O'Reilly Auto Center

Noise Impact Study

County of San Bernardino, CA

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1.0 Introduction

1.1 Purpose of Analysis and Study Objectives

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

The following is provided in this report:

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

1.2 Site Location and Study Area

The proposed O'Reilly Auto Center (Project) site is located at 3919 Phelan Road in the unincorporated Phelan Pinon Hills Community in the County of San Bernardino, CA. See Exhibit A for the location. Land uses directly surrounding the Project site include commercial to the north, east, south, and west. There are nonconforming residential uses to the southwest and northwest (APNs: 306621131, 306608115). Other sensitive land uses include residential uses further north and further south. Phelan Road is to the north and Malpaso Road is to the west.

1.3 Proposed Project Description

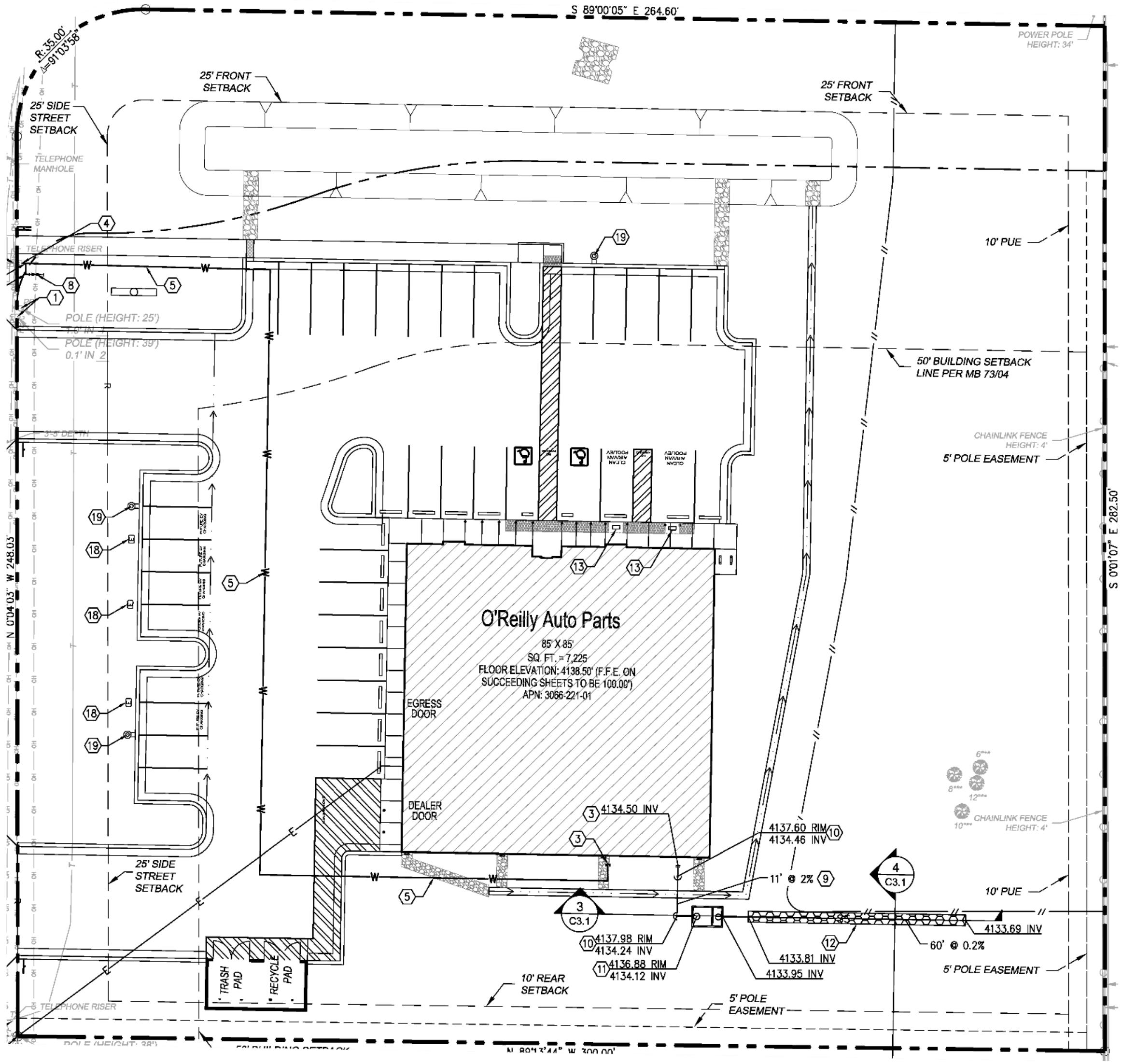
The proposed Project consists of the construction and operation of an O'Reilly Auto Center. The Project proposes to construct a 7,453-square-foot single-story block building and approximately 39 parking spaces on 1.89 acres. Operational hours will be from 7:00 AM to 9:00 PM. The site plan is shown in Exhibit B. Construction of the Project is anticipated to occur from March to August 2026 for approximately 150 days.

Exhibit A

Location Map

Exhibit B

Site Plan



2.0 Fundamentals of Noise

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

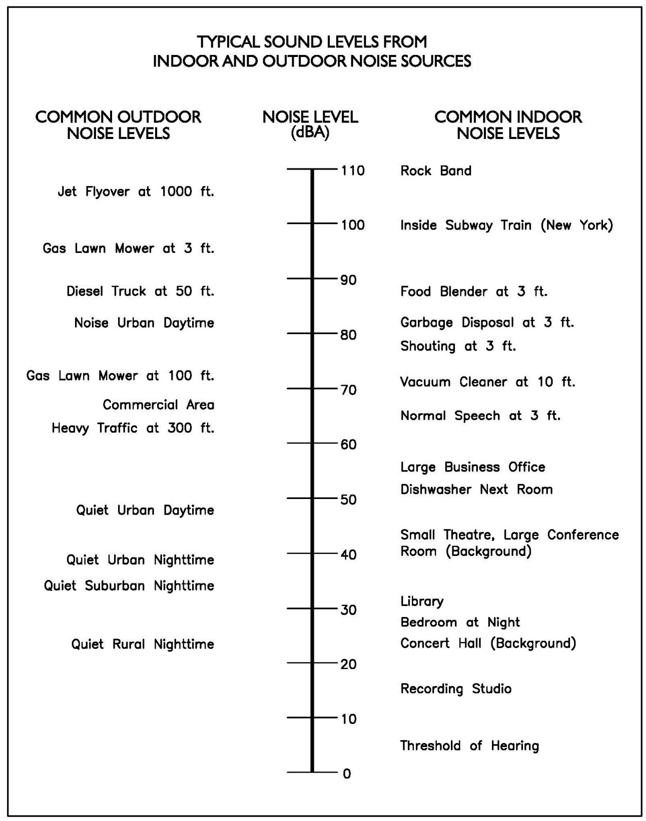
2.1 Sound, Noise and Acoustics

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

2.2 Frequency and Hertz

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

Exhibit C: Typical A-Weighted Noise Levels



2.3 Sound Pressure Levels and Decibels

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

2.4 Addition of Decibels

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

2.5 Sensitive Receptors

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

2.6 Human Response to Changes in Noise Levels

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

Table 1: Decibel Changes and Loudness

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

2.7 Noise Descriptors

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

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

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

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

PM and after addition of ten (10) decibels to sound levels in the night before 7:00 AM and after 10:00 PM.

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

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

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

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

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

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

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

Percent Noise Levels: See L(n).

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

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

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

2.8 Traffic Noise Prediction

Noise levels associated with traffic depends on a variety of factors: (1) volume of traffic, (2) speed of traffic, (3) auto, medium truck (2 axle) and heavy truck percentage (3 axle and greater), and sound propagation. The greater the volume of traffic, higher speeds and truck percentages equate to a louder volume in noise. A doubling of the Average Daily Traffic (ADT) along a roadway will increase noise levels by approximately 3 dB; reasons for this are discussed in the sections above.

2.9 Sound Propagation

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

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

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

3.0 Ground-Bourne Vibration Fundamentals

3.1 Vibration Descriptors

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

Several different methods are used to quantify vibration amplitude.

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

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

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

3.2 Vibration Perception

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

There are three main types of vibration propagation: surface, compression, and shear waves. Surface waves, or Rayleigh waves, travel along the ground's surface. These waves carry most of their energy along an expanding circular wave front, similar to ripples produced by throwing a rock into a pool of water. P-waves, or compression waves, are body waves that carry their energy along an expanding spherical 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. S-waves, or shear 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 vibration energy decreases in a logarithmic nature and the vibration levels typically decrease by 6 VdB per doubling of the distance from the vibration source. As stated above, this drop-off rate can vary greatly depending on the soil but has been shown to be effective enough for screening purposes, in order to identify potential vibration impacts that may need to be studied through actual field tests.

