 Goya at Heritage Park, Moreno Valley

Measurement	
Start	2022-10-11 14:28:01
Stop	2022-10-11 14:43:01
Duration	00:15:00.0
Run Time	00:15:00.0
Pause	00:00:00.0
Pre-Calibration	2022-10-11 14:27:33
Post-Calibration	None

Overall Settings	
RMS Weight	A Weighting
Peak Weight	A Weighting
Detector	Slow
Preamplifier	PRMLxT1L
Microphone Correction	Off
Integration Method	Linear
OBA Range	Normal
OBA Bandwidth	1/1 and 1/3
OBA Frequency Weighting	C Weighting
OBA Max Spectrum	At LMax
Overload	123.1 dB

Results			
LA_{eq}	61.7		
LAE	91.3		
EA	148.7553 µPa²h		
EA8	4.76017 mPa²h		
EA40	23.80085 mPa²h		
$LA_{peak\ (max)}$	2022-10-11 14:39:15	102.5 dB	
LAS_{max}	2022-10-11 14:39:16	87.2 dB	
LAS_{min}	2022-10-11 14:42:15	37.4 dB	
			Statistics
LC_{eq}	73.3 dB		**LA2.00** 63.1 dB
LA_{eq}	61.7 dB		**LA8.00** 55.0 dB
LC_{eq} - LA_{eq}	11.6 dB		**LA25.00** 46.6 dB
LAI_{eq}	65.8 dB		**LA50.00** 42.9 dB
LA_{eq}	61.7 dB		**LA66.60** 41.6 dB
LAI_{eq} - LA_{eq}	4.1 dB		**LA90.00** 39.7 dB
Overload Count	0		

Measurement Report

Report Summary

Meter's File Name	LxT_Data.111.s	Computer's File Name	LxT_0003099-20221011 142801-LxT_Data.111.ldbin
Meter	LxT1 0003099		
Firmware	2.404		
User	Ian Edward Gallagher	Location	STNM3 33°53'2.10"N 117°13'49.72"W
Job Description	15 minute noise measurement (1 x 15 minutes)		
Note	Ganddini Project 19550 Goya at Heritage Park, Moreno Valley		
Start Time	2022-10-11 14:28:01	Duration	0:15:00.0
End Time	2022-10-11 14:43:01	Run Time	0:15:00.0
Pause Time	0:00:00.0		

Results

Overall Metrics

LA_{eq}	61.7 dB		
LAE	91.3 dB	SEA	--- dB
EA	148.8 µPa²h	LAFTM5	70.6 dB
EA8	4.8 mPa²h		
EA40	23.8 mPa²h		
LA_{peak}	102.5 dB	2022-10-11 14:39:15	
LAS_{max}	87.2 dB	2022-10-11 14:39:16	
LAS_{min}	37.4 dB	2022-10-11 14:42:15	
LA_{eq}	61.7 dB		
LC_{eq}	73.3 dB	LC_{eq} - LA_{eq}	11.6 dB
LAI_{eq}	65.8 dB	LAI_{eq} - LA_{eq}	4.1 dB

Exceedances	Count	Duration
LAS > 65.0 dB	2	0:00:17.5
LAS > 85.0 dB	1	0:00:02.0
LApeak > 135.0 dB	0	0:00:00.0
LApeak > 137.0 dB	0	0:00:00.0
LApeak > 140.0 dB	0	0:00:00.0

Community Noise	LDN	LDay	LNight
	--- dB	--- dB	0.0 dB

	LDEN	LDay	LEve	LNight
	--- dB	--- dB	--- dB	--- dB

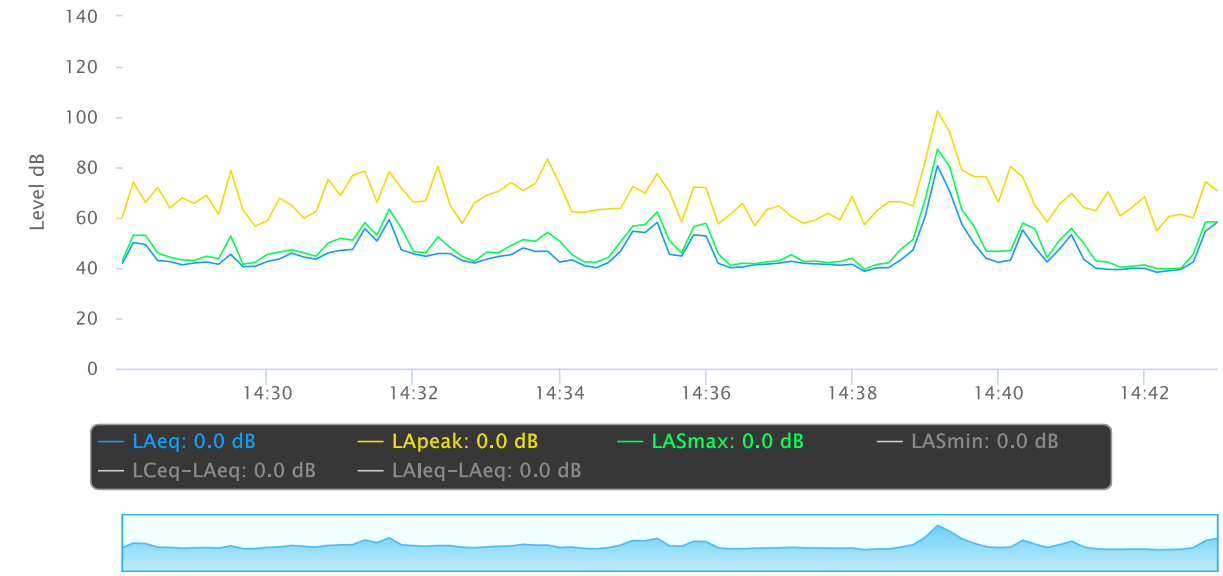
Any Data	A		C		Z	
	Level	Time Stamp	Level	Time Stamp	Level	Time Stamp
L_{eq}	61.7 dB		73.3 dB		--- dB	
$L_{S(max)}$	87.2 dB	2022-10-11 14:39:16	--- dB		--- dB	
$L_{S(min)}$	37.4 dB	2022-10-11 14:42:15	--- dB		--- dB	
$L_{Peak(max)}$	102.5 dB	2022-10-11 14:39:15	--- dB		--- dB	

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

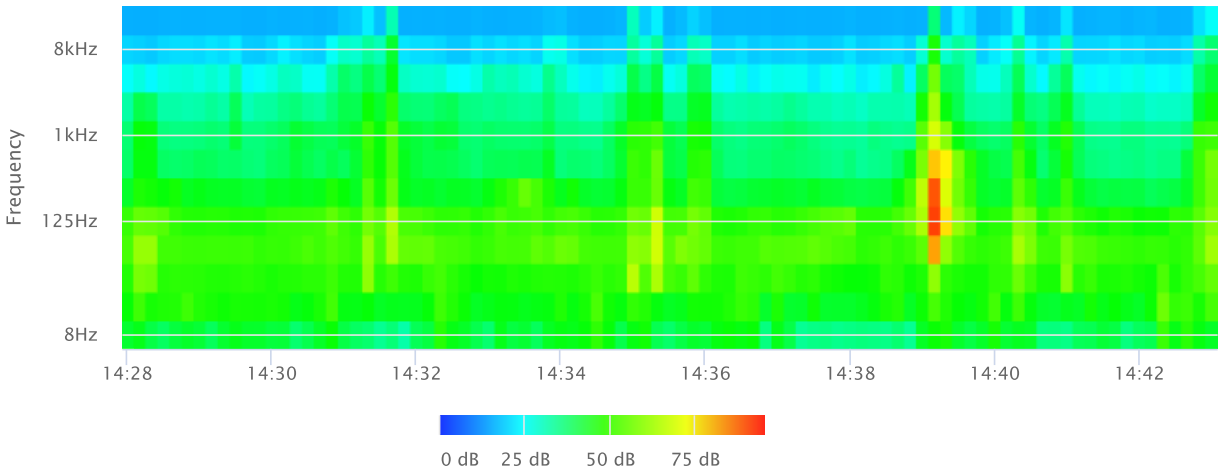
Statistics

LAS 2.0	63.1 dB
LAS 8.0	55.0 dB
LAS 25.0	46.6 dB
LAS 50.0	42.9 dB
LAS 66.6	41.6 dB
LAS 90.0	39.7 dB

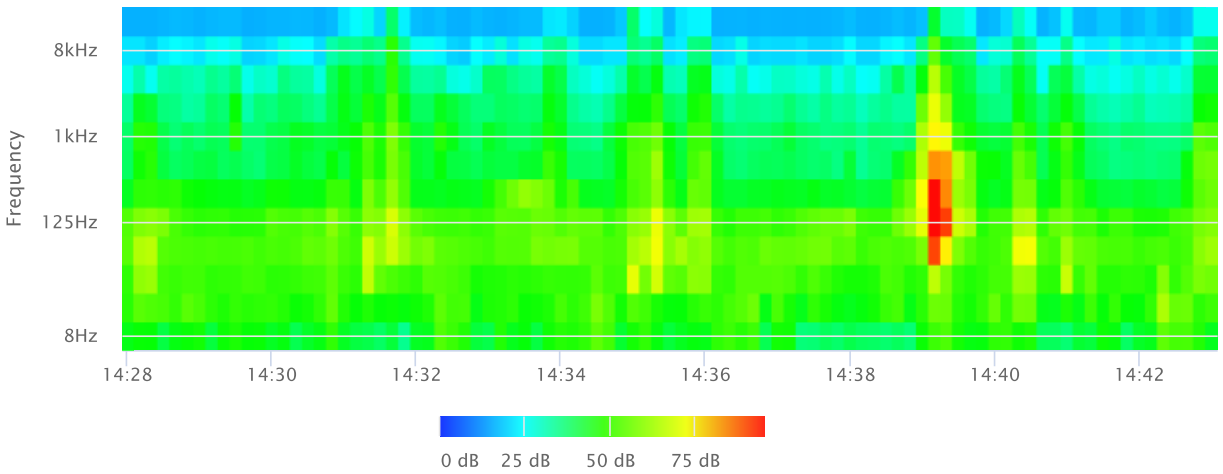
Time History



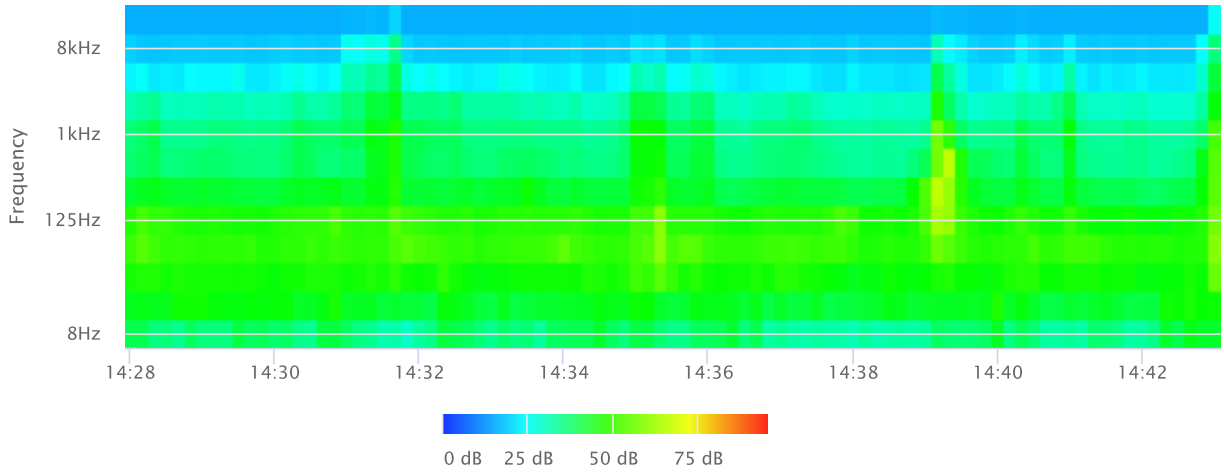
OBA 1/1 Leq



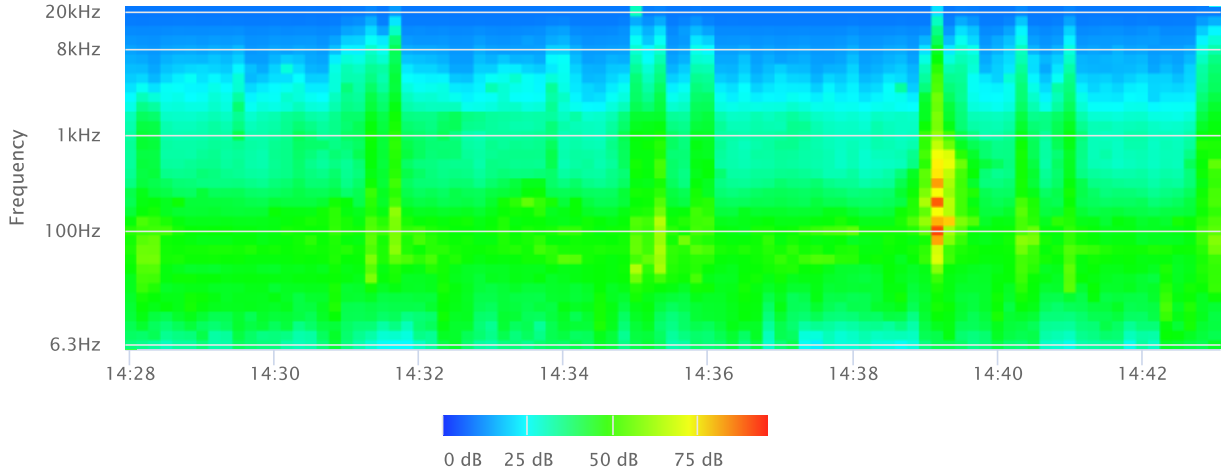
OBA 1/1 Lmax



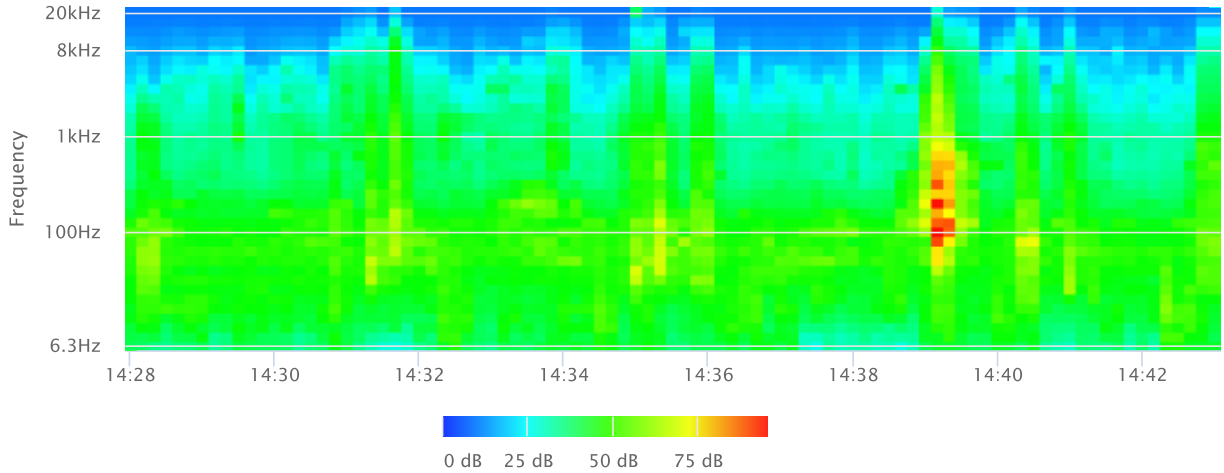
OBA 1/1 Lmin



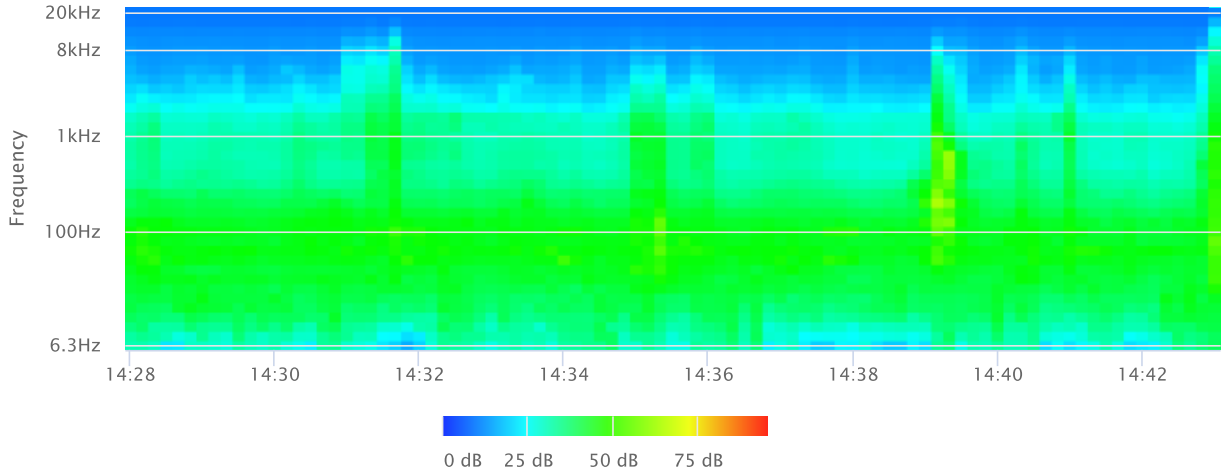
OBA 1/3 Leq



OBA 1/3 Lmax



OBA 1/3 Lmin


20kHz
8kHz
1kHz
100Hz
6.3Hz
Frequency
14:28
14:30
14:32
14:34
14:36
14:38
14:40
14:42
0 dB
25 dB
50 dB
75 dB

Noise Measurement
Field Data

Project Name: Goya at Heritage Park, Moreno Valley **Date:** October 11, 2022

Project #: 19550

Noise Measurement #: STNM4 Run Time: 15 minutes (1 x 15 minutes) **Technician:** Ian Edward Gallagher

Nearest Address or Cross Street: 24608 Constellation Way, Moreno Valley CA 92551

Site Description (Type of Existing Land Use and any other notable features): STNM4 Site: Measurement taken near the western terminus of Constellation Way just south of residence 24608 Constellation Way. Adjacent: Single-family residential to north w/ vacant land further north, Constellation Way to south w/ single-family residential further south, single-family residential to west (large property mostly vacant land).

