APPENDIX I

NOISE IMPACT STUDY

913 California Street
Noise Impact Study
City of Redlands, CA

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MD ACOUSTICS
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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 with the applicable noise criterion as outlined within the City of Redlands 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 project site is located near the southwest corner of California Street and I-10 Redlands Freeway in the City of Redlands, CA. Additionally, it is located out of the San Bernardino International Airport (SBIA) noise contours (according to Figures 4-6 of the Eastgate Air Cargo Facility Final Environmental Assessment published by the SBIAA on July 2, 2019) and also is out of the Redlands Municipal Airport noise contours (according to Figure 7-7 from the City's General Plan). See Exhibit A for the location.

Existing land uses surrounding the Project site include:

- North: Southern California Regional Rail Authority (SCAX) railroad;
- East: Commercial land uses across Redlands Blvd;
- South: Multi-family residential across drainage canal; and
- West: Single-family residential land uses across drainage canal.

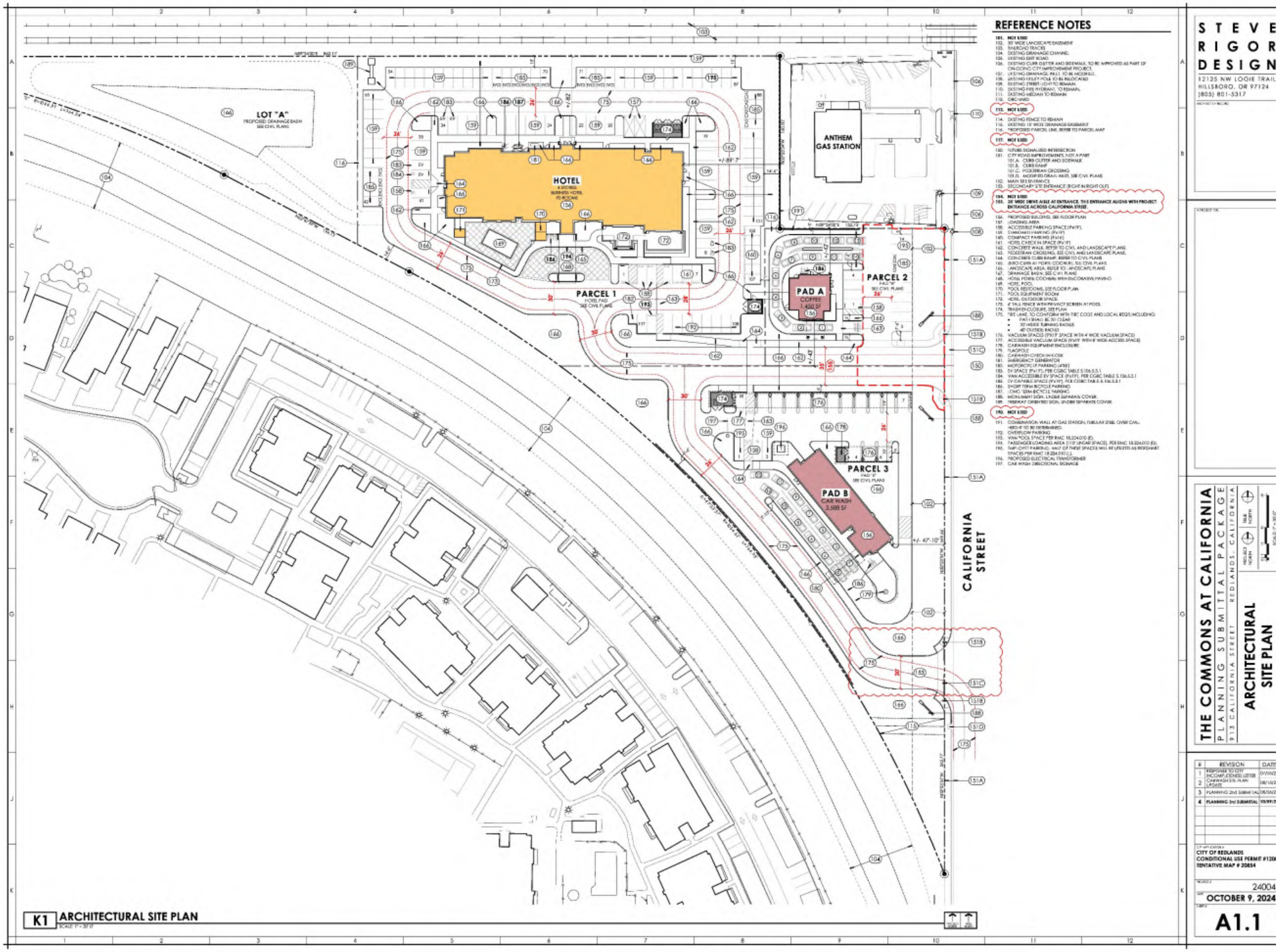
1.3 Proposed Project Description

The proposed project consists of a commercial center including a hotel, a coffee shop restaurant, and an express car wash. The proposed project will provide a hotel building with 90 rooms, 56,515 SF and 119 parking spaces. Also, a coffee shop restaurant with 1,450 SF, and 14 parking spaces. Finally, 3,588 SF of car wash with 22 parking spaces. Primary access to the project site will be from California Street. Exhibit B provides the Site Plan.

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.

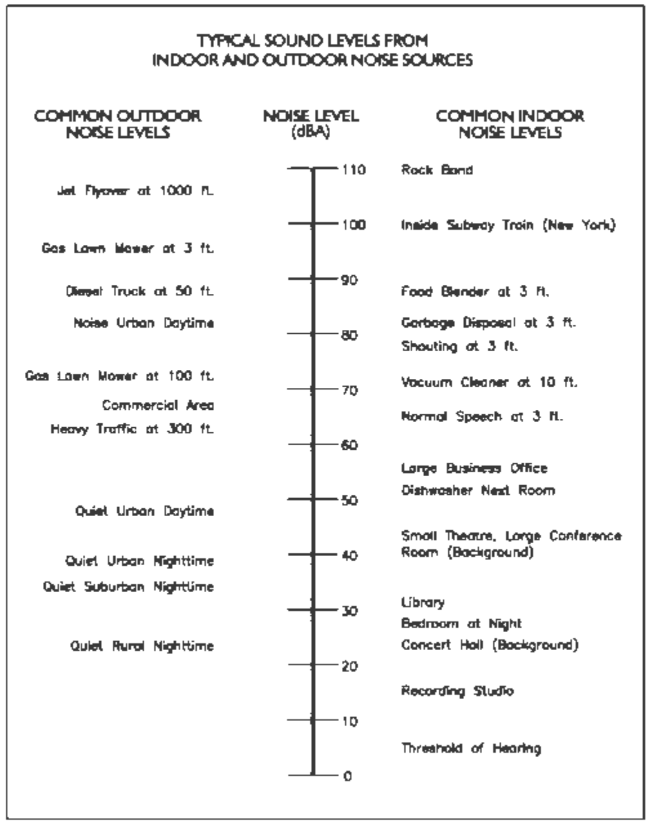
2.1 Sound, Noise, and Acoustics

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 at 20 Hz to the high pitch of 20,000 Hz.

Exhibit C: Typical A-Weighted Noise Levels



2.3 Sound Pressure Levels and Decibels

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

2.4 Addition of Decibels

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

2.5 Sensitive Receptors

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

2.6 Human Response to Changes in Noise Levels

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

Table 1: Decibel Changes and Loudness

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

2.7 Noise Descriptors

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

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

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

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

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

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

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

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

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

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

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

Percent Noise Levels: See L(n).

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

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

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

2.8 Traffic Noise Prediction

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

2.9 Sound Propagation

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

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

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

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

4.0 Regulatory Setting

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

4.1 Federal Regulations

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

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

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

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

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

4.2 State Regulations

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

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

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

Exhibit D: Land Use Compatibility Guidelines

TABLE 7-10: NOISE/LAND USE COMPATIBILITY MATRIX AND INTERPRETATION (MEASURE U TABLE 9.1)