4.0 Regulatory Setting

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

4.1 Federal Regulations

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

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

The Federal Office of Noise Abatement and Control (ONAC) originally was tasked with implementing the Noise Control Act. However, it was eventually eliminated leaving other federal agencies and committees to develop noise policies and programs. Some examples of these agencies are as follows: The Department of Transportation (DOT) assumed a significant role in noise control through its various agencies. The Federal Aviation Agency (FAA) is responsible to regulate noise from aircraft and airports. The Federal Highway Administration (FHWA) is responsible to regulate noise from the interstate highway system. The Occupational Safety and Health Administration (OSHA) is responsible for the prohibition of excessive noise exposure to workers.

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

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

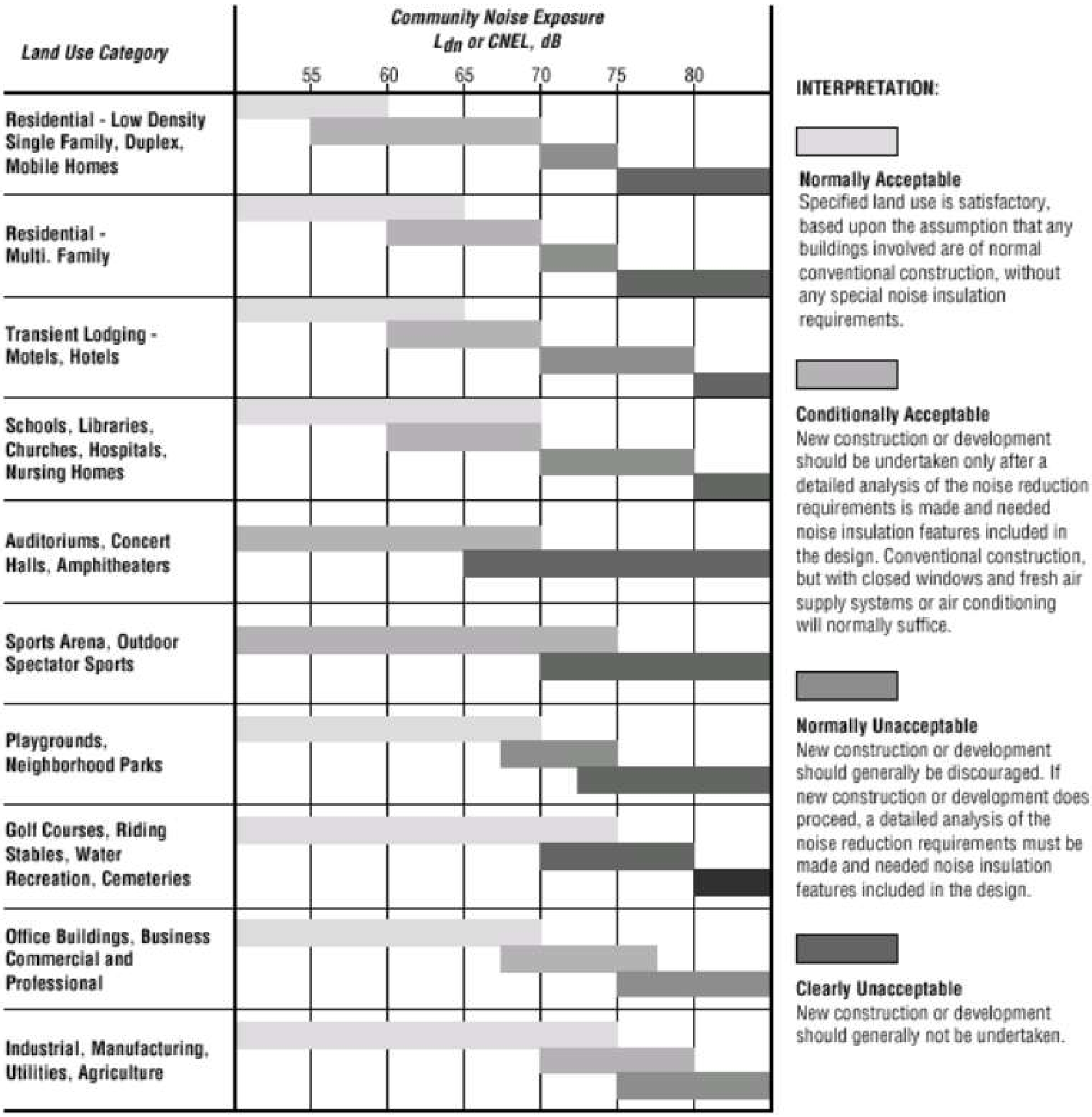
4.2 State Regulations

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

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

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

Exhibit D: Land Use Compatibility Guidelines



4.3 County of San Bernardino Noise Regulations

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

County of San Bernardino General Plan

Applicable policies and standards governing environmental noise in the County of San Bernardino are set forth in the Policy Plan Hazards Element. The County has outlined goals and policies to reduce potential noise impacts and are presented below:

Goals and Policies

Goals and policies from the Policy Plan that would mitigate potential impacts on noise include the following.

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

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

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

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

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

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

County of San Bernardino Municipal Code

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

Section 83.01.080 –Noise

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

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

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

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

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

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

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

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

Table 2: Noise Standards for Stationary Noise Sources

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

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

1. The noise standard for the receiving land use as specified in Subdivision (b) (Noise-Impacted Areas), above, for a cumulative period of more than 30 minutes in any hour.
2. The noise standard plus five dB(A) for a cumulative period of more than 15 minutes in any hour.
3. The noise standard plus ten dB(A) for a cumulative period of more than five minutes in any hour.
4. The noise standard plus 15 dB(A) for a cumulative period of more than one minute in any hour.
5. The noise standard plus 20 dB(A) for any period of time.

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

Table 3: Noise Standards for Adjacent Mobile Noise Sources

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

Notes:
[1] The indoor environment shall exclude bathrooms, kitchens, toilets, closets and corridors.
[2] The outdoor environment shall be limited to
- Hospital/office building patios
- Mobile home parks
- Multi-family private patios or balconies
- Park picnic areas
- Private yard of single-family dwellings
- School playgrounds

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

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

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

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

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

(2) Emergency equipment, vehicles, and devices.

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

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

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

Table 4: Noise Standards for Other Structures

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

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

5.0 Study Method and Procedure

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

5.1 Noise Measurement Procedure and Criteria

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

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

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

- Microphones for sound level meters were placed 5 feet above the ground for all measurements
- Sound level meters were calibrated (Larson Davis CAL 200) before and after each measurement
- Following the calibration of equipment, a windscreen was placed over the microphone
- Frequency weighting was set on "A" and slow response
- Results of the noise measurements were recorded on field data sheets
- During any short-term noise measurements any noise contaminations such as barking dogs, local traffic, lawnmowers, or aircraft fly-overs were noted
- Temperature and sky conditions were observed and documented

5.2 Noise Measurement Locations

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

5.3 SoundPLAN Noise Model (Operational Noise)

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

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

Noise associated with proposed truck and automobile parking areas was modeled using the SoundPLAN parking tool. The Project proposes 39 total parking spaces. The CalEEMod estimates 177 daily trips to and from the Project site. Assuming 10% of trips occur during the peak hour, there would be approximately 0.5 movements per space per hour. As a worst-case, the parking lot was modeled with a lot-wide average of 1 movement per space per hour. There are four (4) 5-ton HVAC rooftop units. The rooftop units were modeled as continuous point sources each with a sound power level of 78 dBA. The model also includes the proposed 2'7" parapet wall around the rooftop. Modeling assumptions are summarized in Table 5. SoundPLAN noise modeling input and results are provided in Appendix B.

Table 5: SoundPLAN Modeling Assumptions

Noise Source	Source Type	Reference Level	Descriptor
HVAC	Point Source	78	Lw
Parking	Area (Parking Tool)	1	Movements per hr
Source: See Appendix B.			

5.4 Construction Noise Modeling

Construction noise associated with the proposed project was calculated 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. Construction activities are anticipated to include four phases site preparation, grading, building construction, and paving.

Construction noise levels were calculated for each phase based on CalEEMod Air Quality Model assumptions. All equipment was assumed to be situated at the edge of the Project site closest to the sensitive receptor. Construction equipment typically moves back and forth across the site, so this is a conservative assumption. Construction worksheets are provided in Appendix C.

6.0 Existing Noise Environment

Two (2) 15-minute noise measurements were conducted at the project site in order to document the existing noise environment. The measurements include the Leq, Lmin, Lmax and other statistical data (e.g. L2, L8). The results of the noise measurements are presented in Table 6. Noise measurement field sheets are provided in Appendix A.