Weather: Mostly cloudy, 20% precipitation. Sunset: 6:22 PM **Settings:** SLOW FAST

Temperature: 71 deg F **Wind:** 8 mph **Humidity:** 67% **Terrain:** Flat

Start Time: 2:59 PM **End Time:** 3:14 PM **Run Time:**

Leq:	44.9	dB
Lmax	58.1	dB
L2	50.4	dB
L8	48.0	dB
L25	45.2	dB
L50	43.2	dB

Primary Noise Source: Traffic ambiance from vehicles traveling along Indian Street ~670 ft W of STNM4.

Traffic ambiance from vehicles on other roads.

Secondary Noise Sources: Some residential ambiance. Overhead air traffic. Bird song. Leaf rustle due to 8mph breeze.

NOISE METER:	SoundTrack LXT Class 1	**CALIBRATOR:**	Larson Davis CA 250
MAKE:	Larson Davis	**MAKE:**	Larson Davis
MODEL:	LXT1	**MODEL:**	CA 250
SERIAL NUMBER:	3099	**SERIAL NUMBER:**	2723
FACTORY CALIBRATION DATE:	11/17/2021	**FACTORY CALIBRATION DATE:**	11/18/2021
FIELD CALIBRATION DATE:	10/11/2022		

Noise Measurement
Field Data

PHOTOS:

STNM4 looking N towards front yard of residence 24608 Constellation Way, Moreno Valley.

STNM4 looking W from western terminus of Constellation Way toward residential property 16410 Indian street, Moreno Valley.

Summary	
File Name on Meter	LxT_Data.112.s
File Name on PC	LxT_0003099-20221011 145953-LxT_Data.112.ldbin
Serial Number	3099
Model	SoundTrack LxT®
Firmware Version	2.404
User	Ian Edward Gallagher
Location	STNM4 33°52'56.82"N 117°13'57.67"W
Job Description	15 minute noise measurement (1 x 15 minutes)
Note	Ganddini Project 19550 Goya at Heritage Park, Moreno Valley

Measurement	
Start	2022-10-11 14:59:53
Stop	2022-10-11 15:14:53
Duration	00:15:00.0
Run Time	00:15:00.0
Pause	00:00:00.0
Pre-Calibration	2022-10-11 14:59:31
Post-Calibration	None

Overall Settings	
RMS Weight	A Weighting
Peak Weight	A Weighting
Detector	Slow
Preamplifier	PRMLxT1L
Microphone Correction	Off
Integration Method	Linear
OBA Range	Normal
OBA Bandwidth	1/1 and 1/3
OBA Frequency Weighting	C Weighting
OBA Max Spectrum	At LMax
Overload	123.5 dB

Results			
LA_{eq}	44.9		
LAE	74.4		
EA	3.083925	µPa²h	
EA8	98.68559	µPa²h	
EA40	493.428	µPa²h	
$LA_{peak\ (max)}$	2022-10-11 15:08:00	85.4	dB
LAS_{max}	2022-10-11 15:08:00	58.1	dB
LAS_{min}	2022-10-11 15:00:15	38.0	dB

		Statistics	
LC_{eq}	64.1 dB	**LA2.00**	51.4 dB
LA_{eq}	44.9 dB	**LA8.00**	48.0 dB
LC_{eq} - LA_{eq}	19.2 dB	**LA25.00**	45.2 dB
LAI_{eq}	48.6 dB	**LA50.00**	43.2 dB
LA_{eq}	44.9 dB	**LA66.60**	42.2 dB
LAI_{eq} - LA_{eq}	3.8 dB	**LA90.00**	40.0 dB
Overload Count	0		

Measurement Report

Report Summary

Meter's File Name	LxT_Data.112.s	Computer's File Name	LxT_0003099-20221011 145953-LxT_Data.112.ldbin
Meter	LxT1 0003099		
Firmware	2.404		
User	Ian Edward Gallagher	Location	STNM4 33°52'56.82"N 117°13'57.67"W
Job Description	15 minute noise measurement (1 x 15 minutes)		
Note	Ganddini Project 19550 Goya at Heritage Park, Moreno Valley		
Start Time	2022-10-11 14:59:53	Duration	0:15:00.0
End Time	2022-10-11 15:14:53	Run Time	0:15:00.0
Pause Time	0:00:00.0		

Results

Overall Metrics

LA_{eq}	44.9 dB		
LAE	74.4 dB	SEA	--- dB
EA	3.1 µPa²h	LAFTM5	50.1 dB
EA8	98.7 µPa²h		
EA40	493.4 µPa²h		
LA_{peak}	85.4 dB	2022-10-11 15:08:00	
LAS_{max}	58.1 dB	2022-10-11 15:08:00	
LAS_{min}	38.0 dB	2022-10-11 15:00:15	
LA_{eq}	44.9 dB		
LC_{eq}	64.1 dB	LC_{eq} - LA_{eq}	19.2 dB
LAI_{eq}	48.6 dB	LAI_{eq} - LA_{eq}	3.8 dB

Exceedances	Count	Duration
LAS > 65.0 dB	0	0:00:00.0
LAS > 85.0 dB	0	0:00:00.0
LApeak > 135.0 dB	0	0:00:00.0
LApeak > 137.0 dB	0	0:00:00.0
LApeak > 140.0 dB	0	0:00:00.0

Community Noise	LDN	LDay	LNight
	--- dB	--- dB	0.0 dB

	LDEN	LDay	LEve	LNight
	--- dB	--- dB	--- dB	--- dB

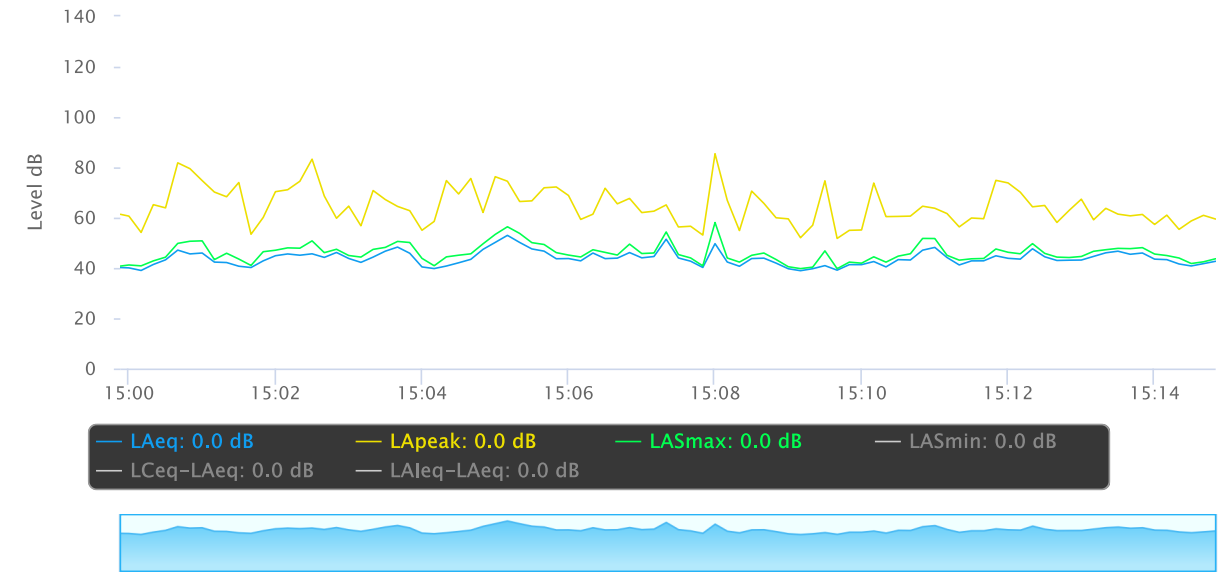
Any Data	A		C		Z	
	Level	Time Stamp	Level	Time Stamp	Level	Time Stamp
L_{eq}	44.9 dB		64.1 dB		--- dB	
$L_{S(max)}$	58.1 dB	2022-10-11 15:08:00	--- dB		--- dB	
$L_{S(min)}$	38.0 dB	2022-10-11 15:00:15	--- dB		--- dB	
$L_{Peak(max)}$	85.4 dB	2022-10-11 15:08:00	--- dB		--- dB	

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

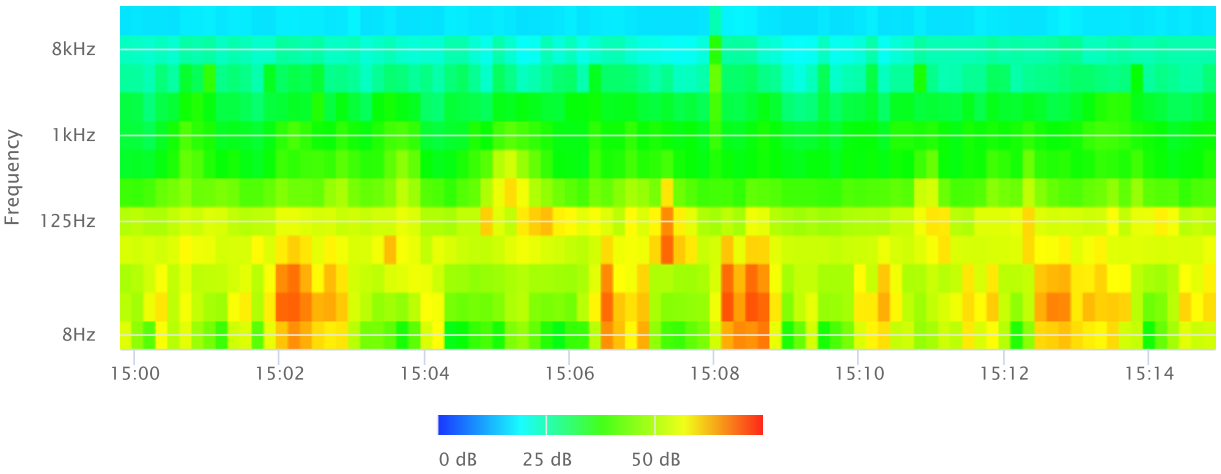
Statistics

LAS 2.0	51.4 dB
LAS 8.0	48.0 dB
LAS 25.0	45.2 dB
LAS 50.0	43.2 dB
LAS 66.6	42.2 dB
LAS 90.0	40.0 dB