Land Use Categories		Community Noise Equivalent Level (CNEL)						
Categories	**Uses**	< 60	60–65	65–70	70–75	75–80	80–85	85 >
RESIDENTIAL	Single Family, Duplex Multiple Family	A	C	C	C	D	D	D
RESIDENTIAL	Mobile Homes	A	C	C	C	D	D	D
COMMERCIAL Regional, District	Hotel, Motel, Transient Lodging	A	A	B	B	C	C	D
COMMERCIAL Regional, Village District, Special	Commercial Retail, Bank, Restaurant, Movie Theater, Mixed Uses with residential units	A	A	A	A	B	B	D
COMMERCIAL INDUSTRIAL INSTITUTIONAL	Office Building, Research & Dev., Professional Offices, City Office Building	A	A	A	B	B	C	D
COMMERCIAL Recreation INSTITUTIONAL Civic Center	Amphitheater, Concert Hall, Auditorium, Meeting Hall	B	B	C	C	D	D	D
COMMERCIAL Recreation	Childrens Amusement Park, Miniature Golf Course, Go-cart Track, Equestrian Center, Sports Club	A	A	A	A	B	B	B
COMMERCIAL General, Special INDUSTRIAL, INSTITUTIONAL	Automobile Service Station, Auto Dealership, Manufacturing, Warehousing, Wholesale, Utilities	A	A	A	A	B	B	B
INSTITUTIONAL General	Hospital, Church, Library, Schools Classroom	A	A	B	C	C	D	D
OPEN SPACE	Parks	A	A	A	B	C	D	D
OPEN SPACE	Golf Course, Cemeteries, Nature Centers, Wildlife Reserves, Wildlife Habitat	A	A	A	A	B	C	C
AGRICULTURE	Agriculture	A	A	A	A	A	A	A

Zone A CLEARLY COMPATIBLE	Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction without any special noise insulation requirements.
ZONE B NORMALLY COMPATIBLE	New construction or development should be undertaken only after detailed analysis of the noise reduction requirements are made and needed noise insulation features in the design are determined. Conventional construction, with closed windows and fresh air supply systems or air conditioning, will normally suffice.
ZONE C NORMALLY INCOMPATIBLE	New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of noise reduction requirements must be made and needed noise insulation features included in the design.
ZONE D CLEARLY INCOMPATIBLE	New construction or development should generally not be undertaken.

Source: Mestre Greve Associates; Guidelines for the Preparation and Content of the Noise Element of the General Plan, prepared by the California Department of Health Services in coordination with The Governor's Office of Planning and Research. Adapted to the City of Redlands' standards.

Source: 2035 General Plan

4.3 City of Redlands Noise Regulations

The City of Redlands outlines its noise regulations and standards within the Municipal Code and the City of Redlands General Plan.

City of Redlands General Plan

Applicable policies and standards governing environmental noise in the City are set forth in the General Plan Noise Element. Table 7-11 of the Redlands Noise Element outlines the interior and exterior noise standards for community noise environments. According to Table 7-11, noise limits for commercial land uses are 45 dBA CNEL interior and 65 dBA CNEL exterior for the hotel and 55 dBA CNEL interior for the restaurant and commercial uses. It should be noted that if exterior levels exceed this limit, the architectural design should be such that interior noise levels are not greater than 45 dBA. The project will be compared to these noise limits.

In addition to the noise standards, the City has outlined goals, policies and implementation measures to reduce potential noise impacts and are presented below:

Goals, Policies, and Implementation Measures

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

9.0e: Use the criteria specified in GP Table 9.1 [Table 7-10] to assess the compatibility of proposed land uses with the projected noise environment, and apply the noise standards in GP Table 9.2 [Table 7-11], which prescribe interior and exterior noise standards in relation to specific land uses. Do not approve projects that would not comply with the standards in GP Table 9.2 [Table 7-1].

These tables are the primary tools which allow the City to ensure noise-integrated planning for compatibility between land uses and outdoor noise.

9.0f: Require a noise impact evaluation based on noise measurements at the site for all projects in Noise Referral Zones (B, C, or D) as shown on GP Table 9.1 [Table 7-10] and on GP Figure 9.1 [Figure 7-9] or as determined from tables in the Appendix, as part of the project review process. Should measurements indicate that unacceptable noise levels will be created or experienced, require mitigation measures based on a detailed technical study prepared by a qualified acoustical engineer (i.e., a Registered Professional Engineer in the State of California with a minimum of three years experience in acoustics).

9.0h: Require construction of barriers to mitigate sound emissions where necessary or where feasible, and encourage use of walls and berms to protect residential or other noise sensitive land uses that are adjacent to major roads, commercial, or industrial areas.

9.0k: Ensure the effective enforcement of City, State and federal noise levels by all appropriate City departments.

9.0s: Require mitigation to ensure that indoor noise levels for residential living spaces not exceed 45 dB LDN/CNEL due to the combined effect of all exterior noise sources.