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

Location	Start Time	Stop Time	L_{EQ}	L_{MAX}	L_{MIN}	L_2	L_8	L_{25}	L_{50}	L_{90}
NM1	10:35 AM	10:50 AM	57.7	74.0	40.6	68.6	58.5	53.8	49.6	43.7
NM2	10:15 AM	10:30 AM	58.5	73.1	46.6	66.3	62.4	58.6	55.6	50.6
Notes: 1. Short-term noise monitoring locations are illustrated in Exhibit E.										

The data presented in Table 6 and the field notes provided in Appendix A indicate that ambient noise levels in the project vicinity range 58 to 59 dBA Leq. The field data and observations indicate that traffic on Phelan Road is the dominant source of noise.

Exhibit E

Measurement Locations

\# = Short-Term Monitoring Locations

7.0 Future Noise Environment Impacts and Mitigation

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

7.1 Off-Site Traffic Noise Impact

The County is not currently requiring a traffic study, therefore, a full traffic impact analysis is not provided in this assessment. However, the following provides a brief description of potential traffic noise impact. Traffic noise along Phelan Road is the main source of noise impacting the project site and the surrounding area. Phelan Road has an existing ADT of 15,175, per the San Bernardino Countywide Plan Transportation Existing Conditions Report from Fehr & Peers. The Project projects 177 daily trips, per CalEEMod. It takes a change of 3 dB or more to hear an audible difference, which would occur with a doubling of traffic. The Project is anticipated to increase the existing noise level by less than 1 dB due to an increase in traffic. Therefore, the impact is less than significant.

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

Worst-case operational noise was modeled using SoundPLAN acoustical modeling software (see Exhibit F). Four (4) receptors representing adjacent commercial uses and one (1) receptor representing nearby residential uses were modeled using the SoundPLAN noise model to evaluate the proposed project's operational impact. A receptor is denoted by a yellow dot. All yellow dots represent an existing building, a property line, or a sensitive receptor.

<u>Daytime Operational Noise Levels</u>
Worst-case "project only" daytime exterior operational noise is presented in Exhibit F. Receptors 1 through 4 represent commercial uses, and receptor 5 represents a nonconforming residential use. The daytime operational noise model assumes that the HVAC equipment and the parking lot are operating at full capacity throughout the hour.

Table 7 presents the ambient noise level, the project's daytime noise level, and the combined project plus ambient noise level condition.

<Table 7, next page>

Table 7: Daytime Operational Noise Levels (dBA Leq)

Receptor[1]	Existing Ambient Noise Level (dBA)[2]	Project Noise Level (dBA)[3]	Total Combined Noise Level (dBA)	Daytime (7 a.m. to 10 p.m.) Non Transp. Noise Limit (dBA, Leq)	Change in Noise Level as Result of Project
R1	59	43	59	**60**	0
R2	58	47	58	**60**	0
R3	59	37	59	**60**	0
R4	58	34	58	**60**	0
R5	58	40	58	**60**	0

Notes:
1. Receptors 1 through 4 are commercial uses, Receptor 5 is nonconforming residential.
2. See Appendix A for noise measurement field sheet.
3. See Exhibit F for the operational noise level projections at said receptors.

As shown in Table 7, daytime operational noise levels are expected to be 34 to 47 dBA Leq at adjacent commercial receptors and will meet the City's 60 dBA daytime noise limit (see Table 2). The operational noise level at the nonconforming residential receptor is expected to be 40 dBA Leq and meets the City's 50 dBA daytime noise limit for residential uses. Existing plus project noise level projections are anticipated to be 58 to 59 dBA Leq at the surrounding receptors. Project-generated operational noise is not expected to increase the existing ambient noise level at the nearby receptors. Thus, the impact is less than significant.

Nighttime Operational Noise Levels

Worst-case "project only" nighttime exterior operational noise is presented in Exhibit G. Receptors 1 through 4 represent commercial uses, and receptor 5 represents a nonconforming residential use. The nighttime operational noise model assumes that the HVAC equipment is running simultaneously and continuously throughout the hour.

Table 8 compares the nighttime project noise levels to the County's noise standard.

<Table 8, next page>

Table 8: Nighttime Operational Noise Levels (dBA Leq)

Receptor[1]	Project Noise Level (dBA Leq)[3]	Nighttime (10 p.m. to 7 a.m.) Non Transp. Noise Limit (dBA, Leq)	Meets Standard (Yes/No)
R1	30	**60**	Yes
R2	32	**60**	Yes
R3	29	**60**	Yes
R4	30	**60**	Yes
R5	30	**60**	Yes

Notes:
[1.] Receptors 1 through 4 are commercial uses, Receptor 5 is nonconforming residential.
[3.] See Exhibit G for the nighttime operational noise level projections at said receptors.

As shown in Table 8, nighttime exterior operational noise levels are expected to be between 29 and 32 dBA Leq, which will meet the City's 60 dBA nighttime noise limit (see Table 2). At the nonconforming residential receptor, operational noise is expected to be 30 dBA Leq, which adheres to the City's 45 dBA Leq nighttime noise limit for residential uses.

Nighttime measurements were not taken at the project site, thus, the nighttime project noise levels were not compared to the existing nighttime ambient noise conditions. However, nighttime operational noise levels are well below the nighttime commercial noise level limit, and the project is not anticipated to significantly increase the existing ambient noise levels.

The noise due to the project will not exceed the County's daytime and nighttime noise standards at the surrounding receptors, and the project is not anticipated to increase the existing ambient noise level. Thus, the impact is less than significant, and no mitigation is required.