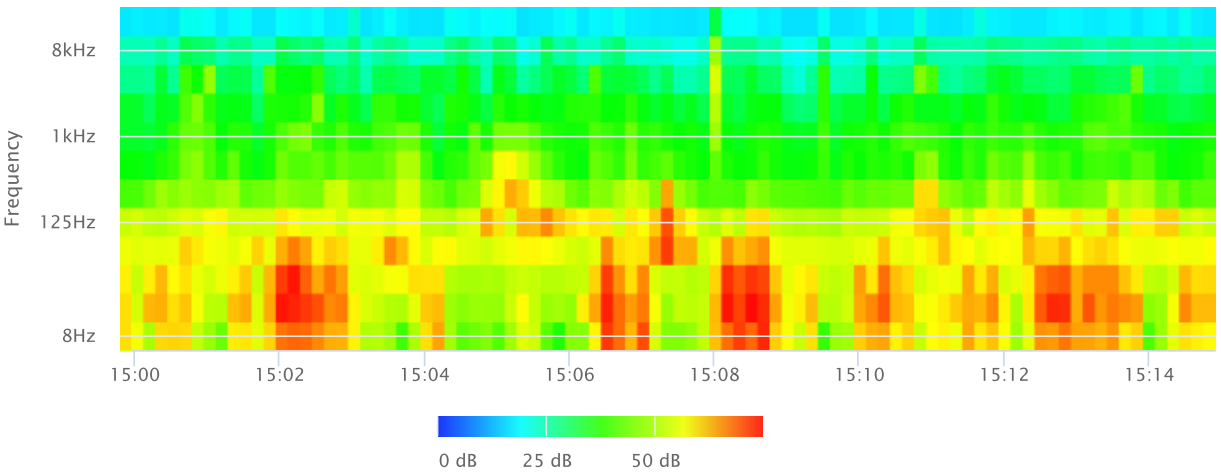
Time History



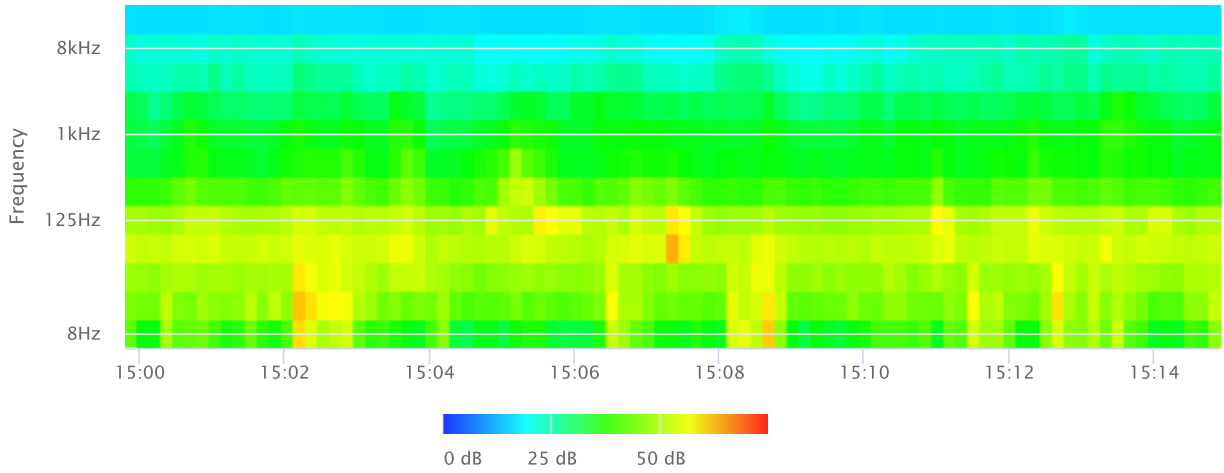
OBA 1/1 Leq



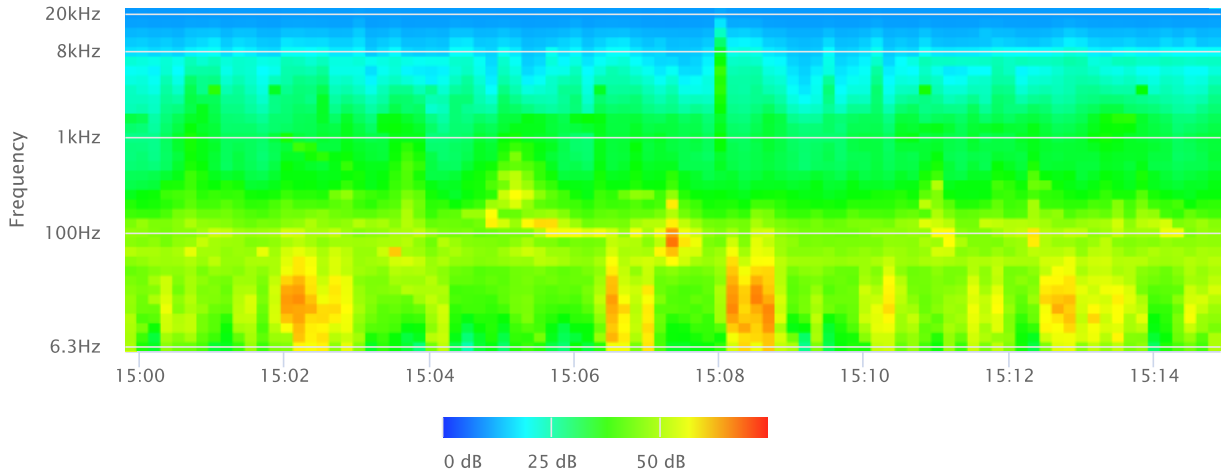
OBA 1/1 Lmax



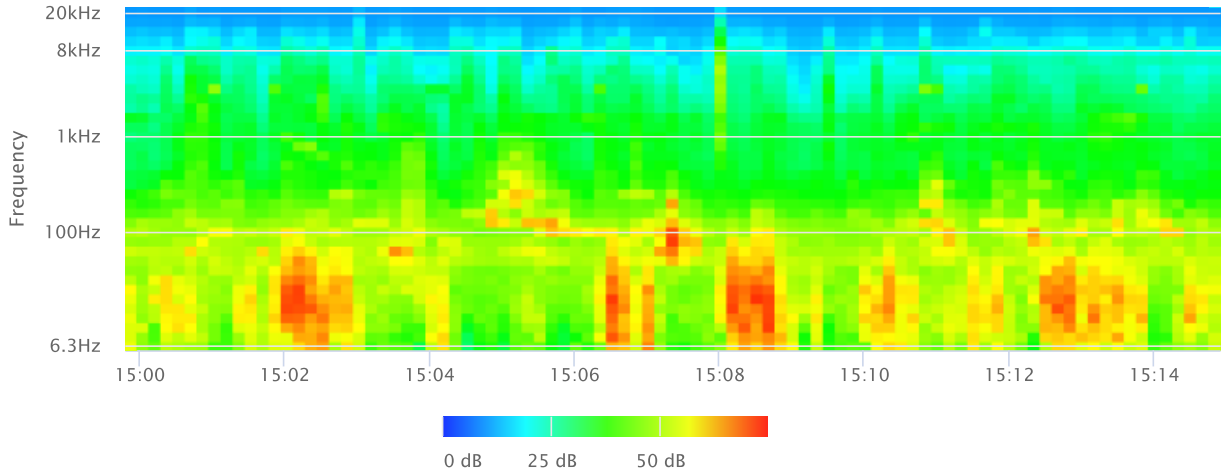
OBA 1/1 Lmin



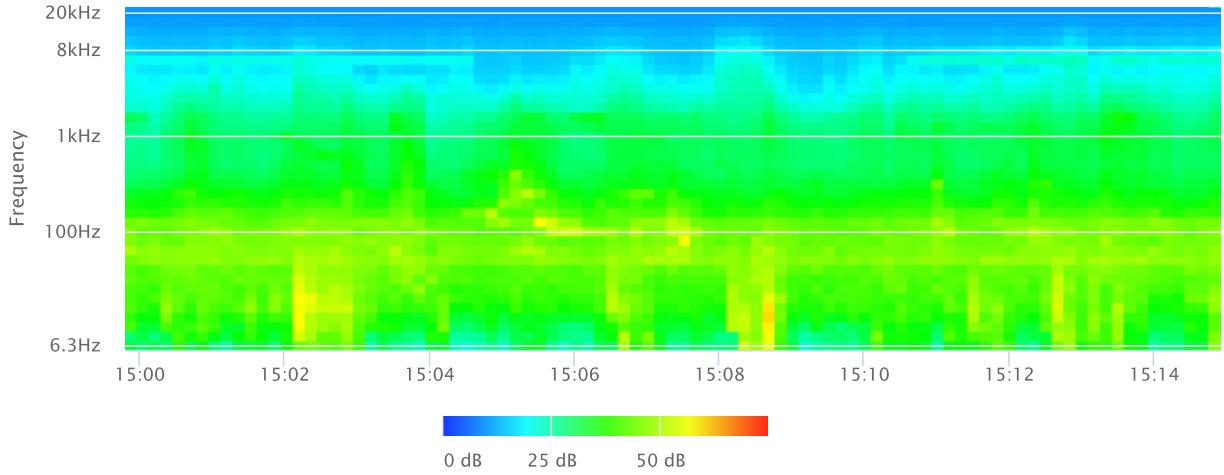
OBA 1/3 Leq



OBA 1/3 Lmax



OBA 1/3 Lmin


20kHz
8kHz
1kHz
100Hz
6.3Hz
Frequency
15:00
15:02
15:04
15:06
15:08
15:10
15:12
15:14
0 dB
25 dB
50 dB

Noise Measurement
Field Data

Project Name: Goya at Heritage Park, Moreno Valley **Date:** October 11, 2022

Project #: 19550

Noise Measurement #: STNM5 Run Time: 15 minutes (1 x 15 minutes) **Technician:** Ian Edward Gallagher

Nearest Address or Cross Street: 16410 Indian Street, Moreno Valley CA 92551

Site Description (Type of Existing Land Use and any other notable features): STNM5 Site: Measurement taken just west of residence 16410 Indian Street, Moreno Valley along the eastern side of Indian Street. Adjacent: Single-family residence to east & NE/SE, vacant project site further NE, & Indian Street to west w/ industrial building further west.

Weather: Mostly cloudy, 20% precipitation. Sunset: 6:22 PM **Settings:** SLOW FAST

Temperature: 71 deg F **Wind:** 8 mph **Humidity:** 67% **Terrain:** Flat

Start Time: 3:37 PM **End Time:** 3:52 PM **Run Time:**

Leq: 63 dB

Lmax 79 dB

L2 70.3 dB

L8 68.3 dB

L25 63.9 dB

L50 56.2 dB

Primary Noise Source: Traffic noise from the 100 vehicles traveling along Indian Street ~40 ft W of STNM5.

Traffic ambiance from vehicles on other roads.

Secondary Noise Sources: Some residential ambiance. Overhead air traffic. Bird song. Leaf rustle due to 8mph breeze.

NOISE METER:	SoundTrack LXT Class 1	**CALIBRATOR:**	Larson Davis CA 250
MAKE:	Larson Davis	**MAKE:**	Larson Davis
MODEL:	LXT1	**MODEL:**	CA 250
SERIAL NUMBER:	3099	**SERIAL NUMBER:**	2723
FACTORY CALIBRATION DATE:	11/17/2021	**FACTORY CALIBRATION DATE:**	11/18/2021
FIELD CALIBRATION DATE:	10/11/2022		

Noise Measurement
Field Data

PHOTOS:

STNM5 looking E towards front yard of residence 16410 Indian Street, Moreno Valley.

STNM5 looking W across Indian Street towards building 24015 Iris Avenue, Moreno Valley.

Summary	
File Name on Meter	LxT_Data.113.s
File Name on PC	LxT_0003099-20221011 153722-LxT_Data.113.ldbin
Serial Number	3099
Model	SoundTrack LxT®
Firmware Version	2.404
User	Ian Edward Gallagher
Location	STNM5 33°52'55.91"N 117°14'5.13"W
Job Description	15 minute noise measurement (1 x 15 minutes)
Note	Ganddini Project 19550 Goya at Heritage Park, Moreno Valley

Measurement	
Start	2022-10-11 15:37:22
Stop	2022-10-11 15:52:22
Duration	00:15:00.0
Run Time	00:15:00.0
Pause	00:00:00.0
Pre-Calibration	2022-10-11 15:37:03
Post-Calibration	None

Overall Settings	
RMS Weight	A Weighting
Peak Weight	A Weighting
Detector	Slow
Preamplifier	PRMLxT1L
Microphone Correction	Off
Integration Method	Linear
OBA Range	Normal
OBA Bandwidth	1/1 and 1/3
OBA Frequency Weighting	C Weighting
OBA Max Spectrum	At LMax
Overload	123.0 dB

Results				
LA_{eq}	63.0			
LAE	92.5			
EA	199.1394	µPa²h		
EA8	6.37246	mPa²h		
EA40	31.8623	mPa²h		
$LA_{peak\ (max)}$	2022-10-11 15:40:10	97.9	dB	
LAS_{max}	2022-10-11 15:40:10	79.0	dB	
LAS_{min}	2022-10-11 15:37:44	43.0	dB	

			Statistics	
LC_{eq}	71.9	dB	**LA2.00**	70.3 dB
LA_{eq}	63.0	dB	**LA8.00**	68.3 dB
LC_{eq} - LA_{eq}	8.9	dB	**LA25.00**	63.9 dB
LAI_{eq}	64.7	dB	**LA50.00**	56.2 dB
LA_{eq}	63.0	dB	**LA66.60**	51.6 dB
LAI_{eq} - LA_{eq}	1.7	dB	**LA90.00**	46.3 dB
Overload Count	0			

Measurement Report

Report Summary

Meter's File Name	LxT_Data.113.s	Computer's File Name	LxT_0003099-20221011 153722-LxT_Data.113.ldbin
Meter	LxT1 0003099		
Firmware	2.404		
User	Ian Edward Gallagher	Location	STNM5 33°52'55.91"N 117°14'5.13"W
Job Description	15 minute noise measurement (1 x 15 minutes)		
Note	Ganddini Project 19550 Goya at Heritage Park, Moreno Valley		
Start Time	2022-10-11 15:37:22	Duration	0:15:00.0
End Time	2022-10-11 15:52:22	Run Time	0:15:00.0
Pause Time	0:00:00.0		

Results

Overall Metrics

LA_{eq}	63.0 dB		
LAE	92.5 dB	SEA	--- dB
EA	199.1 µPa²h	LAFTM5	67.4 dB
EA8	6.4 mPa²h		
EA40	31.9 mPa²h		
LA_{peak}	97.9 dB	2022-10-11 15:40:10	
LAS_{max}	79.0 dB	2022-10-11 15:40:10	
LAS_{min}	43.0 dB	2022-10-11 15:37:44	
LA_{eq}	63.0 dB		
LC_{eq}	71.9 dB	LC_{eq} - LA_{eq}	8.9 dB
LAI_{eq}	64.7 dB	LAI_{eq} - LA_{eq}	1.7 dB

Exceedances	Count	Duration
LAS > 65.0 dB	31	0:03:40.0
LAS > 85.0 dB	0	0:00:00.0
LApeak > 135.0 dB	0	0:00:00.0
LApeak > 137.0 dB	0	0:00:00.0
LApeak > 140.0 dB	0	0:00:00.0

Community Noise	LDN	LDay	LNight
	--- dB	--- dB	0.0 dB

	LDEN	LDay	LEve	LNight
	--- dB	--- dB	--- dB	--- dB

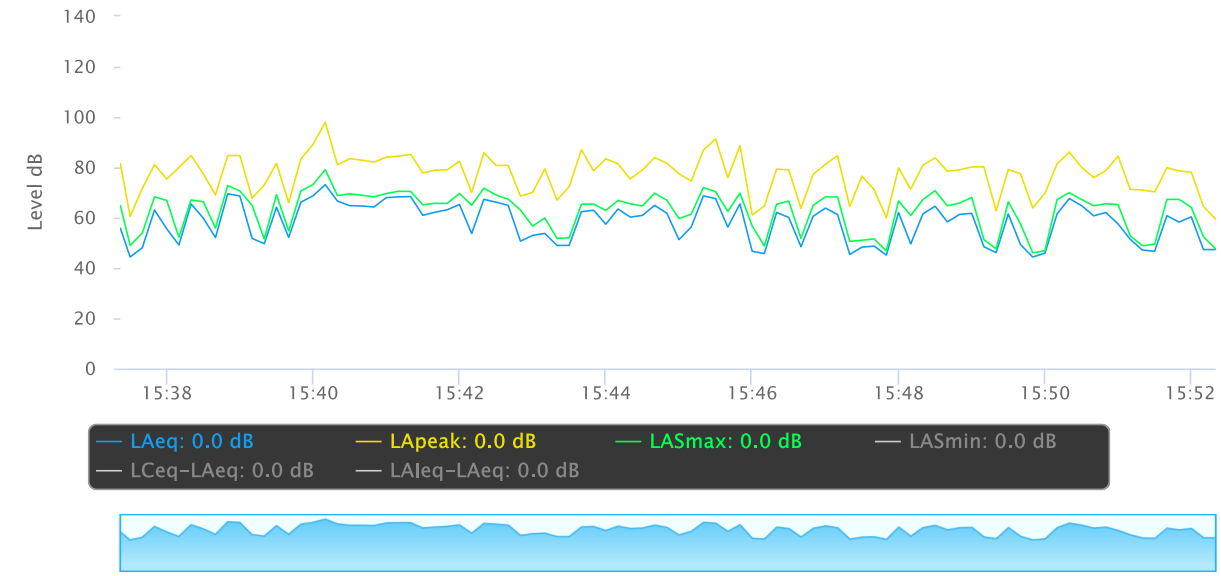
Any Data	A		C		Z	
	Level	Time Stamp	Level	Time Stamp	Level	Time Stamp
L_{eq}	63.0 dB		71.9 dB		--- dB	
$L_{S(max)}$	79.0 dB	2022-10-11 15:40:10	--- dB		--- dB	
$L_{S(min)}$	43.0 dB	2022-10-11 15:37:44	--- dB		--- dB	
$L_{Peak(max)}$	97.9 dB	2022-10-11 15:40:10	--- dB		--- dB	

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

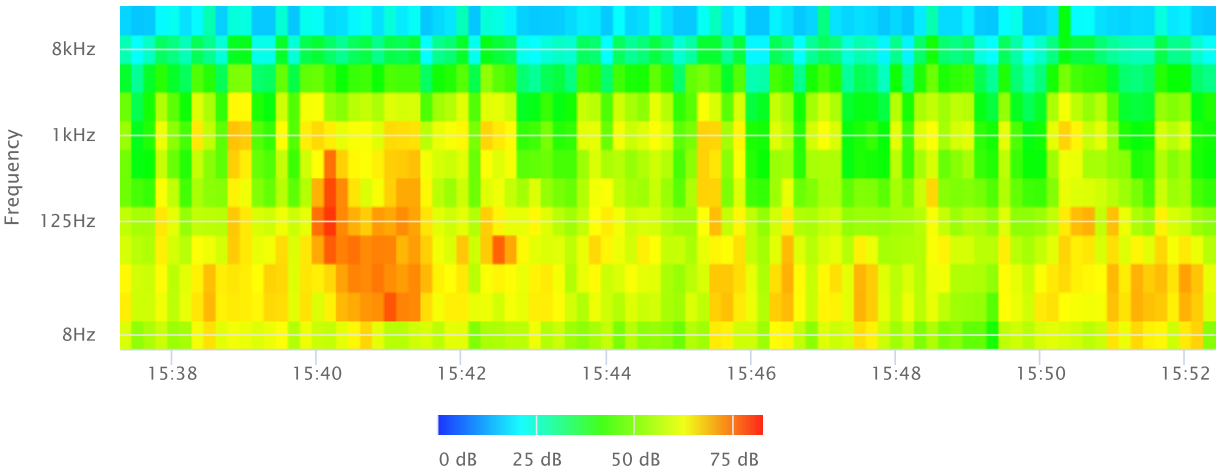
Statistics

LAS 2.0	70.3 dB
LAS 8.0	68.3 dB
LAS 25.0	63.9 dB
LAS 50.0	56.2 dB
LAS 66.6	51.6 dB
LAS 90.0	46.3 dB