The Uniform Building Code (specifically, the California Administrative Code, Title 24, Part 6, Division T25, Chapter 1, Subchapter 1, Article 4, Sections T25 28) requires that "Interior community noise levels (CNEL/LDN) with windows closed, attributable to exterior sources shall not exceed an annual CNEL or LDN of 45 dB in any habitable room." The code requires that this standard be applied to all new hotels, motels, apartment houses and dwellings other than detached single family dwellings.

Policy 9-s sets the maximum acceptable interior noise level at 45 CNEL. The Noise Referral Zones (65 CNEL) delineate areas within which tests to ensure compliance are to be required for new structures.

9.0t: Require proposed commercial projects near existing residential land use to demonstrate compliance with the Community Noise Ordinance prior to approval of the project.

9.0v: Consider the following impacts as possibly "significant":

- An increase in exposure of four or more dB if the resulting noise level would exceed that described as clearly compatible for the affected land use, as established in GP Table 9.1 [Table 7-10] and GP Table 9.2 [Table 7-11];
- Any increase of six dB or more, due to the potential for adverse community response.

9.0w: Limit hours for all construction or demolition work where site-related noise is audible beyond the site boundary.

9.0x: Work with Caltrans to establish sound walls along freeways where appropriate.

9.0y: Minimize impacts of loud trucks by requiring that maximum noise levels due to single events be controlled to 50 dB in bedrooms and 55 dB in other habitable spaces.

City of Redlands – Noise Ordinance

Chapter 8.06 of the noise ordinance outlines the City's community noise control and establishes the exterior noise limits for stationary noise sources.

Section 8.06.070.A. The noise standards for the categories of land uses identified in table 1 of this section shall, unless otherwise specifically indicated, apply to all such property within a designated zone.

Table 2: Table 1 Section 8.06.070

Maximum Permissible Sound Levels By Receiving Land Uses		
Receiving Lan Use Category	**Time Period**	**Noise**
Single-family residential districts	10:00 P.M. – 7:00 A.M.	50
	7:00 A.M. – 10:00 P.M.	60
Multi-family residential districts; public space; institutional	10:00 P.M. – 7:00 A.M.	50
	7:00 A.M. – 10:00 P.M.	60
Commercial	10:00 P.M. – 7:00 A.M.	60
	7:00 A.M. – 10:00 P.M.	65
Industrial	Any time	75

Section 8.06.070.B. No person shall operate, or cause to be operated, any source of sound at any location within the city or allow the creation of any noise on property owned, leased, occupied or otherwise controlled by such person which causes the noise level when measured on any other property to exceed:

1. The noise standard for that land use specified in table 1 of this section for a cumulative period of more than thirty (30) minutes in any hour; or
2. The noise standard specified in table 1 of this section plus five (5) dB for a cumulative period of more than fifteen (15) minutes in any hour; or
3. The noise standard specified in table 1 of this section plus ten (10) dB for a cumulative period of more than five (5) minutes in any hour; or
4. The noise standard specified in table 1 of this section plus fifteen (15) dB for a cumulative period of more than one minute in any hour; or
5. The noise standard specified in table 1 of this section plus twenty (20) dB or the maximum measured ambient level, for any period of time.

Section 8.06.070.C. If the measured ambient level exceeds the allowable noise exposure standard within any of the first four (4) noise limit categories above, the allowable noise exposure standard shall be adjusted in five (5) dB increments in each category as appropriate to encompass or reflect said ambient noise level. In the event the ambient noise level exceeds the fifth noise limit category, the maximum allowable noise level under this category shall be increased to reflect the maximum ambient noise level.

Section 8.06.090 The following acts, and the causing or permitting thereof, are declared to be in violation of this chapter

Section 8.06.090.F. Construction And/Or Demolition: Operating or causing the operation of any tools or equipment used in construction, drilling, repair, alteration or demolition work between weekday hours of six o'clock (6:00) P.M. and seven o'clock (7:00) A.M., including Saturdays, or at any time on Sundays or holidays, such that the sound therefrom creates a noise disturbance across a residential or commercial real property line, except for emergency work by public service utilities, the city or another governmental entity. All mobile or stationary internal combustion engine powered equipment or machinery shall be equipped with exhaust and air intake silencers in proper working order, or suitable to meet the standards set forth herein.

Section 8.06.090.G. Vibration: Operating or permitting the operation of any device that creates a vibration which is above the vibration perception threshold of an individual at or beyond the property boundary of the source if on private property or at one hundred fifty feet (150') from the source if on a public space or public right of way.