Exhibit F

Daytime Operational Noise Levels

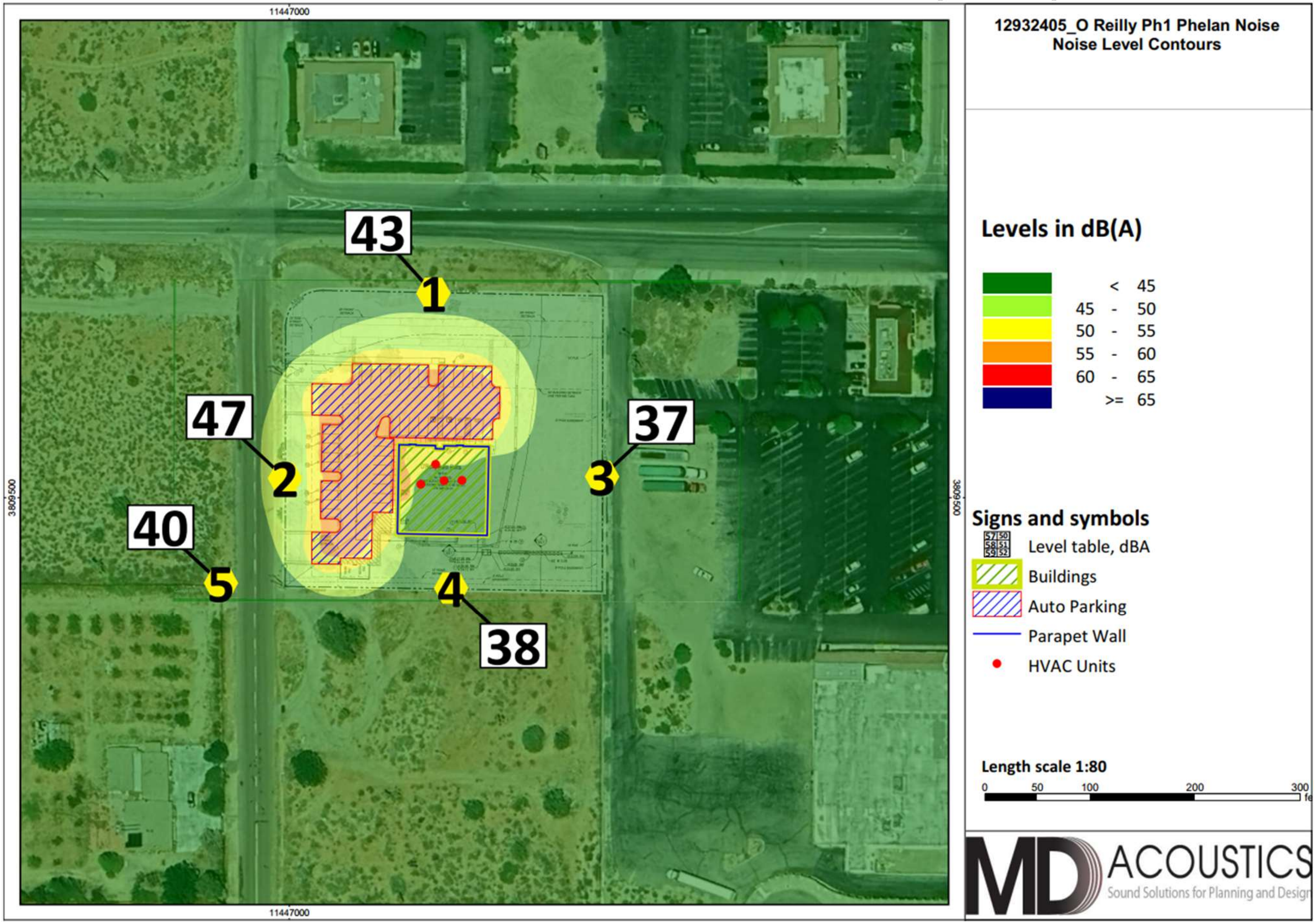
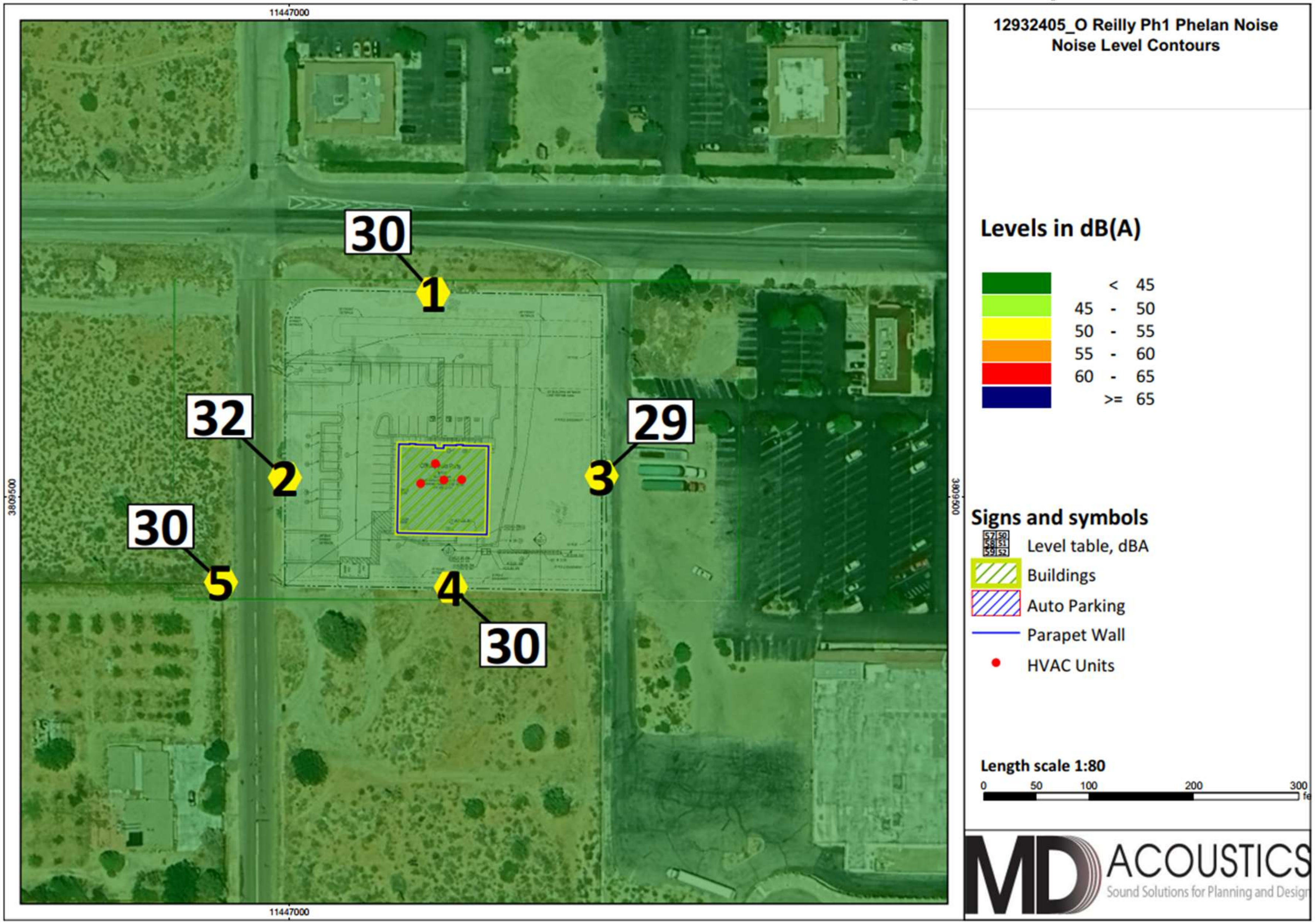


Exhibit G

Nighttime Operational Noise Levels



8.0 Construction Noise and Vibration Impacts

The degree of construction noise may vary for different areas of the project site and also vary depending on the construction activities. Project construction will occur in five phases, site preparation, grading, building construction, paving, and architectural coating. This section summarizes discusses noise and ground-borne vibration modeling efforts, impact analysis, and mitigation, if necessary.

8.1 Construction Noise

Typical construction equipment noise levels are presented in Table 9.

Table 9: Typical Construction Equipment Noise Levels[1]

EQUIPMENT POWERED BY INTERNAL COMBUSTION ENGINES

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

IMPACT EQUIPMENT

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

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

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

according to the County's Municipal Code. The County does not have a defined significance threshold for construction noise, however, NIOSH recommends a construction noise level threshold of 85 dBA Leq. MD has applied the NIOSH threshold for construction noise to analyze the noise impact due to construction activities.

Construction noise is considered a short-term impact and would be considered significant if construction activity does not follow the above requirements or if construction occurs outside the allowable times as described in the County's Municipal Code. Construction noise will have a temporary or periodic increase in the ambient noise level above the existing within the project vicinity. The construction noise impact is considered less than significant; however, construction noise level projections are provided.

The closest sensitive land use to the project is the residential use to the southwest of the site. The residential property is an average of 270 feet away from construction activities (distance from the center of the project site to the residential property line) and as close as 60 feet from construction activities (distance from the edge of the project site to the residential property line).

Construction equipment was taken from the project's CalEEMod. Typical operating cycles for these types of construction equipment may involve one or two minutes of full power operation followed by three to four minutes at lower power settings. Noise levels are in Table 10. A likely worst-case construction noise scenario assumes equipment operating as close as 60 feet and an average of 270 feet from the property line of the nearest sensitive receptor, the residence to the southwest. The Lmax levels represent maximum levels when construction occurs adjacent to the residential receptors. Leq levels represent the average construction noise level during each phase. The construction noise calculation output worksheet is located in Appendix C.

Table 10: Construction Noise Level by Phase (dBA, Leq)

Activity	Noise Levels at Nearest Sensitive Receptor	
	Leq	Lmax
Site Preparation	64	83
Grading	65	83
Building Construction	64	82
Paving	63	82
Architectural Coating	55	76
Notes: Construction Modeling Worksheets are provided in Appendix C.		

As shown in Table 10, project construction noise is expected to range between 55 to 65 dBA Leq and 76 to 83 dBA Lmax at the nearest sensitive receptor. Thus, construction noise levels will be well below the NIOSH 85 dBA Leq threshold for construction noise. The project will be required to adhere to the allowed times for construction outlined in the Municipal Code in Section 83.01.080(g)(3). The impact is less than significant, and no mitigation is required.

8.2 Construction Vibration

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

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

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

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

The thresholds from the Caltrans Transportation and Construction Induced Vibration Guidance Manual in Table 11 (below) provides general thresholds and guidelines as to the vibration damage potential from vibratory impacts.

Table 11: Guideline Vibration Damage Potential Threshold Criteria

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

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

Table 12 gives approximate vibration levels for particular construction activities. This data provides a reasonable estimate for a wide range of soil conditions.

Table 12: Vibration Source Levels for Construction Equipment

Equipment	Peak Particle Velocity (inches/second) at 25 feet	Approximate Vibration Level LV (dVB) at 25 feet
Pile driver (impact)	1.518 (upper range)	112
	0.644 (typical)	104
Pile driver (sonic)	0.734 upper range	105
	0.170 typical	93
Clam shovel drop (slurry wall)	0.202	94
Hydromill	0.008 in soil	66
(slurry wall)	0.017 in rock	75
Vibratory Roller	0.21	94
Hoe Ram	0.089	87
Large bulldozer	0.089	87
Caisson drill	0.089	87
Loaded trucks	0.076	86
Jackhammer	0.035	79
Small bulldozer	0.003	58
Source: Transit Noise and Vibration Impact Assessment, Federal Transit Administration, May 2018.		