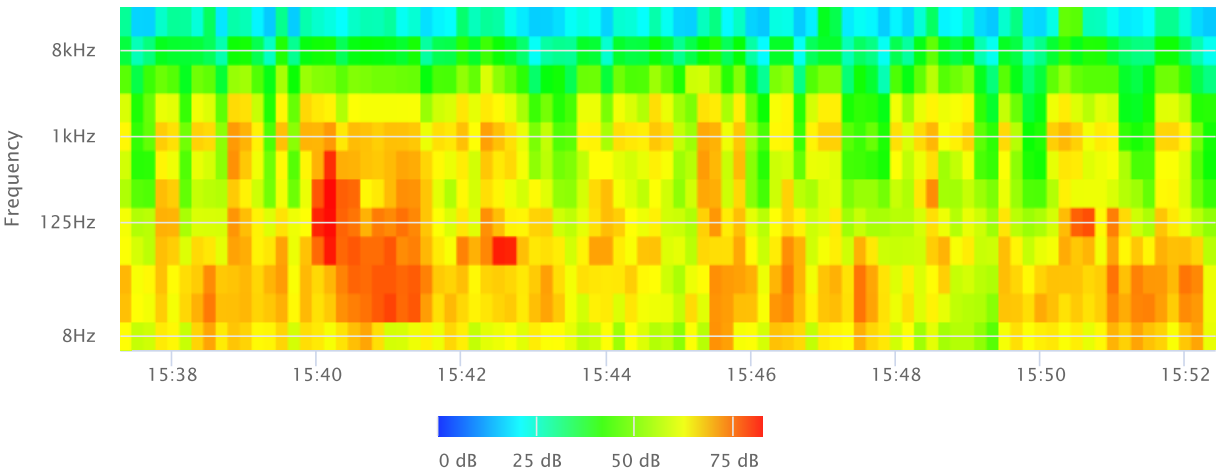
Time History



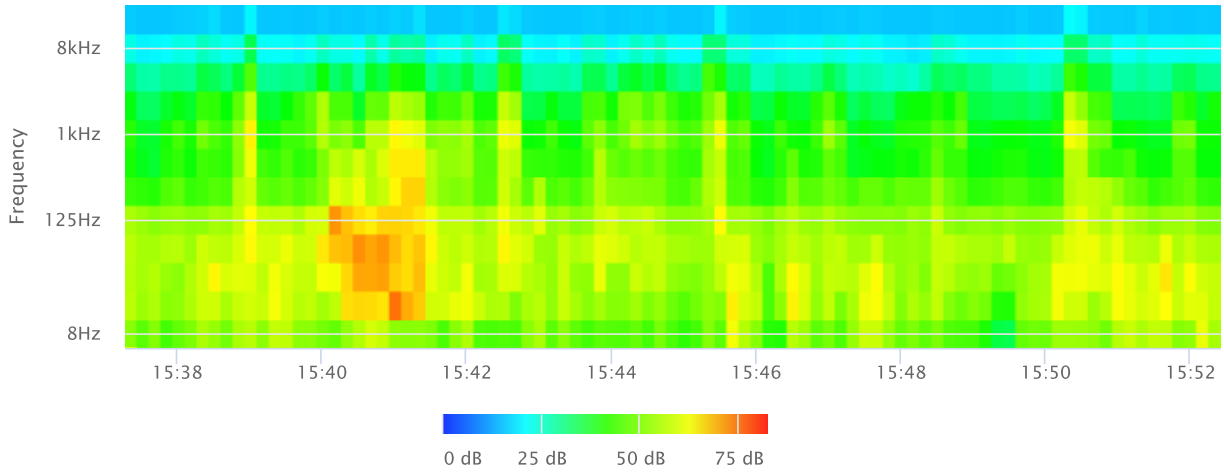
OBA 1/1 Leq



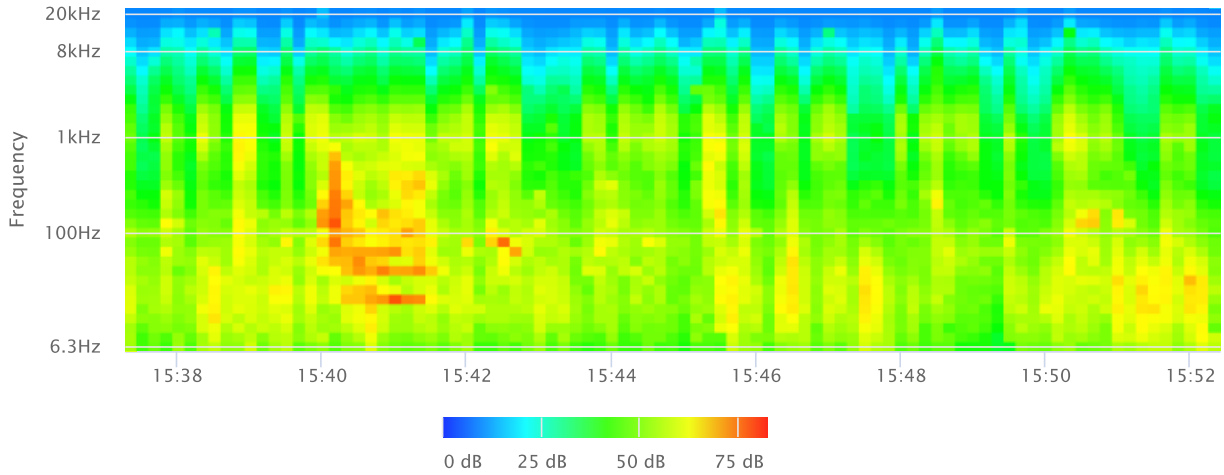
OBA 1/1 Lmax



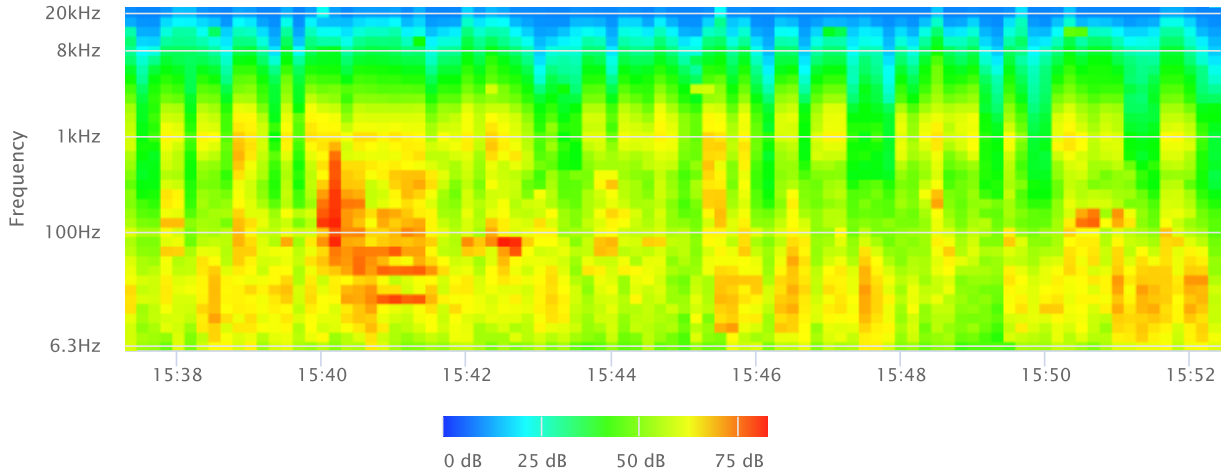
OBA 1/1 Lmin



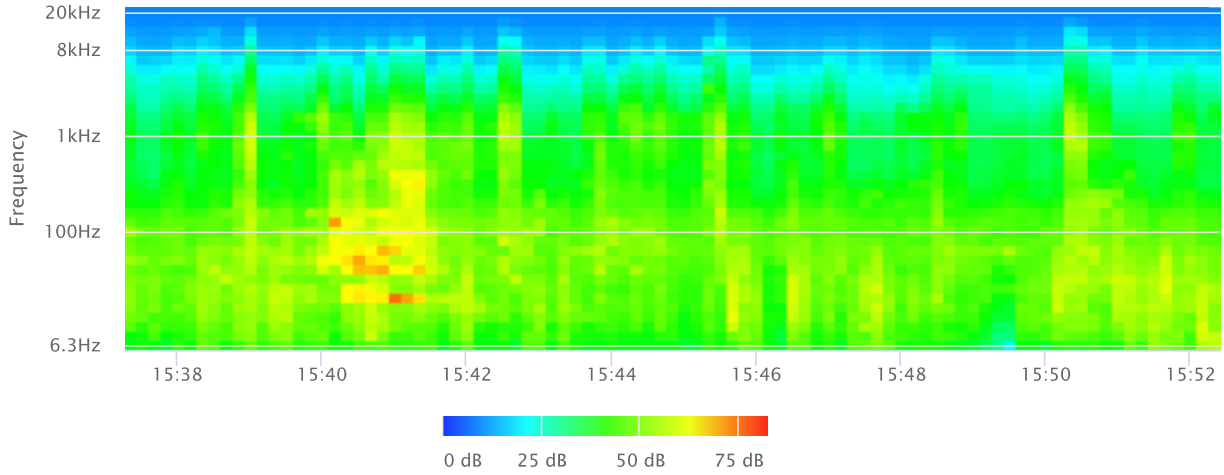
OBA 1/3 Leq



OBA 1/3 Lmax



OBA 1/3 Lmin


20kHz
8kHz
1kHz
100Hz
6.3Hz
Frequency
15:38
15:40
15:42
15:44
15:46
15:48
15:50
15:52
0 dB
25 dB
50 dB
75 dB

Noise Measurement
Field Data

Project Name: Goya at Heritage Park, Moreno Valley **Date:** October 11-12, 2022

Project #: 19550

Noise Measurement #: LTNM1 Run Time: 24 hours(24 x 1 hours) **Technician:** Ian Edward Gallagher

Nearest Address or Cross Street: 16220 Indian Street, Moreno Valley CA 92551

Site Description (Type of Existing Land Use and any other notable features): LTNM1 Site: Measurement taken in northwestern portion of site near southern property line of missionary church 16220 Indian Street, Moreno Valley. Adjacent: Residential/church & vacant land to north (also unpaved portion of Goya Road), vacant project site to south and east, Indian St (running N-S) ~150 ft W & warehouse ~200 ft W of LTNM1. March Air Reserve Base 4,000' W of LTNM1.

Weather: Mostly cloudy, 20% precipitation. Sunset/rise:6:22PM/6:54AM **Settings:** SLOW FAST

Temperature: 62-80 deg F **Wind:** 0-10 mph **Humidity:** 65-80% **Terrain:** Flat

Start Time: 7:00 PM **End Time:** 7:00 PM **Run Time:**

Leq: 51.4 dB **Primary Noise Source:** Traffic noise from vehicles traveling along Indian Street ~150 ft W of LTNM1.

Lmax 82.8 dB Traffic ambiance from vehicles on other roads.

L2 58.5 dB **Secondary Noise Sources:** Some residential ambiance. Overhead air traffic. Bird song. Leaf rustle due to 8mph

L8 55.2 dB breeze. Crickets at night.

L25 51.6 dB

L50 47.4 dB

NOISE METER:	SoundTrack LXT Class 1	**CALIBRATOR:**	Larson Davis CA 250
MAKE:	Larson Davis	**MAKE:**	Larson Davis
MODEL:	LXT1	**MODEL:**	CA 250
SERIAL NUMBER:	3099	**SERIAL NUMBER:**	2723
FACTORY CALIBRATION DATE:	11/17/2021	**FACTORY CALIBRATION DATE:**	11/18/2021
FIELD CALIBRATION DATE:	10/11/2022		

Noise Measurement
Field Data

PHOTOS:

LTNM1 looking W along northern edge of site. Chain link fence bordering property 16220 Indian Street, Moreno Valley.

LTNM1 looking SSW across site toward Indian Street. East side of building 24015 Iris Ave is running parallel with Indian Street.

Summary	
File Name on Meter	LxT_Data.114.s
File Name on PC	LxT_0003099-20221011 190000-LxT_Data.114.ldbin
Serial Number	0003099
Model	SoundTrack LxT®
Firmware Version	2.404
User	Ian Edward Gallagher
Location	LTNM1 33°53'4.69"N 117°14'3.26"W
Job Description	24 hour noise measurement (24 x 1 hours)
Note	Ganddini Project 19550 Goya at Heritage Park, Moreno Valley

Measurement	
Start	2022-10-11 19:00:00
Stop	2022-10-12 19:00:00
Duration	24:00:00.0
Run Time	24:00:00.0
Pause	00:00:00.0
Pre-Calibration	2022-10-11 18:00:19
Post-Calibration	None

Overall Settings	
RMS Weight	A Weighting
Peak Weight	A Weighting
Detector	Slow
Preamplifier	PRMLxT1L
Microphone Correction	Off
Integration Method	Linear
OBA Range	Normal
OBA Bandwidth	1/1 and 1/3
OBA Frequency Weighting	A Weighting
OBA Max Spectrum	Bin Max
Overload	122.8 dB

Results		
LA_{eq}	51.4	
LAE	100.8	
EA	1.337	mPa²h
EA8	445.550	µPa²h
EA40	2.228	mPa²h
$LA_{peak\ (max)}$	2022-10-12 14:15:43	99.0 dB
LAS_{max}	2022-10-12 15:59:39	82.8 dB
LAS_{min}	2022-10-12 03:47:13	35.6 dB

		Statistics	
LC_{eq}	62.2 dB	**LA2.00**	58.5 dB
LA_{eq}	51.4 dB	**LA8.00**	55.2 dB
LC_{eq} - LA_{eq}	10.8 dB	**LA25.00**	51.6 dB
LAI_{eq}	53.6 dB	**LA50.00**	47.4 dB
LA_{eq}	51.4 dB	**LA90.00**	40.7 dB
LAI_{eq} - LA_{eq}	2.1 dB	**LA99.00**	38.0 dB
Overload Count	0		