The nearest residential building facade is 60 feet southwest of the Project site. At this distance, a vibratory roller would yield a worst-case 0.080 PPV (in/sec) which may be perceptible but will not result in architectural damage. The impact is not significant and no mitigation is required. The ground-borne vibration worksheet is provided in Appendix E.

9.0 References

County of San Bernardino
2020 General Policy Plan
2024 Municipal Code

California Department of Transportation (Caltrans)
2013 Transportation and Construction Induced Vibration Guidance Manual.
2018 Technical Noise Supplement to the Traffic Noise Analysis Protocol. Sept.

Federal Highway Administration (FHWA)
2010 Highway Traffic Noise Analysis and Abatement Policy and Guidance.
https://www.fhwa.dot.gov/environMent/noise/regulations_and_guidance/polguide/polguide02.cfm

Federal Transit Administration (FTA)
2018 Transit Noise and Vibration Impact Assessment Manual

Governor's Office of Planning and Research
State of California General Plan Guidelines, 1998

SoundPLAN International, LLC
2020 SoundPLAN Essential 5.1 Manual.

Appendix A:
Field Measurement Data

15-Minute Continuous Noise Measurement Datasheet

Project Name:	O\'Reilly Noise	**Site Observations:**	
Project: #/Name:	1293-2024-005	89F Winds from West 3-5 MPH in gusts, clear skies sunshine. The primary noise source is traffic on the main road.	
Site Address/Location:	3919 Phelan Rd		
Date:	06/05/2024		
Field Tech/Engineer:	Jason Schuyler / Rachel Edelman		

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

MD ACOUSTICS

15-Minute Continuous Noise Measurement Datasheet - Cont.

Project Name: O\'Reilly Noise

Site Address/Location: 3919 Phelan Rd

Site Id: NM1, NM2

Figure 1: NM1

Figure 2: NM2

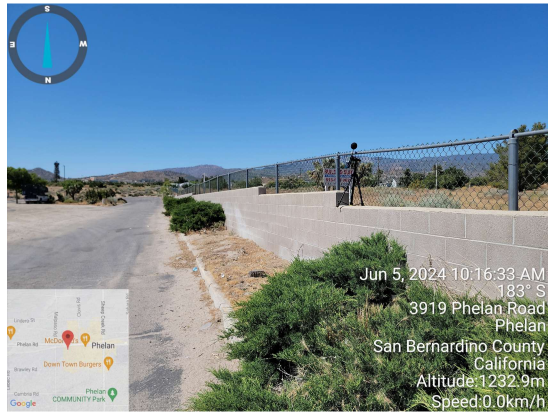


Figure 3: NM2

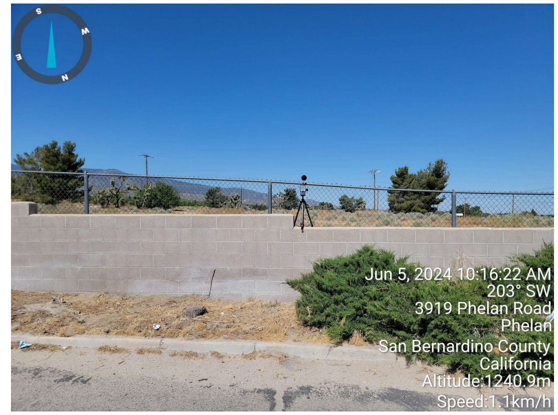
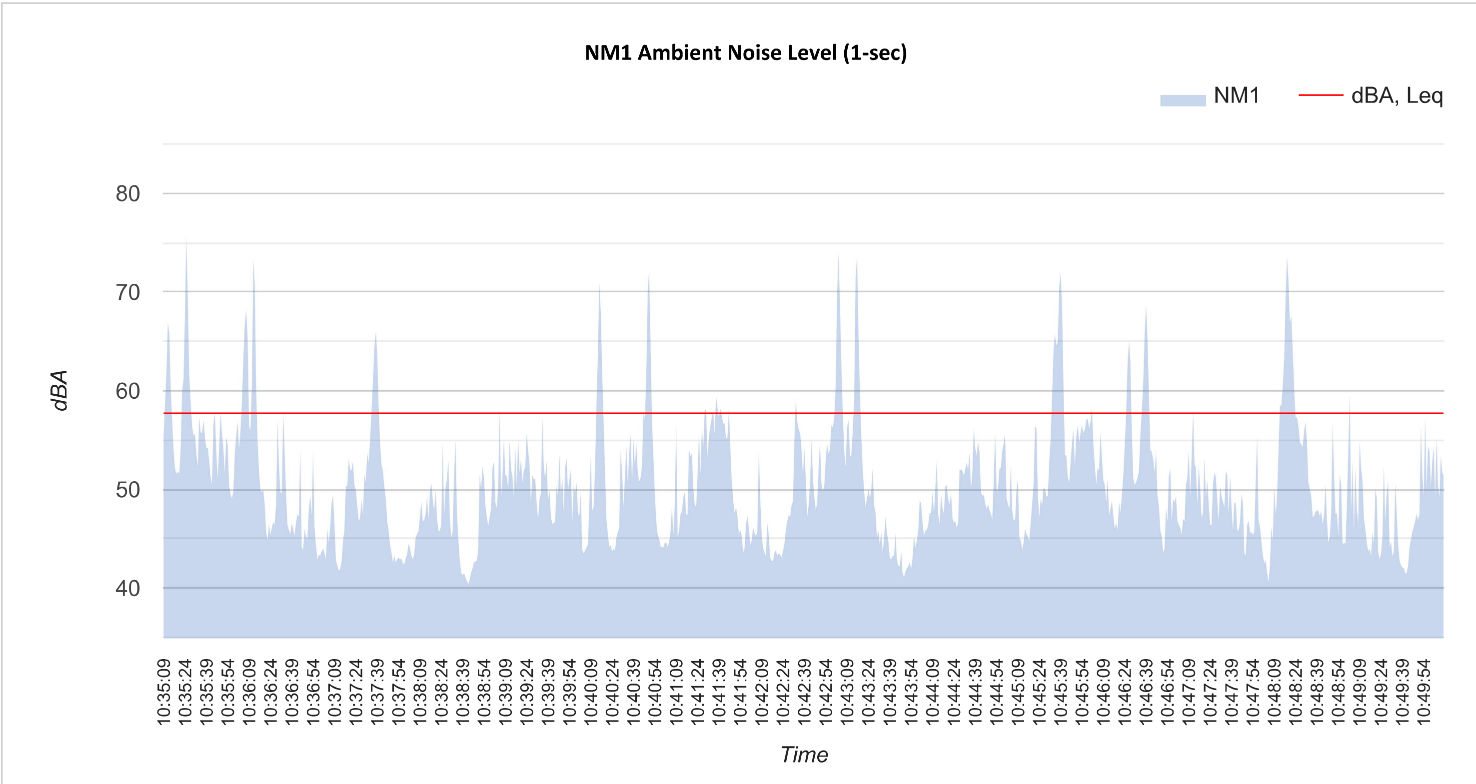


Table 1: Baseline Noise Measurement Summary

Location	Start	Stop	Leq	Lmax	Lmin	L2	L8	L25	L50	L90
NM1	10:35 AM	10:50 AM	57.7	74.0	40.6	68.6	58.5	53.8	49.6	43.7
NM2	10:15 AM	10:30 AM	58.5	73.1	46.6	66.3	62.4	58.6	55.6	50.6