Record #	Date	Time	Run Duration	Run Time	Pause	LAeq	LASmin	LASmin Time	LASmax	LASmax Time	LAS2.00	LAS8.00	LAS25.00	LAS50.00	LAS90.00	LAS99.00
1	2022-10-11	19:00:00	01:00:00.0	01:00:00.0	00:00:00.0	53.2	43.7	19:59:02	67.0	19:08:37	59.7	56.8	54.0	50.9	46.7	44.8
2	2022-10-11	20:00:00	01:00:00.0	01:00:00.0	00:00:00.0	52.8	41.6	20:34:03	67.7	20:29:47	60.3	56.4	53.4	50.1	45.3	42.7
3	2022-10-11	21:00:00	01:00:00.0	01:00:00.0	00:00:00.0	54.2	42.0	21:52:11	81.4	21:18:50	59.6	55.8	52.2	48.3	44.1	42.8
4	2022-10-11	22:00:00	01:00:00.0	01:00:00.0	00:00:00.0	50.5	40.2	22:56:25	66.6	22:36:15	57.8	54.3	50.3	46.5	42.2	41.0
5	2022-10-11	23:00:00	01:00:00.0	01:00:00.0	00:00:00.0	45.4	38.5	23:17:33	59.3	23:49:29	52.9	49.8	45.2	42.2	39.9	39.0
6	2022-10-12	00:00:00	01:00:00.0	01:00:00.0	00:00:00.0	46.0	37.3	00:26:19	64.1	00:02:28	53.4	49.8	45.7	42.6	39.4	37.9
7	2022-10-12	01:00:00	01:00:00.0	01:00:00.0	00:00:00.0	45.9	38.7	01:19:59	63.1	01:23:36	53.5	49.8	45.0	42.1	39.7	39.2
8	2022-10-12	02:00:00	01:00:00.0	01:00:00.0	00:00:00.0	45.2	37.7	02:14:12	60.8	02:23:41	53.6	49.6	44.1	41.3	38.8	38.2
9	2022-10-12	03:00:00	01:00:00.0	01:00:00.0	00:00:00.0	47.5	35.6	03:47:13	71.5	03:55:26	55.3	51.4	45.9	41.5	37.5	36.2
10	2022-10-12	04:00:00	01:00:00.0	01:00:00.0	00:00:00.0	49.2	36.9	04:45:16	65.0	04:24:22	57.0	53.8	49.3	44.1	39.2	37.7
11	2022-10-12	05:00:00	01:00:00.0	01:00:00.0	00:00:00.0	51.4	36.0	05:41:50	71.7	05:56:37	58.4	55.4	51.0	46.0	39.0	37.4
12	2022-10-12	06:00:00	01:00:00.0	01:00:00.0	00:00:00.0	50.6	37.1	06:14:10	64.6	06:22:54	57.5	54.9	51.6	47.3	41.1	38.2
13	2022-10-12	07:00:00	01:00:00.0	01:00:00.0	00:00:00.0	53.9	38.7	07:03:08	67.1	07:15:57	60.2	57.4	55.2	52.3	43.8	40.9
14	2022-10-12	08:00:00	01:00:00.0	01:00:00.0	00:00:00.0	51.2	38.5	08:38:21	67.1	08:49:19	57.5	55.3	52.2	48.6	43.0	39.9
15	2022-10-12	09:00:00	01:00:00.0	01:00:00.0	00:00:00.0	50.1	39.6	09:43:53	66.8	09:58:38	57.1	54.0	50.5	47.0	42.5	40.8
16	2022-10-12	10:00:00	01:00:00.0	01:00:00.0	00:00:00.0	50.5	38.5	10:10:04	64.9	10:07:37	57.9	54.5	51.1	47.2	42.1	39.5
17	2022-10-12	11:00:00	01:00:00.0	01:00:00.0	00:00:00.0	49.9	39.7	11:05:38	63.4	11:24:57	56.6	53.7	50.5	47.3	42.9	40.9
18	2022-10-12	12:00:00	01:00:00.0	01:00:00.0	00:00:00.0	51.2	37.8	12:40:26	65.5	12:24:11	58.6	54.8	52.0	48.9	43.1	40.3
19	2022-10-12	13:00:00	01:00:00.0	01:00:00.0	00:00:00.0	50.2	37.3	13:58:24	65.0	13:48:37	58.2	54.0	50.6	47.6	41.6	39.0
20	2022-10-12	14:00:00	01:00:00.0	01:00:00.0	00:00:00.0	50.7	36.5	14:07:14	70.6	14:15:44	56.8	53.8	50.8	47.7	41.0	37.6
21	2022-10-12	15:00:00	01:00:00.0	01:00:00.0	00:00:00.0	54.8	40.7	15:03:40	82.8	15:59:39	59.3	56.0	53.0	49.8	44.6	41.9
22	2022-10-12	16:00:00	01:00:00.0	01:00:00.0	00:00:00.0	54.1	40.9	16:28:48	73.1	16:50:54	61.3	57.4	54.4	51.7	46.0	43.1
23	2022-10-12	17:00:00	01:00:00.0	01:00:00.0	00:00:00.0	53.2	39.8	17:20:44	65.5	17:05:33	60.0	57.1	54.0	51.0	45.3	42.0
24	2022-10-12	18:00:00	01:00:00.0	01:00:00.0	00:00:00.0	53.2	41.0	18:26:12	70.3	18:00:46	60.4	56.7	53.6	50.4	44.4	42.3

Measurement Report

Report Summary

Meter's File Name	LxT_Data.114.s	Computer's File Name	LxT_0003099-20221011 190000-LxT_Data.114.ldbin
Meter	LxT1 0003099		
Firmware	2.404		
User	Ian Edward Gallagher	Location	LTNM1 33°53'4.69"N 117°14'3.26"W
Job Description	24 hour noise measurement (24 x 1 hours)		
Note	Ganddini Project 19550 Goya at Heritage Park, Moreno Valley		
Start Time	2022-10-11 19:00:00	Duration	24:00:00.0
End Time	2022-10-12 19:00:00	Run Time	24:00:00.0
Pause Time	0:00:00.0		

Results

Overall Metrics

LA_{eq}	51.4 dB		
LAE	100.8 dB	SEA	--- dB
EA	1.3 mPa²h	LAFTM5	55.9 dB
EA8	445.6 µPa²h		
EA40	2.2 mPa²h		
LA_{peak}	99.0 dB	2022-10-12 14:15:43	
LAS_{max}	82.8 dB	2022-10-12 15:59:39	
LAS_{min}	35.6 dB	2022-10-12 03:47:13	
LA_{eq}	51.4 dB		
LC_{eq}	62.2 dB	LC_{eq} - LA_{eq}	10.8 dB
LAI_{eq}	53.6 dB	LAI_{eq} - LA_{eq}	2.1 dB

Exceedances	Count	Duration
LAS > 65.0 dB	40	0:02:58.5
LAS > 85.0 dB	0	0:00:00.0
LApeak > 135.0 dB	0	0:00:00.0
LApeak > 137.0 dB	0	0:00:00.0
LApeak > 140.0 dB	0	0:00:00.0

Community Noise	LDN	LDay	LNight
	--- dB	--- dB	0.0 dB

	LDEN	LDay	LEve	LNight
	--- dB	--- dB	--- dB	--- dB

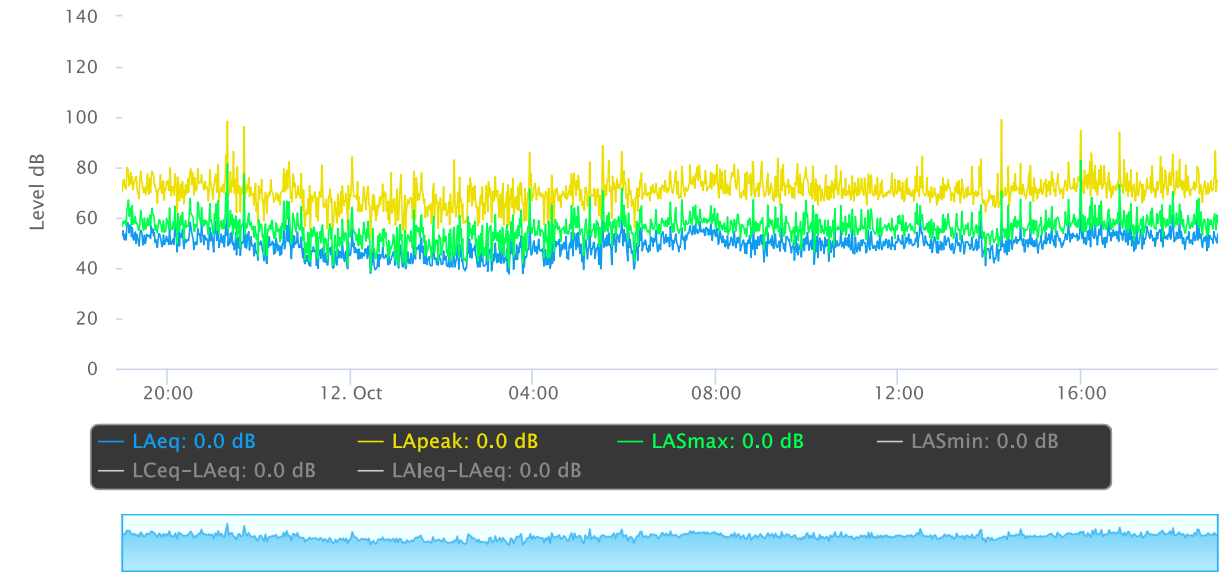
Any Data	A		C		Z	
	Level	Time Stamp	Level	Time Stamp	Level	Time Stamp
L_{eq}	51.4 dB		62.2 dB		--- dB	
$L_{S(max)}$	82.8 dB	2022-10-12 15:59:39	--- dB		--- dB	
$L_{S(min)}$	35.6 dB	2022-10-12 03:47:13	--- dB		--- dB	
$L_{Peak(max)}$	99.0 dB	2022-10-12 14:15:43	--- dB		--- dB	

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

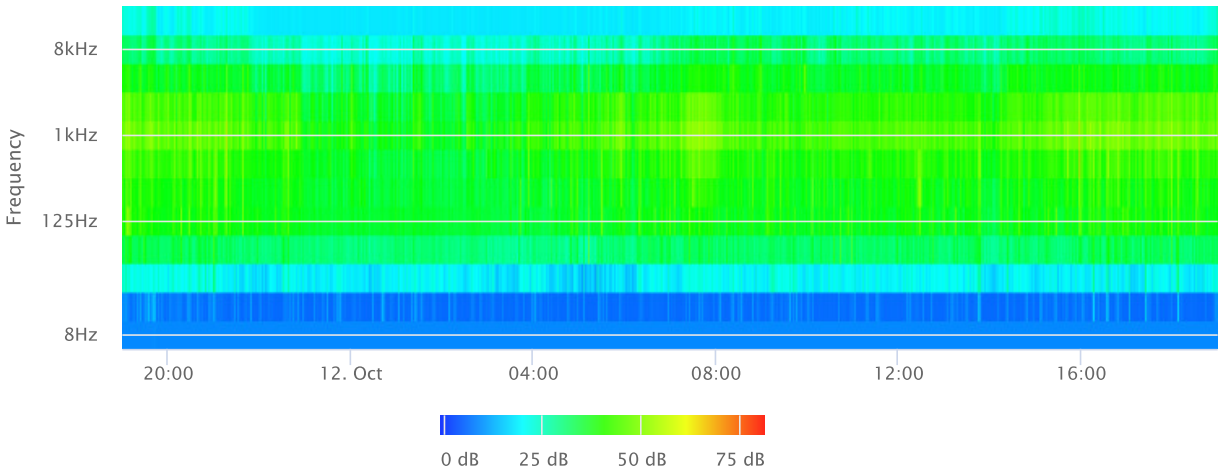
Statistics

LAS 2.0	58.5 dB
LAS 8.0	55.2 dB
LAS 25.0	51.6 dB
LAS 50.0	47.4 dB
LAS 90.0	40.7 dB
LAS 99.0	38.0 dB