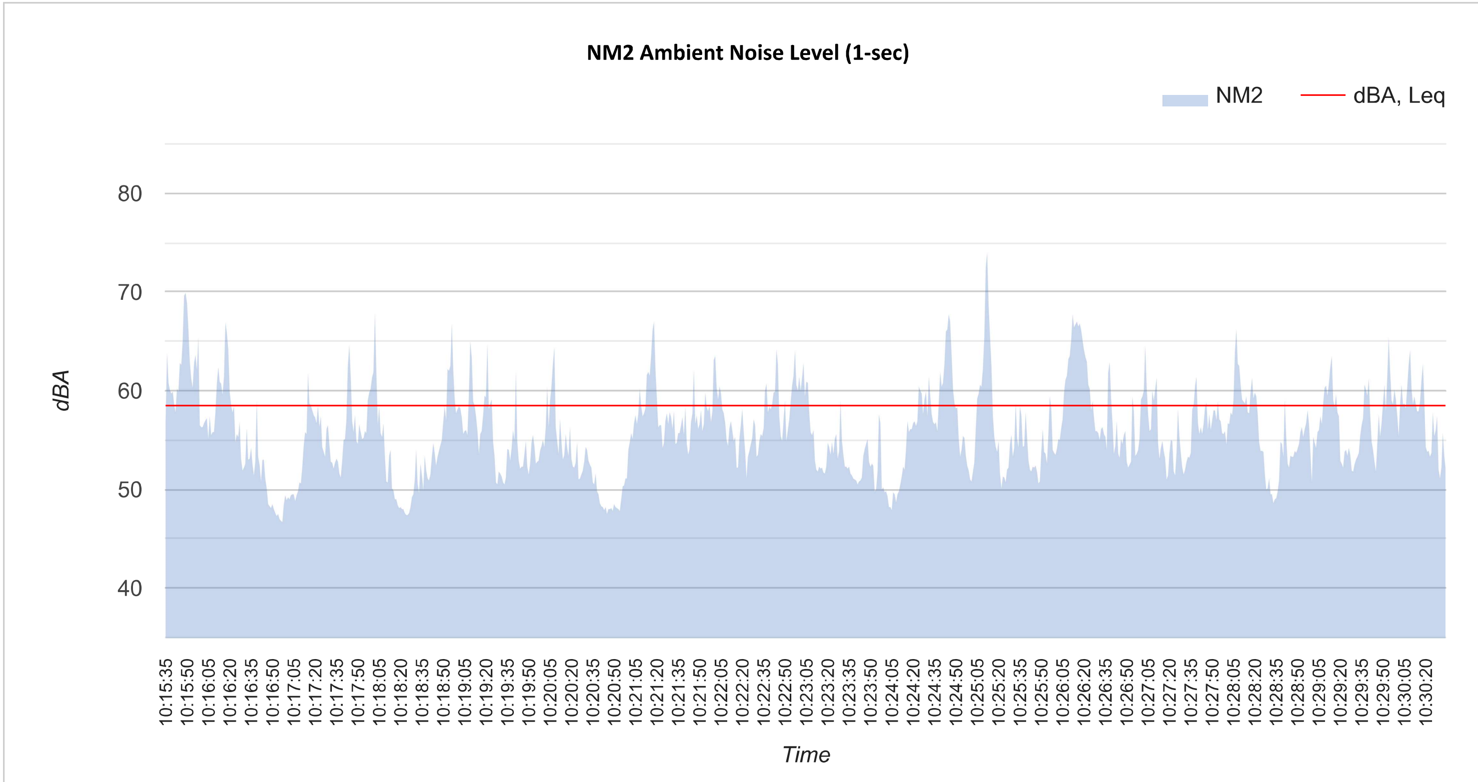
15-Minute Continuous Noise Measurement Datasheet - Cont.

Project Name:	O\'Reilly Noise	**Site Topo:**	Hillside with downslope to road	**Noise Source(s) w/ Distance:**
Site Address/Location:	3919 Phelan Rd	**Meteorological Cond.:**	89F winds 1-3MPH	Road Noise
Site Id:	NM1	**Ground Type:**	loose powdery dirt with piles of rock	

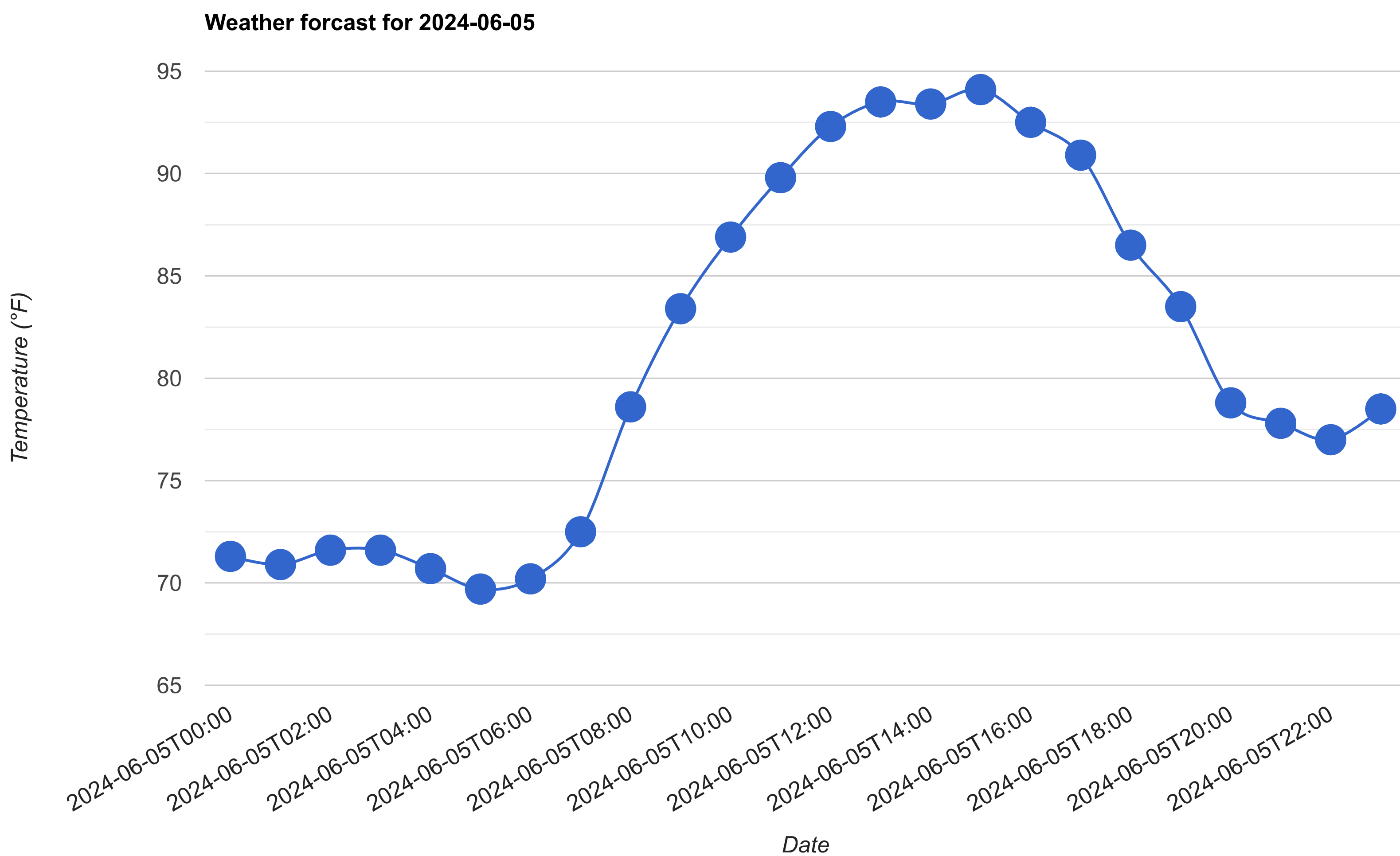


15-Minute Continuous Noise Measurement Datasheet - Cont.

Project Name:	O\'Reilly Noise	**Site Topo:**	Hillside with downslope to road	**Noise Source(s) w/ Distance:**
Site Address/Location:	3919 Phelan Rd	**Meteorological Cond.:**	89F winds 1-3MPH	Road Noise
Site Id:	NM2	**Ground Type:**	loose powdery dirt with piles of rock	