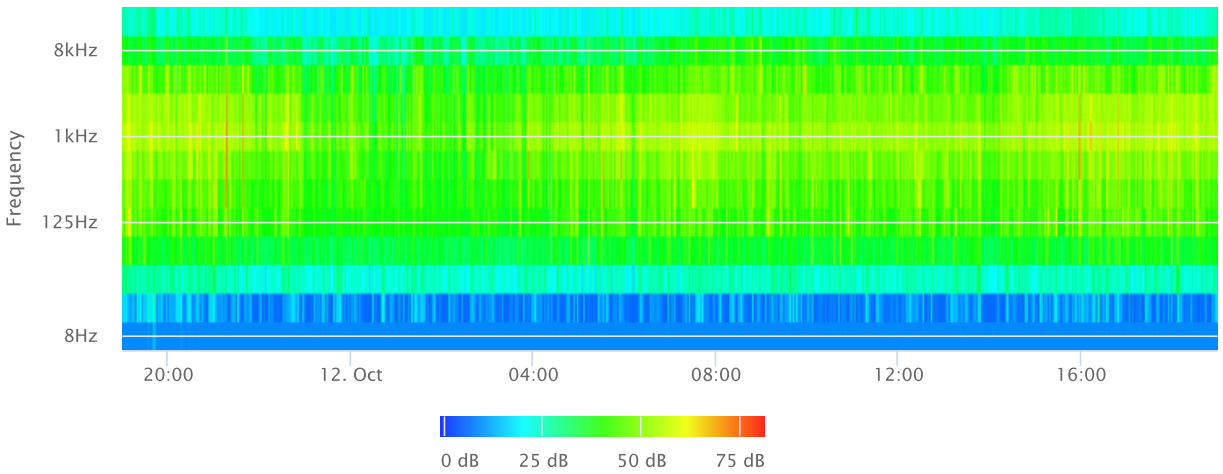
Time History



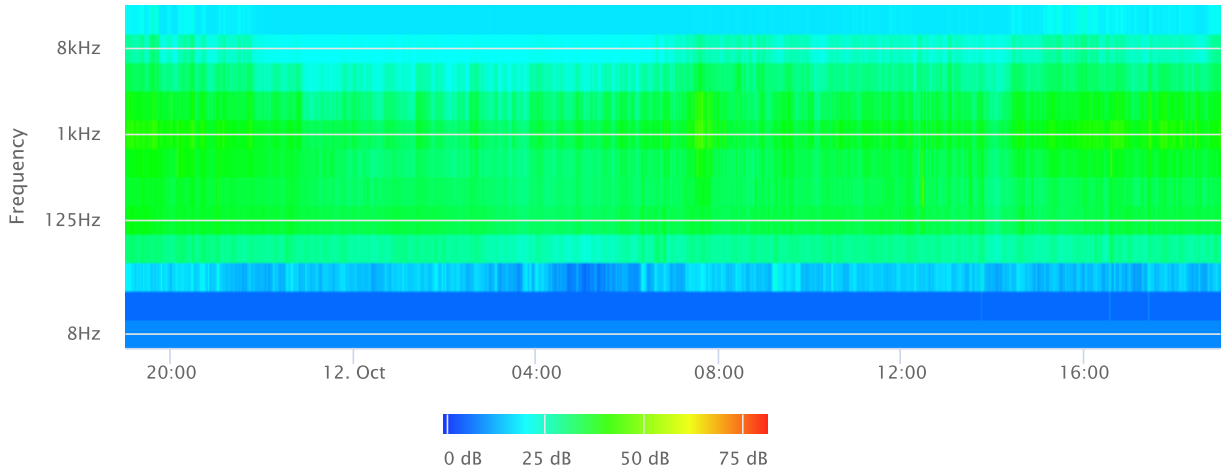
OBA 1/1 Leq



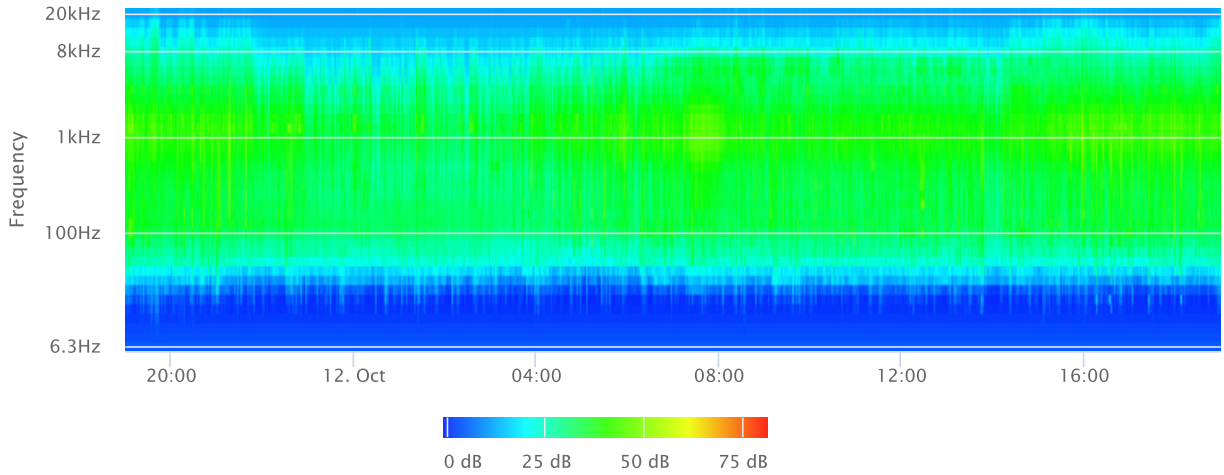
OBA 1/1 Lmax



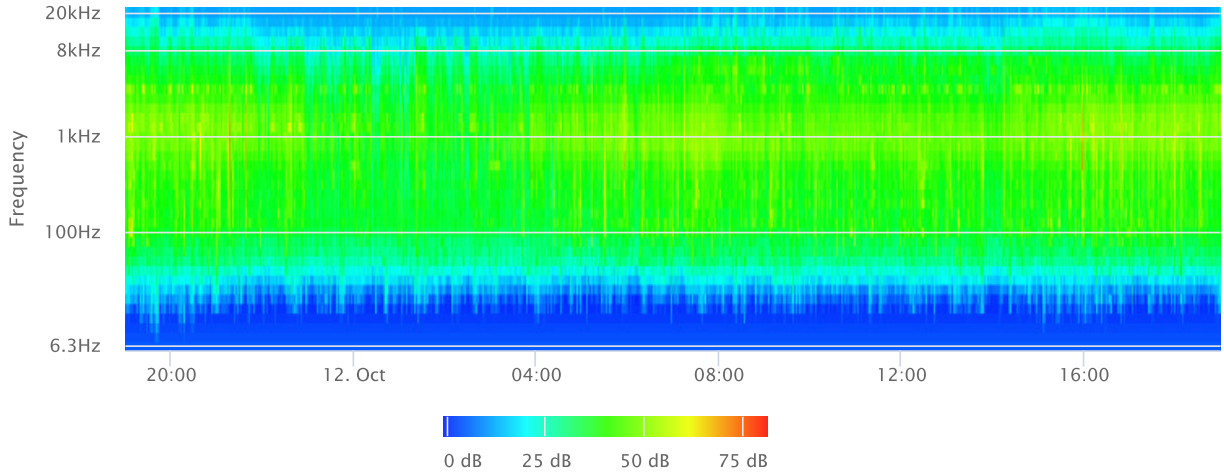
OBA 1/1 Lmin



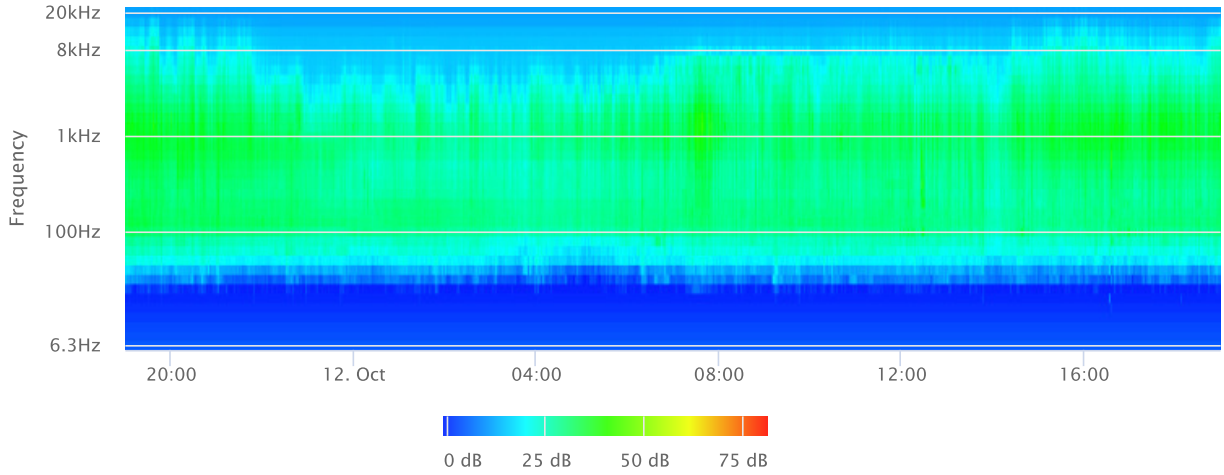
OBA 1/3 Leq



OBA 1/3 Lmax



OBA 1/3 Lmin


20kHz
8kHz
1kHz
100Hz
6.3Hz
Frequency
20:00
12. Oct
04:00
08:00
12:00
16:00
0 dB
25 dB
50 dB
75 dB

APPENDIX D

CONSTRUCTION NOISE MODEL WORKSHEETS

Receptor - Residential to North (16233 Smoke Tree Place, Moreno Valley)

Construction Phase Equipment Item	# of Items	Item Lmax at 50 feet, dBA[1]	Distance to Receptor[3]	Item Usage Percent	Usage Factor	Dist. Correction dB	Usage Adj. dB	Receptor Item Lmax, dBA	Receptor Item Leq, dBA
Grading and Off-Site Roadway Improvements [4]									
Excavators	2	81	406	40	0.8	-18.2	-1.0	62.8	61.8
Rubber Tired Dozers	2	82	406	40	0.80	-18.2	-1.0	63.8	62.8
Tractors/Loaders/Backhoes	3	84	406	40	1.20	-18.2	0.8	65.8	66.6
Graders	2	85	406	40	0.80	-18.2	-1.0	66.8	65.8
Scrapers	2	84	406	40	0.80	-18.2	-1.0	65.8	64.8
								Log Sum	71.7
Building Construction									
Cranes	1	81	406	16	0.16	-18.2	-8.0	62.8	54.9
Forklifts[2]	3	48	406	40	1.20	-18.2	0.8	29.8	30.6
Generator Sets	1	81	406	50	0.50	-18.2	-3.0	62.8	59.8
Welders	1	74	406	40	0.40	-18.2	-4.0	55.8	51.8
Tractors/Loaders/Backhoes	3	84	406	40	1.20	-18.2	0.8	65.8	66.6
								Log Sum	67.8
Paving									
Pavers	2	77	406	50	1.00	-18.2	0.0	58.8	58.8
Paving Equipment	2	77	406	50	1.00	-18.2	0.0	58.8	58.8
Rollers	2	80	406	20	0.40	-18.2	-4.0	61.8	57.8
								Log Sum	63.3
Architectural Coating									
Air Compressors	1	78	406	40	0.40	-18.2	-4.0	59.8	55.8
								Log Sum	55.8

Notes:

(1) Source: Referenced noise levels from the Federal Transit Administration (FTA) Transit Noise and Vibration Impact Assessment Manual (September 2018) and the FHWA Roadway Construction Noise Model User's Guide (January 2006)

(2) Source: SoundPLAN reference list.

(3) Distance to receptor calculated from center of site. Construction noise projected from the center of the project site to nearest sensitive use (property line).

(4)The AQ-GHG-En study prepared for the proposed project (Ganddini Group, Inc. 2023) assumed the off-site roadway improvements along Goya Ave would overlap with the grading phase of the proposed project. Therefore, to be conservative and consistent with the AQ-GHG-En study, the loudest equipment phase (grading) of the off-site improvements was combined with the equipment anticipated during grading of the proposed project to produce a worst-case construction noise level during grading.

Receptor - Church to North (16220 Indian Street, Moreno Valley)

Construction Phase Equipment Item	# of Items	Item Lmax at 50 feet, dBA[1]	Distance to Receptor[3]	Item Usage Percent	Usage Factor	Dist. Correction dB	Usage Adj. dB	Receptor Item Lmax, dBA	Receptor Item Leq, dBA
Grading and Off-Site Roadway Improvements [4]									
Excavators	2	81	394	40	0.8	-17.9	-1.0	63.1	62.1
Rubber Tired Dozers	2	82	394	40	0.80	-17.9	-1.0	64.1	63.1
Tractors/Loaders/Backhoes	3	84	394	40	1.20	-17.9	0.8	66.1	66.9
Graders	2	85	394	40	0.80	-17.9	-1.0	67.1	66.1
Scrapers	2	84	394	40	0.80	-17.9	-1.0	66.1	65.1
								Log Sum	72.0
Building Construction									
Cranes	1	81	394	16	0.16	-17.9	-8.0	63.1	55.1
Forklifts[2]	3	48	394	40	1.20	-17.9	0.8	30.1	30.9
Generator Sets	1	81	394	50	0.50	-17.9	-3.0	63.1	60.1
Welders	1	74	394	40	0.40	-17.9	-4.0	56.1	52.1
Tractors/Loaders/Backhoes	3	84	394	40	1.20	-17.9	0.8	66.1	66.9
								Log Sum	68.0
Paving									
Pavers	2	77	394	50	1.00	-17.9	0.0	59.1	59.1
Paving Equipment	2	77	394	50	1.00	-17.9	0.0	59.1	59.1
Rollers	2	80	394	20	0.40	-17.9	-4.0	62.1	58.1
								Log Sum	63.5
Architectural Coating									
Air Compressors	1	78	394	40	0.40	-17.9	-4.0	60.1	56.1
								Log Sum	56.1

Notes:

(1) Source: Referenced noise levels from the Federal Transit Administration (FTA) Transit Noise and Vibration Impact Assessment Manual (September 2018) and the FHWA Roadway Construction Noise Model User's Guide (January 2006)

(2) Source: SoundPLAN reference list.

(3) Distance to receptor calculated from center of site. Construction noise projected from the center of the project site to nearest sensitive use (property line).

(4)The AQ-GHG-En study prepared for the proposed project (Ganddini Group, Inc. 2023) assumed the off-site roadway improvements along Goya Ave would overlap with the grading phase of the proposed project. Therefore, to be conservative and consistent with the AQ-GHG-En study, the loudest equipment phase (grading) of the off-site improvements was combined with the equipment anticipated during grading of the proposed project to produce a worst-case construction noise level during grading.

Receptor - Residential to South (16410 Indian Street, Moreno Valley)

Construction Phase Equipment Item	# of Items	Item Lmax at 50 feet, dBA[1]	Distance to Receptor[3]	Item Usage Percent	Usage Factor	Dist. Correction dB	Usage Adj. dB	Receptor Item Lmax, dBA	Receptor Item Leq, dBA
Grading and Off-Site Roadway Improvements [4]									
Excavators	2	81	316	40	0.8	-16.0	-1.0	65.0	64.0
Rubber Tired Dozers	2	82	316	40	0.80	-16.0	-1.0	66.0	65.0
Tractors/Loaders/Backhoes	3	84	316	40	1.20	-16.0	0.8	68.0	68.8
Graders	2	85	316	40	0.80	-16.0	-1.0	69.0	68.0
Scrapers	2	84	316	40	0.80	-16.0	-1.0	68.0	67.0
								Log Sum	73.9
Building Construction									
Cranes	1	81	316	16	0.16	-16.0	-8.0	65.0	57.0
Forklifts[2]	3	48	316	40	1.20	-16.0	0.8	32.0	32.8
Generator Sets	1	81	316	50	0.50	-16.0	-3.0	65.0	62.0
Welders	1	74	316	40	0.40	-16.0	-4.0	58.0	54.0
Tractors/Loaders/Backhoes	3	84	316	40	1.20	-16.0	0.8	68.0	68.8
								Log Sum	69.9
Paving									
Pavers	2	77	316	50	1.00	-16.0	0.0	61.0	61.0
Paving Equipment	2	77	316	50	1.00	-16.0	0.0	61.0	61.0
Rollers	2	80	316	20	0.40	-16.0	-4.0	64.0	60.0
								Log Sum	65.5
Architectural Coating									
Air Compressors	1	78	316	40	0.40	-16.0	-4.0	62.0	58.0
								Log Sum	58.0

Notes:

(1) Source: Referenced noise levels from the Federal Transit Administration (FTA) Transit Noise and Vibration Impact Assessment Manual (September 2018) and the FHWA Roadway Construction Noise Model User's Guide (January 2006)

(2) Source: SoundPLAN reference list.

(3) Distance to receptor calculated from center of site. Construction noise projected from the center of the project site to nearest sensitive use (property line).

(4)The AQ-GHG-En study prepared for the proposed project (Ganddini Group, Inc. 2023) assumed the off-site roadway improvements along Goya Ave would overlap with the grading phase of the proposed project. Therefore, to be conservative and consistent with the AQ-GHG-En study, the loudest equipment phase (grading) of the off-site improvements was combined with the equipment anticipated during grading of the proposed project to produce a worst-case construction noise level during grading.

Receptor - Residential to South (24608 Constellation Way, Moreno Valley)

Construction Phase Equipment Item	# of Items	Item Lmax at 50 feet, dBA[1]	Distance to Receptor[3]	Item Usage Percent	Usage Factor	Dist. Correction dB	Usage Adj. dB	Receptor Item Lmax, dBA	Receptor Item Leq, dBA
Grading and Off-Site Roadway Improvements [4]									
Excavators	2	81	348	40	0.8	-16.9	-1.0	64.1	63.2
Rubber Tired Dozers	2	82	348	40	0.80	-16.9	-1.0	65.1	64.2
Tractors/Loaders/Backhoes	3	84	348	40	1.20	-16.9	0.8	67.1	67.9
Graders	2	85	348	40	0.80	-16.9	-1.0	68.1	67.2
Scrapers	2	84	348	40	0.80	-16.9	-1.0	67.1	66.2
								Log Sum	73.1
Building Construction									
Cranes	1	81	348	16	0.16	-16.9	-8.0	64.1	56.2
Forklifts[2]	3	48	348	40	1.20	-16.9	0.8	31.1	31.9
Generator Sets	1	81	348	50	0.50	-16.9	-3.0	64.1	61.1
Welders	1	74	348	40	0.40	-16.9	-4.0	57.1	53.2
Tractors/Loaders/Backhoes	3	84	348	40	1.20	-16.9	0.8	67.1	67.9
								Log Sum	69.1
Paving									
Pavers	2	77	348	50	1.00	-16.9	0.0	60.1	60.1
Paving Equipment	2	77	348	50	1.00	-16.9	0.0	60.1	60.1
Rollers	2	80	348	20	0.40	-16.9	-4.0	63.1	59.2
								Log Sum	64.6
Architectural Coating									
Air Compressors	1	78	348	40	0.40	-16.9	-4.0	61.1	57.2
								Log Sum	57.2

Notes:

(1) Source: Referenced noise levels from the Federal Transit Administration (FTA) Transit Noise and Vibration Impact Assessment Manual (September 2018) and the FHWA Roadway Construction Noise Model User's Guide (January 2006)

(2) Source: SoundPLAN reference list.

(3) Distance to receptor calculated from center of site. Construction noise projected from the center of the project site to nearest sensitive use (property line).

(4)The AQ-GHG-En study prepared for the proposed project (Ganddini Group, Inc. 2023) assumed the off-site roadway improvements along Goya Ave would overlap with the grading phase of the proposed project. Therefore, to be conservative and consistent with the AQ-GHG-En study, the loudest equipment phase (grading) of the off-site improvements was combined with the equipment anticipated during grading of the proposed project to produce a worst-case construction noise level during grading.

Receptor - Residential to East (16296 Emma Lane, Moreno Valley)

Construction Phase Equipment Item	# of Items	Item Lmax at 50 feet, dBA[1]	Distance to Receptor[3]	Item Usage Percent	Usage Factor	Dist. Correction dB	Usage Adj. dB	Receptor Item Lmax, dBA	Receptor Item Leq, dBA
Grading and Off-Site Roadway Improvements [4]									
Excavators	2	81	825	40	0.8	-24.3	-1.0	56.7	55.7
Rubber Tired Dozers	2	82	825	40	0.80	-24.3	-1.0	57.7	56.7
Tractors/Loaders/Backhoes	3	84	825	40	1.20	-24.3	0.8	59.7	60.4
Graders	2	85	825	40	0.80	-24.3	-1.0	60.7	59.7
Scrapers	2	84	825	40	0.80	-24.3	-1.0	59.7	58.7
								Log Sum	65.6
Building Construction									
Cranes	1	81	825	16	0.16	-24.3	-8.0	56.7	48.7
Forklifts[2]	3	48	825	40	1.20	-24.3	0.8	23.7	24.4
Generator Sets	1	81	825	50	0.50	-24.3	-3.0	56.7	53.6
Welders	1	74	825	40	0.40	-24.3	-4.0	49.7	45.7
Tractors/Loaders/Backhoes	3	84	825	40	1.20	-24.3	0.8	59.7	60.4
								Log Sum	61.6
Paving									
Pavers	2	77	825	50	1.00	-24.3	0.0	52.7	52.7
Paving Equipment	2	77	825	50	1.00	-24.3	0.0	52.7	52.7
Rollers	2	80	825	20	0.40	-24.3	-4.0	55.7	51.7
								Log Sum	57.1
Architectural Coating									
Air Compressors	1	78	825	40	0.40	-24.3	-4.0	53.7	49.7
								Log Sum	49.7

Notes:

(1) Source: Referenced noise levels from the Federal Transit Administration (FTA) Transit Noise and Vibration Impact Assessment Manual (September 2018) and the FHWA Roadway Construction Noise Model User's Guide (January 2006)

(2) Source: SoundPLAN reference list.

(3) Distance to receptor calculated from center of site. Construction noise projected from the center of the project site to nearest sensitive use (property line).

(4)The AQ-GHG-En study prepared for the proposed project (Ganddini Group, Inc. 2023) assumed the off-site roadway improvements along Goya Ave would overlap with the grading phase of the proposed project. Therefore, to be conservative and consistent with the AQ-GHG-En study, the loudest equipment phase (grading) of the off-site improvements was combined with the equipment anticipated during grading of the proposed project to produce a worst-case construction noise level during grading.

APPENDIX E

SOUNDPLAN WORKSHEETS

Noise emissions of road traffic

Statio km	ADT Veh/24	Vehicles type	Vehicle name	Traffic values day Veh/h	evening Veh/h	night Veh/h	Speed km/h	Contr devic	Cons Spee km/h	Affec veh. %	Road surface	Gradie Min / M %
Indian Avenue			Traffic direction: In entry direction									
0+00	22250	Total	-	1360	969	336	-	none	-	-	Average (of DGAC a	0.0
		Automobiles	-	1289	957	237	72					
		Medium trucks	-	27	5	37	72					
		Heavy trucks	-	45	7	62	72					
		Buses	-	-	-	-	-					
		Motorcycles	-	-	-	-	-					
		Auxiliary vehicle	-	-	-	-	-					

Receiver list

No.	Receiver name	Building side	Floor	Limit Lden dB(A)	Level w/o NP Lden dB(A)	Level w NP Lden dB(A)	Difference Lden dB	Conflict Lden dB
1	1	-	EG	-	70.8	64.4	-6.4	-
			1.OG	-	72.3	72.2	0.0	-
2	2	-	EG	-	70.9	64.5	-6.4	-
			1.OG	-	72.3	72.3	0.0	-
3	3	-	EG	-	71.0	64.4	-6.7	-
			1.OG	-	72.4	72.4	0.0	-
4	4	-	EG	-	71.2	64.2	-7.0	-
			1.OG	-	72.5	72.5	0.0	-

APPENDIX F

FHWA TRAFFIC NOISE WORKSHEETS

Existing Traffic Noise

1	:Id	Vehicle Distribution (Heavy Truck Mix)				ADT	4400
		Motor-Vehicle Type	Daytime % (7 AM - 7 PM)	Evening % (7 PM - 10 PM)	Night % (10 PM - 7 AM)	Total % of Traffic Flow		
Indian Street	:Road	Automobiles	75.54	14.02	10.43	92.00	Speed	45
Iris Avenue to Goya Avenue	:Segment	Medium Trucks	48.00	2.00	50.00	3.00	Distance	44
		Heavy Trucks	48.00	2.00	50.00	5.00	Left Angle	-90
							Right Angle	90

	Daytime			Evening			Night		
Noise Parameters	Autos	Medium Trucks	Heavy Trucks	Autos	Medium Trucks	Heavy Trucks	Autos	Medium Trucks	Heavy Trucks
INPUT PARAMETERS									
Vehicles per hour	254.82	5.28	8.80	189.18	0.88	1.47	46.91	7.33	12.22
Speed in MPH	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00
Left angle	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00
Right angle	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00
NOISE CALCULATIONS									
Reference levels	69.34	77.62	82.14	69.34	77.62	82.14	69.34	77.62	82.14
ADJUSTMENTS									
Flow	17.22	0.39	2.61	15.93	-7.39	-5.17	9.87	1.82	4.03
Distance	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49
Finite Roadway	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Barrier	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grade	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Constant	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00
LEQ	62.05	53.50	60.23	60.76	45.71	52.45	54.70	54.92	61.66
	DAY LEQ	64.60		EVENING LEQ	61.48		NIGHT LEQ	63.16	

F		CNEL	69.90	Day hour	89.00
		DAY LEQ	64.60	Absorptive?	no
				Use hour?	no
				GRADE dB	0.00

Notes:

(1) FHWA Traffic Noise Prediction Model FHWA-RD-77-108

(2) Vehicle percentages based on County of Riverside heavy truck mix.

Existing Plus Project Traffic Noise

1	:Id	Vehicle Distribution (Heavy Truck Mix)				ADT	4700
Indian Street	:Road	Motor-Vehicle Type	Daytime % (7 AM - 7 PM)	Evening % (7 PM - 10 PM)	Night % (10 PM - 7 AM)	Total % of Traffic Flow	Speed	45
Iris Avenue to Goya Avenue	:Segment	Automobiles	75.54	14.02	10.43	92.00	Distance	44
		Medium Trucks	48.00	2.00	50.00	3.00	Left Angle	-90
		Heavy Trucks	48.00	2.00	50.00	5.00	Right Angle	90

	Daytime			Evening			Night		
Noise Parameters	Autos	Medium Trucks	Heavy Trucks	Autos	Medium Trucks	Heavy Trucks	Autos	Medium Trucks	Heavy Trucks
INPUT PARAMETERS									
Vehicles per hour	272.20	5.64	9.40	202.07	0.94	1.57	50.11	7.83	13.06
Speed in MPH	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00
Left angle	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00
Right angle	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00
NOISE CALCULATIONS									
Reference levels	69.34	77.62	82.14	69.34	77.62	82.14	69.34	77.62	82.14
ADJUSTMENTS									
Flow	17.51	0.67	2.89	16.22	-7.11	-4.89	10.16	2.10	4.32
Distance	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49
Finite Roadway	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Barrier	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grade	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Constant	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00
LEQ	62.34	53.78	60.52	61.05	46.00	52.74	54.99	55.21	61.95
	DAY LEQ	64.89		EVENING LEQ	61.76		NIGHT LEQ	63.45	

CNEL	70.18	Day hour	89.00
DAY LEQ	64.89	Absorptive?	no
		Use hour?	no
		GRADE dB	0.00

Notes:

(1) FHWA Traffic Noise Prediction Model FHWA-RD-77-108

(2) Vehicle percentages based on County of Riverside heavy truck mix.

Existing Traffic Noise

2	:Id
Indian Street	:Road
Goya Avenue to Krameria Avenue	:Segment

Vehicle Distribution (Heavy Truck Mix)				
Motor-Vehicle Type	Daytime % (7 AM - 7 PM)	Evening % (7 PM - 10 PM)	Night % (10 PM - 7 AM)	Total % of Traffic Flow
Automobiles	75.54	14.02	10.43	92.00
Medium Trucks	48.00	2.00	50.00	3.00
Heavy Trucks	48.00	2.00	50.00	5.00

ADT	4400
Speed	45
Distance	44
Left Angle	-90
Right Angle	90

	Daytime			Evening			Night		
Noise Parameters	Autos	Medium Trucks	Heavy Trucks	Autos	Medium Trucks	Heavy Trucks	Autos	Medium Trucks	Heavy Trucks
INPUT PARAMETERS									
Vehicles per hour	254.82	5.28	8.80	189.18	0.88	1.47	46.91	7.33	12.22
Speed in MPH	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00
Left angle	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00
Right angle	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00
NOISE CALCULATIONS									
Reference levels	69.34	77.62	82.14	69.34	77.62	82.14	69.34	77.62	82.14
ADJUSTMENTS									
Flow	17.22	0.39	2.61	15.93	-7.39	-5.17	9.87	1.82	4.03
Distance	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49
Finite Roadway	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Barrier	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grade	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Constant	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00
LEQ	62.05	53.50	60.23	60.76	45.71	52.45	54.70	54.92	61.66
	DAY LEQ	64.60		EVENING LEQ	61.48		NIGHT LEQ	63.16	

CNEL	69.90
DAY LEQ	64.60

Day hour	90.00
Absorptive?	no
Use hour?	no
GRADE dB	1.00

Notes:

(1) FHWA Traffic Noise Prediction Model FHWA-RD-77-108

(2) Vehicle percentages based on County of Riverside heavy truck mix.

Existing Plus Project Traffic Noise

2	:Id
Indian Street	:Road
Goya Avenue to Krameria Avenue	:Segment

Vehicle Distribution (Heavy Truck Mix)				
Motor-Vehicle Type	Daytime % (7 AM - 7 PM)	Evening % (7 PM - 10 PM)	Night % (10 PM - 7 AM)	Total % of Traffic Flow
Automobiles	75.54	14.02	10.43	92.00
Medium Trucks	48.00	2.00	50.00	3.00
Heavy Trucks	48.00	2.00	50.00	5.00

ADT	4700
Speed	45
Distance	44
Left Angle	-90
Right Angle	90

	Daytime			Evening			Night		
Noise Parameters	Autos	Medium Trucks	Heavy Trucks	Autos	Medium Trucks	Heavy Trucks	Autos	Medium Trucks	Heavy Trucks
INPUT PARAMETERS									
Vehicles per hour	272.20	5.64	9.40	202.07	0.94	1.57	50.11	7.83	13.06
Speed in MPH	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00
Left angle	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00
Right angle	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00
NOISE CALCULATIONS									
Reference levels	69.34	77.62	82.14	69.34	77.62	82.14	69.34	77.62	82.14
ADJUSTMENTS									
Flow	17.51	0.67	2.89	16.22	-7.11	-4.89	10.16	2.10	4.32
Distance	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49
Finite Roadway	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Barrier	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grade	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Constant	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00
LEQ	62.34	53.78	60.52	61.05	46.00	52.74	54.99	55.21	61.95
	DAY LEQ	64.89		EVENING LEQ	61.76		NIGHT LEQ	63.45	

CNEL	70.18
DAY LEQ	64.89

Day hour	90.00
Absorptive?	no
Use hour?	no
GRADE dB	1.00

Notes:

(1) FHWA Traffic Noise Prediction Model FHWA-RD-77-108

(2) Vehicle percentages based on County of Riverside heavy truck mix.

Existing Traffic Noise

3	:Id
Goya Avenue	:Road
Indian Street to Emma Lane	:Segment

Vehicle Distribution (Light Truck Mix)				
Motor-Vehicle Type	Daytime % (7 AM - 7 PM)	Evening % (7 PM - 10 PM)	Night % (10 PM - 7 AM)	Total % of Traffic Flow
Automobiles	75.56	13.96	10.49	97.40
Medium Trucks	48.91	2.17	48.91	1.84
Heavy Trucks	47.30	5.41	47.30	0.74

ADT	100
Speed	25
Distance	33
Left Angle	-90
Right Angle	90

	Daytime			Evening			Night		
Noise Parameters	Autos	Medium Trucks	Heavy Trucks	Autos	Medium Trucks	Heavy Trucks	Autos	Medium Trucks	Heavy Trucks
INPUT PARAMETERS									
Vehicles per hour	6.13	0.07	0.03	4.53	0.01	0.01	1.14	0.10	0.04
Speed in MPH	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00
Left angle	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00
Right angle	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00
NOISE CALCULATIONS									
Reference levels	59.44	71.09	77.24	59.44	71.09	77.24	59.44	71.09	77.24
ADJUSTMENTS									
Flow	3.59	-15.53	-19.64	2.28	-23.04	-23.03	-3.73	-14.29	-18.39
Distance	1.73	1.73	1.73	1.73	1.73	1.73	1.73	1.73	1.73
Finite Roadway	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Barrier	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grade	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Constant	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00
LEQ	39.77	32.29	34.34	38.45	24.78	30.94	32.44	33.54	35.59
	DAY LEQ	41.43		EVENING LEQ	39.32		NIGHT LEQ	38.83	

CNEL	45.90
DAY LEQ	41.43

Day hour	91.00
Absorptive?	no
Use hour?	no
GRADE dB	2.00

Notes:

(1) FHWA Traffic Noise Prediction Model FHWA-RD-77-108

(2) Vehicle percentages based on County of Riverside light truck mix.

Existing Plus Project Traffic Noise

3	:Id
Goya Avenue	:Road
Indian Street to Emma Lane	:Segment

Vehicle Distribution (Light Truck Mix)				
Motor-Vehicle Type	Daytime % (7 AM - 7 PM)	Evening % (7 PM - 10 PM)	Night % (10 PM - 7 AM)	Total % of Traffic Flow
Automobiles	75.56	13.96	10.49	97.40
Medium Trucks	48.91	2.17	48.91	1.84
Heavy Trucks	47.30	5.41	47.30	0.74

ADT	500
Speed	25
Distance	33
Left Angle	-90
Right Angle	90

	Daytime			Evening			Night		
Noise Parameters	Autos	Medium Trucks	Heavy Trucks	Autos	Medium Trucks	Heavy Trucks	Autos	Medium Trucks	Heavy Trucks
INPUT PARAMETERS									
Vehicles per hour	30.66	0.37	0.15	22.66	0.07	0.07	5.68	0.50	0.19
Speed in MPH	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00
Left angle	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00
Right angle	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00
NOISE CALCULATIONS									
Reference levels	59.44	71.09	77.24	59.44	71.09	77.24	59.44	71.09	77.24
ADJUSTMENTS									
Flow	10.58	-8.55	-12.65	9.27	-16.05	-16.04	3.26	-7.30	-11.40
Distance	1.73	1.73	1.73	1.73	1.73	1.73	1.73	1.73	1.73
Finite Roadway	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Barrier	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grade	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Constant	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00
LEQ	46.76	39.28	41.33	45.44	31.77	37.93	39.43	40.53	42.58
	DAY LEQ	48.41		EVENING LEQ	46.31		NIGHT LEQ	45.82	

CNEL	52.89
DAY LEQ	48.41

Day hour	91.00
Absorptive?	no
Use hour?	no
GRADE dB	2.00

Notes:

(1) FHWA Traffic Noise Prediction Model FHWA-RD-77-108

(2) Vehicle percentages based on County of Riverside light truck mix.

Existing Traffic Noise

4	:Id
Emma Lane	:Road
North of Goya Avenue	:Segment

Vehicle Distribution (Light Truck Mix)				
Motor-Vehicle Type	Daytime % (7 AM - 7 PM)	Evening % (7 PM - 10 PM)	Night % (10 PM - 7 AM)	Total % of Traffic Flow
Automobiles	75.56	13.96	10.49	97.40
Medium Trucks	48.91	2.17	48.91	1.84
Heavy Trucks	47.30	5.41	47.30	0.74

ADT	1000
Speed	25
Distance	25
Left Angle	-90
Right Angle	90

	Daytime			Evening			Night		
Noise Parameters	Autos	Medium Trucks	Heavy Trucks	Autos	Medium Trucks	Heavy Trucks	Autos	Medium Trucks	Heavy Trucks
INPUT PARAMETERS									
Vehicles per hour	61.33	0.75	0.29	45.32	0.13	0.13	11.35	1.00	0.39
Speed in MPH	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00
Left angle	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00
Right angle	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00
NOISE CALCULATIONS									
Reference levels	59.44	71.09	77.24	59.44	71.09	77.24	59.44	71.09	77.24
ADJUSTMENTS									
Flow	13.59	-5.53	-9.64	12.28	-13.04	-13.03	6.27	-4.29	-8.39
Distance	2.94	2.94	2.94	2.94	2.94	2.94	2.94	2.94	2.94
Finite Roadway	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Barrier	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grade	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Constant	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00
LEQ	50.97	43.49	45.54	49.66	35.98	42.15	43.65	44.74	46.79
	DAY LEQ	52.63		EVENING LEQ	50.52		NIGHT LEQ	50.03	

CNEL	57.11
DAY LEQ	52.63

Day hour	92.00
Absorptive?	no
Use hour?	no
GRADE dB	3.00

Notes:

(1) FHWA Traffic Noise Prediction Model FHWA-RD-77-108

(2) Vehicle percentages based on County of Riverside light truck mix.

Existing Plus Project Traffic Noise

4	:Id
Emma Lane	:Road
North of Goya Avenue	:Segment

Vehicle Distribution (Light Truck Mix)				
Motor-Vehicle Type	Daytime % (7 AM - 7 PM)	Evening % (7 PM - 10 PM)	Night % (10 PM - 7 AM)	Total % of Traffic Flow
Automobiles	75.56	13.96	10.49	97.40
Medium Trucks	48.91	2.17	48.91	1.84
Heavy Trucks	47.30	5.41	47.30	0.74

ADT	1600
Speed	25
Distance	25
Left Angle	-90
Right Angle	90

	Daytime			Evening			Night		
Noise Parameters	Autos	Medium Trucks	Heavy Trucks	Autos	Medium Trucks	Heavy Trucks	Autos	Medium Trucks	Heavy Trucks
INPUT PARAMETERS									
Vehicles per hour	98.13	1.20	0.47	72.52	0.21	0.21	18.16	1.60	0.62
Speed in MPH	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00
Left angle	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00
Right angle	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00
NOISE CALCULATIONS									
Reference levels	59.44	71.09	77.24	59.44	71.09	77.24	59.44	71.09	77.24
ADJUSTMENTS									
Flow	15.63	-3.49	-7.59	14.32	-11.00	-10.99	8.31	-2.24	-6.35
Distance	2.94	2.94	2.94	2.94	2.94	2.94	2.94	2.94	2.94
Finite Roadway	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Barrier	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grade	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Constant	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00
LEQ	53.01	45.53	47.59	51.70	38.03	44.19	45.69	46.78	48.84
	DAY LEQ	54.67		EVENING LEQ	52.56		NIGHT LEQ	52.07	

CNEL	59.15
DAY LEQ	54.67

Day hour	92.00
Absorptive?	no
Use hour?	no
GRADE dB	3.00

Notes:

(1) FHWA Traffic Noise Prediction Model FHWA-RD-77-108

(2) Vehicle percentages based on County of Riverside light truck mix.