MD ACOUSTICS


Weather forcast for 2024-06-05
Temperature (°F)
95
90
85
80
75
70
65
2024-06-05T00:00
2024-06-05T02:00
2024-06-05T04:00
2024-06-05T06:00
2024-06-05T08:00
2024-06-05T10:00
2024-06-05T12:00
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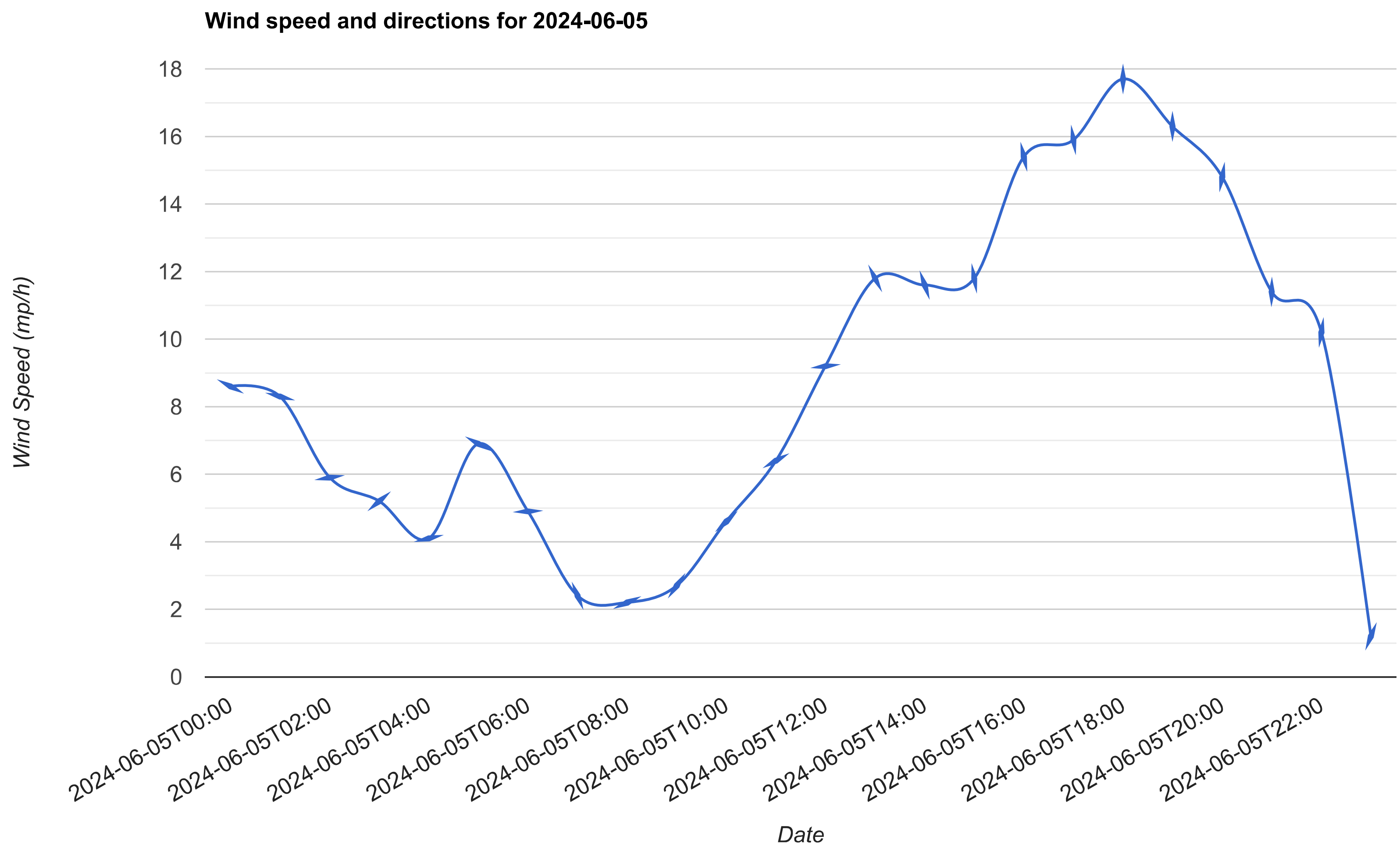
2024-06-05T22:00
Date



Source: Global Forecast System (GFS) weather forcast model

Appendix B:

SoundPLAN Noise Modeling Data

O Reilly Ph1 Phelan Noise
Contribution spectra - 001 - O Reilly Ph1 Phelan: Outdoor SP

Time slice	Sum	25Hz	31.5Hz	40Hz	50Hz	63Hz	80Hz	100Hz	125Hz	160Hz	200Hz	250Hz	315Hz	400Hz	500Hz	630Hz	800Hz	1kHz	1.25kHz	1.6kHz	2kHz	2.5kHz	3.15kHz	4kHz	5kHz	6.3kHz	8kHz	10kHz	12.5kHz	16kHz	20kHz
	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
Receiver R1 Fl G Lr,lim dB(A) Leq,d 42.9 dB(A)																															
Leq,d	42.7					25.6			36.0			27.8			33.4			36.1			37.0			33.5			24.2			3.3	
Leq,d	22.6	-22.7	-16.9	-13.1	-0.3	4.5	-1.7	6.4	8.1	6.8	8.1	7.8	9.3	9.9	10.4	13.8	15.1	10.4	11.7	12.1	9.1	9.0	4.7	4.3	0.4	-2.1	-10.3	-19.5	-27.0	-37.9	-51.5
Leq,d	23.1	-22.7	-16.8	-13.0	-0.2	4.6	-1.6	6.7	8.4	7.1	8.3	8.1	9.7	10.3	10.8	14.2	15.6	10.9	12.2	12.6	9.7	9.6	5.4	4.9	1.1	-1.3	-9.5	-18.7	-26.1	-37.1	-51.1
Leq,d	23.3	-23.4	-17.4	-13.5	-0.6	4.3	-1.8	6.5	8.3	7.0	8.4	8.2	9.8	10.4	11.0	14.5	15.9	11.2	12.5	13.0	10.1	10.0	5.8	5.3	1.5	-0.9	-9.0	-18.2	-25.6	-36.5	-50.8
Leq,d	25.3	-22.6	-16.6	-12.6	0.3	5.2	-0.8	7.6	9.5	8.3	9.7	9.5	11.3	12.0	12.7	16.3	17.8	13.3	14.7	15.3	12.5	12.6	8.5	8.2	4.5	2.3	-5.6	-14.5	-21.4	-31.8	-45.6
Receiver R2 Fl G Lr,lim dB(A) Leq,d 47.2 dB(A)																															
Leq,d	47.0					32.6			42.2			32.1			37.5			39.6			40.2			36.9			28.6			10.4	
Leq,d	27.6	-20.5	-14.5	-10.6	2.4	7.3	1.3	9.7	11.6	10.4	11.8	11.7	13.4	14.2	14.9	18.5	20.2	15.7	17.1	17.7	15.0	15.2	11.1	11.0	7.5	5.6	-1.9	-10.1	-16.2	-25.5	-37.8
Leq,d	23.3	-22.3	-16.4	-12.6	0.2	5.0	-1.2	7.1	8.8	7.5	8.7	8.4	10.0	10.5	11.1	14.4	15.8	11.1	12.3	12.7	9.7	9.7	5.4	5.0	1.2	-1.1	-9.1	-18.1	-25.2	-35.5	-48.5
Leq,d	24.9	-21.3	-15.4	-11.6	1.3	6.1	-0.1	8.2	10.0	8.7	9.9	9.7	11.3	11.9	12.5	16.0	17.4	12.7	14.0	14.5	11.6	11.6	7.4	7.0	3.4	1.2	-6.6	-15.3	-22.0	-32.0	-45.0
Leq,d	25.8	-20.4	-14.6	-10.8	2.0	6.8	0.6	9.0	10.7	9.5	10.6	10.4	12.1	12.7	13.3	16.8	18.3	13.7	15.0	15.5	12.6	12.7	8.6	8.3	4.6	2.5	-5.1	-13.7	-20.2	-29.9	-42.8
Receiver R3 Fl G Lr,lim dB(A) Leq,d 37.5 dB(A)																															
Leq,d	36.8					21.6			30.7			21.1			27.0			30.2			30.8			26.9			16.5			-7.6	
Leq,d	20.9	-22.4	-16.7	-13.0	-0.3	4.4	-2.0	6.0	7.6	6.1	7.2	6.7	8.1	8.5	8.8	12.0	13.2	8.3	9.4	9.7	6.6	6.5	2.1	1.6	-2.2	-4.6	-12.1	-20.2	-26.6	-36.3	-49.5
Leq,d	25.2	-21.0	-15.0	-11.1	1.8	6.7	0.5	9.0	10.7	9.4	10.6	10.3	11.9	12.4	13.0	16.4	17.7	13.0	14.3	14.7	11.7	11.7	7.5	7.2	3.6	1.6	-6.0	-14.4	-20.7	-29.9	-41.4
Leq,d	23.0	-21.5	-15.6	-11.8	0.9	5.7	-0.6	7.6	9.3	7.8	8.9	8.5	10.0	10.4	10.8	14.1	15.4	10.5	11.7	12.0	9.0	8.9	4.6	4.2	0.5	-1.7	-9.5	-17.9	-23.7	-32.7	-45.0
Leq,d	22.2	-21.5	-15.7	-12.0	0.7	5.4	-0.9	7.2	8.8	7.3	8.3	7.8	9.2	9.6	10.0	13.2	14.5	9.6	10.8	11.1	8.0	7.9	3.6	3.2	-0.6	-2.9	-10.8	-18.8	-24.8	-34.1	-46.7
Receiver R4 Fl G Lr,lim dB(A) Leq,d 37.8 dB(A)																															
Leq,d	36.9					22.6			31.5			22.1			27.4			30.0			30.5			26.9			17.7			-3.5	
Leq,d	24.7	-18.3	-12.5	-8.8	3.8	8.5	2.1	10.3	11.8	10.3	11.1	10.5	11.8	12.1	12.4	15.6	16.8	11.9	13.0	13.2	10.2	10.1	5.9	5.6	2.2	1.1	-5.2	-12.1	-16.6	-24.1	-34.4
Leq,d	24.4	-18.1	-12.4	-8.7	3.9	8.5	2.0	10.3	11.7	10.1	10.9	10.3	11.6	11.9	12.1	15.3	16.5	11.5	12.6	12.8	9.8	9.8	5.5	5.3	2.0	1.1	-5.2	-12.1	-16.7	-24.1	-34.4
Leq,d	24.5	-18.2	-12.5	-8.8	3.9	8.4	2.0	10.3	11.7	10.2	10.9	10.3	11.6	11.9	12.2	15.3	16.5	11.6	12.7	12.9	9.9	9.8	5.6	5.3	2.0	1.2	-5.1	-12.0	-16.6	-24.0	-34.2
Leq,d	22.8	-19.5	-13.8	-10.2	2.5	7.0	0.6	8.8	10.2	8.6	9.3	8.7	10.0	10.3	10.5	13.6	14.8	9.9	10.9	11.2	8.1	8.0	3.8	3.4	0.5	-0.5	-7.0	-14.1	-19.1	-27.0	-38.0
Receiver R5 Fl G Lr,lim dB(A) Leq,d 39.7 dB(A)																															
Leq,d	39.2					22.2			32.0			23.7			29.6			33.0			33.7			29.7			19.3			-4.4	
Leq,d	25.6	-24.7	-18.6	-14.7	-1.7	3.3	-2.7	5.6	7.5	6.4	8.1	8.2	10.1	11.1	12.0	15.9	17.8	13.6	15.4	16.5	14.1	14.7	11.0	11.0	7.6	5.5	-2.5	-11.7	-19.5	-31.1	-46.5
Leq,d	23.1	-26.1	-20.1	-16.1	-3.1	1.8	-4.2	4.1	6.0	4.9	6.5	6.5	8.4	9.3	10.1	13.9	15.6	11.3	12.9	13.7	11.1	11.4	7.3	6.9	3.0	0.3	-8.5	-18.7	-27.6	-40.7	-57.8
Leq,d	24.0	-25.5	-19.5	-15.5	-2.5	2.4	-3.6	4.7	6.6	5.5	7.2	7.2	9.1	10.0	10.9	14.7	16.4	12.2	13.9	14.8	12.3	12.6	8.7	8.4	4.7	2.2	-6.3	-16.2	-24.7	-37.2	-53.6
Leq,d	24.3	-25.5	-19.5	-15.5	-2.5	2.4	-3.6	4.8	6.7	5.6	7.3	7.3	9.2	10.1	11.0	14.9	16.7	12.4	14.2	15.2	12.7	13.1	9.2	9.1	5.4	3.0	-5.4	-15.2	-23.7	-36.1	-52.5