Existing Traffic Noise

5	:Id
Emma Lane	:Road
South of Goya Avenue	:Segment

Vehicle Distribution (Light Truck Mix)				
Motor-Vehicle Type	Daytime % (7 AM - 7 PM)	Evening % (7 PM - 10 PM)	Night % (10 PM - 7 AM)	Total % of Traffic Flow
Automobiles	75.56	13.96	10.49	97.40
Medium Trucks	48.91	2.17	48.91	1.84
Heavy Trucks	47.30	5.41	47.30	0.74

ADT	400
Speed	25
Distance	25
Left Angle	-90
Right Angle	90

	Daytime			Evening			Night		
Noise Parameters	Autos	Medium Trucks	Heavy Trucks	Autos	Medium Trucks	Heavy Trucks	Autos	Medium Trucks	Heavy Trucks
INPUT PARAMETERS									
Vehicles per hour	24.53	0.30	0.12	18.13	0.05	0.05	4.54	0.40	0.16
Speed in MPH	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00
Left angle	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00
Right angle	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00
NOISE CALCULATIONS									
Reference levels	59.44	71.09	77.24	59.44	71.09	77.24	59.44	71.09	77.24
ADJUSTMENTS									
Flow	9.61	-9.51	-13.62	8.30	-17.02	-17.01	2.29	-8.26	-12.37
Distance	2.94	2.94	2.94	2.94	2.94	2.94	2.94	2.94	2.94
Finite Roadway	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Barrier	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grade	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Constant	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00
LEQ	46.99	39.51	41.57	45.68	32.00	38.17	39.67	40.76	42.81
	DAY LEQ	48.65		EVENING LEQ	46.54		NIGHT LEQ	46.05	

CNEL	53.13
DAY LEQ	48.65

Day hour	93.00
Absorptive?	no
Use hour?	no
GRADE dB	4.00

Notes:

(1) FHWA Traffic Noise Prediction Model FHWA-RD-77-108

(2) Vehicle percentages based on County of Riverside light truck mix.

Existing Plus Project Traffic Noise

5	:Id
Emma Lane	:Road
South of Goya Avenue	:Segment

Vehicle Distribution (Light Truck Mix)				
Motor-Vehicle Type	Daytime % (7 AM - 7 PM)	Evening % (7 PM - 10 PM)	Night % (10 PM - 7 AM)	Total % of Traffic Flow
Automobiles	75.56	13.96	10.49	97.40
Medium Trucks	48.91	2.17	48.91	1.84
Heavy Trucks	47.30	5.41	47.30	0.74

ADT	800
Speed	25
Distance	25
Left Angle	-90
Right Angle	90

	Daytime			Evening			Night		
Noise Parameters	Autos	Medium Trucks	Heavy Trucks	Autos	Medium Trucks	Heavy Trucks	Autos	Medium Trucks	Heavy Trucks
INPUT PARAMETERS									
Vehicles per hour	49.06	0.60	0.23	36.26	0.11	0.11	9.08	0.80	0.31
Speed in MPH	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00
Left angle	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00
Right angle	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00
NOISE CALCULATIONS									
Reference levels	59.44	71.09	77.24	59.44	71.09	77.24	59.44	71.09	77.24
ADJUSTMENTS									
Flow	12.62	-6.50	-10.61	11.31	-14.01	-14.00	5.30	-5.25	-9.36
Distance	2.94	2.94	2.94	2.94	2.94	2.94	2.94	2.94	2.94
Finite Roadway	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Barrier	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grade	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Constant	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00
LEQ	50.00	42.52	44.58	48.69	35.01	41.18	42.68	43.77	45.82
	DAY LEQ	51.66		EVENING LEQ	49.55		NIGHT LEQ	49.06	

CNEL	56.14
DAY LEQ	51.66

Day hour	93.00
Absorptive?	no
Use hour?	no
GRADE dB	4.00

Notes:

(1) FHWA Traffic Noise Prediction Model FHWA-RD-77-108

(2) Vehicle percentages based on County of Riverside light truck mix.

APPENDIX G

VIBRATION WORKSHEETS

GROUNDBORNE VIBRATION ANALYSIS			
Project:	19550 Goya at Heritage Park		Date: 5/24/23
Source:	Vibratory Roller		
Scenario:	Unmitigated		
Location:	Residential to North (16233 Smoke Tree Pl)		
Address:			
PPV = PPVref(25/D)^n (in/sec)			
INPUT			
Equipment = Type	1	Vibratory Roller	INPUT SECTION IN GREEN
PPVref =	0.21	Reference PPV (in/sec) at 25 ft.	
D =	75.00	Distance from Equipment to Receiver (ft)	
n =	1.50	Vibration attenuation rate through the ground	
Note: Based on reference equations from the Transportation and Construction Vibration Guidance Manual, California Department of Transportation, April 2020, pg 37.			
RESULTS			
PPV =	0.040	IN/SEC	OUTPUT IN BLUE

GROUNDBORNE VIBRATION ANALYSIS

Project:	19550 Goya at Heritage Park	Date:	5/24/23
Source:	Large Bulldozer		
Scenario:	Unmitigated		
Location:	Residential to North (16233 Smoke Tree Pl)		
Address:			

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

INPUT

Equipment Type =	2	Large Bulldozer	INPUT SECTION IN GREEN
PPVref =	0.089	Reference PPV (in/sec) at 25 ft.	
D =	75.00	Distance from Equipment to Receiver (ft)	
n =	1.50	Vibration attenuation rate through the ground	

Note: Based on reference equations from the Transportation and Construction Vibration Guidance Manual, California Department of Transportation, April 2020, pg 37.

RESULTS

PPV =	0.017	IN/SEC	OUTPUT IN BLUE

GROUNDBORNE VIBRATION ANALYSIS			
Project:	19550 Goya at Heritage Park		Date: 5/24/23
Source:	Vibratory Roller		
Scenario:	Unmitigated		
Location:	Church to North (16220 Indian St)		
Address:			
PPV = PPVref(25/D)^n (in/sec)			
INPUT			
Equipment Type =	1	Vibratory Roller	INPUT SECTION IN GREEN
PPVref =	0.21	Reference PPV (in/sec) at 25 ft.	
D =	168.00	Distance from Equipment to Receiver (ft)	
n =	1.50	Vibration attenuation rate through the ground	
Note: Based on reference equations from the Transportation and Construction Vibration Guidance Manual, California Department of Transportation, April 2020, pg 37.			
RESULTS			
PPV =	0.012	IN/SEC	OUTPUT IN BLUE

GROUNDBORNE VIBRATION ANALYSIS

Project:	19550 Goya at Heritage Park	Date:	5/24/23
Source:	Large Bulldozer		
Scenario:	Unmitigated		
Location:	Church to North (16220 Indian St)		
Address:			

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

INPUT

Equipment Type	2	Large Bulldozer	INPUT SECTION IN GREEN
PPVref =	0.089	Reference PPV (in/sec) at 25 ft.	
D =	168.00	Distance from Equipment to Receiver (ft)	
n =	1.50	Vibration attenuation rate through the ground	

Note: Based on reference equations from the Transportation and Construction Vibration Guidance Manual, California Department of Transportation, April 2020, pg 37.

RESULTS

PPV =	0.005	IN/SEC	OUTPUT IN BLUE

GROUNDBORNE VIBRATION ANALYSIS

Project:	19550 Goya at Heritage Park	Date:	5/24/23
Source:	Vibratory Roller		
Scenario:	Unmitigated		
Location:	Residential to South (16410 Indian St)		
Address:			

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

INPUT

Equipment Type =	1	Vibratory Roller	INPUT SECTION IN GREEN
PPVref =	0.21	Reference PPV (in/sec) at 25 ft.	
D =	238.00	Distance from Equipment to Receiver (ft)	
n =	1.50	Vibration attenuation rate through the ground	

Note: Based on reference equations from the Transportation and Construction Vibration Guidance Manual, California Department of Transportation, April 2020, pg 37.

RESULTS

PPV =	0.007	IN/SEC	OUTPUT IN BLUE

GROUNDBORNE VIBRATION ANALYSIS

Project:	19550 Goya at Heritage Park	Date:	5/24/23
Source:	Large Bulldozer		
Scenario:	Unmitigated		
Location:	Residential to South (16410 Indian St)		
Address:			

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

INPUT

Equipment Type =	2	Large Bulldozer	INPUT SECTION IN GREEN
PPVref =	0.089	Reference PPV (in/sec) at 25 ft.	
D =	238.00	Distance from Equipment to Receiver (ft)	
n =	1.50	Vibration attenuation rate through the ground	

Note: Based on reference equations from the Transportation and Construction Vibration Guidance Manual, California Department of Transportation, April 2020, pg 37.

RESULTS

PPV =	0.003	IN/SEC	OUTPUT IN BLUE

GROUNDBORNE VIBRATION ANALYSIS			
Project:	19550 Goya at Heritage Park		Date: 5/24/23
Source:	Vibratory Roller		
Scenario:	Unmitigated		
Location:	Residential to South (24608 Constellation Way)		
Address:			
PPV = PPVref(25/D)^n (in/sec)			
INPUT			
Equipment = Type	1	Vibratory Roller	INPUT SECTION IN GREEN
PPVref =	0.21	Reference PPV (in/sec) at 25 ft.	
D =	5.00	Distance from Equipment to Receiver (ft)	
n =	1.50	Vibration attenuation rate through the ground	
Note: Based on reference equations from the Transportation and Construction Vibration Guidance Manual, California Department of Transportation, April 2020, pg 37.			
RESULTS			
PPV =	2.348	IN/SEC	OUTPUT IN BLUE

GROUNDBORNE VIBRATION ANALYSIS			
Project:	19550 Goya at Heritage Park		Date: 5/24/23
Source:	Large Bulldozer		
Scenario:	Unmitigated		
Location:	Residential to South (24608 Constellation Way)		
Address:			
PPV = PPVref(25/D)^n (in/sec)			
INPUT			
Equipment Type =	2	Large Bulldozer	INPUT SECTION IN GREEN
PPVref =	0.089	Reference PPV (in/sec) at 25 ft.	
D =	5.00	Distance from Equipment to Receiver (ft)	
n =	1.50	Vibration attenuation rate through the ground	
Note: Based on reference equations from the Transportation and Construction Vibration Guidance Manual, California Department of Transportation, April 2020, pg 37.			
RESULTS			
PPV =	0.995	IN/SEC	OUTPUT IN BLUE

GROUNDBORNE VIBRATION ANALYSIS			
Project:	19550 Goya at Heritage Park		Date: 5/24/23
Source:	Vibratory Roller		
Scenario:	Unmitigated		
Location:	Residential to East (16296 Emma Lane)		
Address:			
PPV = PPVref(25/D)^n (in/sec)			
INPUT			
Equipment = Type	1	Vibratory Roller	INPUT SECTION IN GREEN
PPVref =	0.21	Reference PPV (in/sec) at 25 ft.	
D =	375.00	Distance from Equipment to Receiver (ft)	
n =	1.50	Vibration attenuation rate through the ground	
Note: Based on reference equations from the Transportation and Construction Vibration Guidance Manual, California Department of Transportation, April 2020, pg 37.			
RESULTS			
PPV =	0.004	IN/SEC	OUTPUT IN BLUE

GROUNDBORNE VIBRATION ANALYSIS			
Project:	19550 Goya at Heritage Park		Date: 5/24/23
Source:	Large Bulldozer		
Scenario:	Unmitigated		
Location:	Residential to East (16296 Emma Lane)		
Address:			
PPV = PPVref(25/D)^n (in/sec)			
INPUT			
Equipment Type	2	Large Bulldozer	INPUT SECTION IN GREEN
PPVref =	0.089	Reference PPV (in/sec) at 25 ft.	
D =	375.00	Distance from Equipment to Receiver (ft)	
n =	1.50	Vibration attenuation rate through the ground	
Note: Based on reference equations from the Transportation and Construction Vibration Guidance Manual, California Department of Transportation, April 2020, pg 37.			
RESULTS			
PPV =	0.002	IN/SEC	OUTPUT IN BLUE

GROUNDBORNE VIBRATION ANALYSIS

Project:	19550 Goya at Heritage Park	Date:	5/24/23
Source:	Vibratory Roller		
Scenario:	BMPs		
Location:	Residential to South (Constellation Way) with BMP		
Address:			

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

INPUT

Equipment Type =	1	Vibratory Roller	INPUT SECTION IN GREEN
PPVref =	0.21	Reference PPV (in/sec) at 25 ft.	
D =	26.00	Distance from Equipment to Receiver (ft)	
n =	1.50	Vibration attenuation rate through the ground	

Note: Based on reference equations from the Transportation and Construction Vibration Guidance Manual, California Department of Transportation, April 2020, pg 37.

RESULTS

PPV =	0.198	IN/SEC	OUTPUT IN BLUE

GROUNDBORNE VIBRATION ANALYSIS

Project:	19550 Goya at Heritage Park	Date:	5/24/23
Source:	Large Bulldozer		
Scenario:	BMPs		
Location:	Residential to South (Constellation Way) with BMP		
Address:			

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

INPUT

Equipment Type =	2	Large Bulldozer	INPUT SECTION IN GREEN
PPVref =	0.089	Reference PPV (in/sec) at 25 ft.	
D =	15.00	Distance from Equipment to Receiver (ft)	
n =	1.50	Vibration attenuation rate through the ground	

Note: Based on reference equations from the Transportation and Construction Vibration Guidance Manual, California Department of Transportation, April 2020, pg 37.

RESULTS

PPV =	0.191	IN/SEC	OUTPUT IN BLUE

Construction Annoyance Vibration Calculations

Source: Federal Transit Administration (FTA), Transit Noise and Vibration Impact Assessment Manual (September 2018).

Eq. 7-3: $Lvdistance = Lvref - 30\log(D/25)$

Lvdistance = the rms velocity level adjsuted for distance, VdB
Lvref = the source reference vibration level at 25 feet, VdB
D = distance from the equipment to th receiver, ft.

Large Bulldozer:

Residential to North: Lvdistance = 87 - 30 log (75/25) = 72.69 VdB

Church to North: Lvdistance = 87 - 30 log (168/25) = 62.18 VdB

Residential to South (Indian St): Lvdistance = 87 - 30 log (238/25) = 57.64 VdB

Residential to South (Constellation Way): Lvdistance = 87 - 30 log (5/25) = 101.85 VdB

Residential to East: Lvdistance = 87 - 30 log (375/25) = 51.72 VdB

Residential: Under Threshold Mitigation Distance: 87 - 30 log (80/25) = 71.85 VdB
Church: Under Threshold Mitigation Distance: 87 - 30 log (63/25) = 74.96 VdB

Vibratory Roller:

Residential to North: Lvdistance = 94 - 30 log (75/25) = 79.67 VdB

Church to North: Lvdistance = 94 - 30 log (168/25) = 69.18 VdB

Residential to South (Indian St): Lvdistance = 94 - 30 log (238/25) = 64.64 VdB

Residential to South (Constellation Way): Lvdistance = 94 - 30 log (5/25) = 114.97 VdB

Residential to East: Lvdistance = 94 - 30 log (375/25) = 58.72 VdB

Residential: Under Threshold Mitigation Distance: 94 - 30 log (136/25) = 71.93 VdB
Church: Under Threshold Mitigation Distance: 94 - 30 log (108/25) = 74.94 VdB

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