O Reilly Ph1 Phelan Noise
Contribution level - 001 - O Reilly Ph1 Phelan: Outdoor SP

Source group	Source ty	Tr. lane	Leq,d dB(A)	A dB
Receiver R1 FI G Lr,lim dB(A) Leq,d 42.9 dB(A)				
Default parking lot noise	PLot		42.7	0.0
Default industrial noise	Point		25.3	0.0
Default industrial noise	Point		23.3	0.0
Default industrial noise	Point		23.1	0.0
Default industrial noise	Point		22.6	0.0
Receiver R2 FI G Lr,lim dB(A) Leq,d 47.2 dB(A)				
Default parking lot noise	PLot		47.0	0.0
Default industrial noise	Point		25.8	0.0
Default industrial noise	Point		24.9	0.0
Default industrial noise	Point		23.3	0.0
Default industrial noise	Point		27.6	0.0
Receiver R3 FI G Lr,lim dB(A) Leq,d 37.5 dB(A)				
Default parking lot noise	PLot		36.8	0.0
Default industrial noise	Point		22.2	0.0
Default industrial noise	Point		23.0	0.0
Default industrial noise	Point		25.2	0.0
Default industrial noise	Point		20.9	0.0
Receiver R4 FI G Lr,lim dB(A) Leq,d 37.8 dB(A)				
Default parking lot noise	PLot		36.9	0.0
Default industrial noise	Point		22.8	0.0
Default industrial noise	Point		24.5	0.0
Default industrial noise	Point		24.4	0.0
Default industrial noise	Point		24.7	0.0
Receiver R5 FI G Lr,lim dB(A) Leq,d 39.7 dB(A)				
Default parking lot noise	PLot		39.2	0.0
Default industrial noise	Point		24.3	0.0
Default industrial noise	Point		24.0	0.0
Default industrial noise	Point		23.1	0.0
Default industrial noise	Point		25.6	0.0

O Reilly Ph1 Phelan Noise
Octave spectra of the sources in dB(A) - 001 - O Reilly Ph1 Phelan: Outdoor SP

Name	Source type	I or A m,m²	Li dB(A)	Rw dB	L'w dB(A)	Lw dB(A)	KI dB	KT dB	LwMax dB(A)	DO-Wall dB	Day histogram	Emission spectrum	63Hz dB(A)	125Hz dB(A)	250Hz dB(A)	500Hz dB(A)	1kHz dB(A)	2kHz dB(A)	4kHz dB(A)	8kHz dB(A)	16kHz dB(A)
Auto Parking	PLot	1634.71			54.0	86.1	0.0	0.0		0	100%/24h	Typical spectrum	69.5	81.1	73.6	78.1	78.2	78.6	75.9	69.7	56.9
HVAC	Point				78.0	78.0	0.0	0.0		0	100%/24h	HVAC: 67.7dB @ 3ft - Carrier 50TFQ0006 -	55.1	63.6	66.0	70.3	72.6	72.2	69.2	64.3	52.0
HVAC	Point				78.0	78.0	0.0	0.0		0	100%/24h	HVAC: 67.7dB @ 3ft - Carrier 50TFQ0006 -	55.1	63.6	66.0	70.3	72.6	72.2	69.2	64.3	52.0
HVAC	Point				78.0	78.0	0.0	0.0		0	100%/24h	HVAC: 67.7dB @ 3ft - Carrier 50TFQ0006 -	55.1	63.6	66.0	70.3	72.6	72.2	69.2	64.3	52.0
HVAC	Point				78.0	78.0	0.0	0.0		0	100%/24h	HVAC: 67.7dB @ 3ft - Carrier 50TFQ0006 -	55.1	63.6	66.0	70.3	72.6	72.2	69.2	64.3	52.0

Appendix C:

Construction Noise Modeling Output

Receptor - Residence to the Southwest

Construction Phase Equipment Item	# of Items	Item Lmax at 50 feet, dBA[1]	Edge of Site to Receptor, feet	Center of Site to Receptor, feet	Item Usage Percent[1]	Ground Factor[2]	Usage Factor	Receptor Item Lmax, dBA	Recptor. Item Leq, dBA
SITE PREP									
Tractor	1	84	60	270	40	0.66	0.40	81.9	60.5
Grader	1	85	60	270	40	0.66	0.40	82.9	61.5
							Log Sum	82.9	64.1
GRADE									
Tractor	1	84	60	270	40	0.66	0.40	81.9	60.5
Grader	1	85	60	270	40	0.66	0.40	82.9	61.5
Dozer	1	82	60	270	40	0.66	0.40	79.9	58.5
								82.9	65.1
BUILD									
Crane	1	81	60	270	16	0.66	0.16	78.9	53.6
Man lift	2	75	60	270	20	0.66	0.20	72.9	48.5
Tractor	2	84	60	270	40	0.66	0.40	81.9	60.5
								81.9	64.2
PAVE									
Paver	1	77	60	270	50	0.66	0.50	74.9	54.5
Concrete Mixer Truck	4	79	60	270	40	0.66	0.40	76.9	55.5
Roller	1	80	60	270	20	0.66	0.20	77.9	53.5
Tractor	1	84	60	270	40	0.66	0.40	81.9	60.5
								81.9	62.9
ARCH COAT									
Compressor (air)	1	78	60	270	40	0.66	0.40	75.9	54.5
								75.9	54.5

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

Appendix D:

Construction Vibration Modeling Output

VIBRATION LEVEL IMPACT

Project:	O'Reilly Auto Center	Date: 6/11/24
Source:	Vibratory Roller	
Scenario:	Unmitigated	
Location:	Adjacent residences	
Address:	3919 Phelan Rd	

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

DATA INPUT

Equipment = Type	1	Vibratory Roller	INPUT SECTION IN BLUE
PPVref =	0.21	Reference PPV (in/sec) at 25 ft.	
D =	60.00	Distance from Equipment to Receiver (ft)	
n =	1.10	Vibration attenuation rate through the ground	

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

DATA OUT RESULTS

PPV =	**0.080**	IN/SEC	OUTPUT IN RED