Vibration Threshold Guidelines (Caltrans)

Table 3 below shows the vibration damage thresholds summarized in the Transportation and Construction Vibration Guidance Manual by Caltrans.

Table 3: 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.

5.0 Study Method and Procedure

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

5.1 Noise Measurement Procedure and Criteria

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

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

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

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

5.2 Construction Vibration Calculation

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 bulldozer. A large bulldozer has a vibration impact of 0.089 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)

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., dryer blowers, vacuum turbine, idling cars, parking movements, drive-thru and HVAC).

Noise associated with the on-site sources was modeled using SoundPLAN methodology, which takes into consideration the car wash equipment, overall trip generation, number of parking spaces and estimates the number of movements per hour per parking space. The car wash tunnel is approximately 130 feet long with a 10-foot tall by 16 foot wide entrance and exit opening. Also, the blowers (14 MacNeil blowers) were modeled at 10 to 12 feet high as point sources. The blowers will be located approximately 5 to 10 feet inside the exit of the tunnel. Additionally, the vacuum bays were modeled as point sources. The additional on-site sources were the car parking lots which were modeled as 0.3 movements per space per hour. Finally, the car lane for drive-thru was modeled as continuous line sources with idling cars. Modeling assumptions are summarized in Table 4. SoundPLAN noise modeling input and results are provided in Appendix B.

Table 4: SoundPLAN Modeling Assumptions

Noise Source	Source Type	Reference Sound Level (dBA, Leq)	Distance to Reference Source (ft)
Drive-Thru Speaker	Point Source	65	5
Idling Car	Point Source	67	5
HVAC	Point Source	67	3
14 MacNeil Dryers	Point Source, inside tunnel	97	5
Vacuum Bay	Point Source	71	2
Vacuum Turbine	Point Source, inside enclosure	43	3
Source: MD Acoustics. Aug 2020. See Appendix B for noise reference data.			

5.4 Traffic Noise Prediction Modeling

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

Project-generated vehicle traffic can potentially result in an increase in ambient noise levels. To determine the project's noise impact on the surrounding land uses, MD generated noise contours for existing ADT and existing plus project conditions. Table 5 indicates the roadway parameters and vehicle distribution utilized for the modeling. Noise contours are used to characterize sound levels experienced at a set distance from the centerline of a subject roadway. They are intended to represent a worst-case scenario and do not consider structures, sound walls, topography, and/or other sound-attenuating features that may further reduce the actual noise level. Noise contours are developed for comparative purposes and are used to demonstrate potential increases/decreases along subject roadways because of a project. The referenced traffic data and traffic noise calculation worksheet outputs are located in Appendix C. The following parameters are considered for traffic noise calculation:

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

Table 5: Roadway Parameters and Vehicle Distribution

Roadway	Existing ADT[1]	Existing + Project ADT[2]	Speed (MPH)	Site Conditions
California St	19,500	20,500	40	Hard
Redlands Blvd	21,300	21,700	40	Hard
Arterial Motor-Vehicle Type[3]	**Daytime % (7AM to 7 PM)**	**Evening % (7 PM to 10 PM)**	**Night % (10 PM to 7 AM)**	**Total % of Traffic Flow**
Automobiles	75.5	14.0	10.4	92.00
Medium Trucks	48.0	2.0	50.0	3.00
Heavy Trucks	48.0	2.0	50.0	5.00

Notes:
[1] 913 California Street Mixed-Use Center, Traffic Impact Analysis, Ganddini May 1, 2024
[2] Project trip generation provided in the traffic study prepared by Ganddini, May 1, 2024.
[3] Riverside County Required Traffic Noise Modeling Parameters, Office of Industrial Hygiene, November 22, 2000.

5.5 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 the CalEEMod Air Quality Model assumptions provided by a similar previous project. All equipment was assumed to be situated at the center of the project site. Construction worksheets are provided in Appendix D.

6.0 Existing Noise Environment

One (1) 24-hour noise measurement was conducted at the project site to document the existing noise environment. The measurements include the 1-hour Leq, Lmin, Lmax, and other statistical data (e.g. L2, L8). The results of the noise measurement are presented in Table 6. Noise measurement field sheets are provided in Appendix A.

Table 6: Long-Term Noise Measurement Data for (LT1) (dBA)[1]

Date	Time	1-Hour dB(A)							
		L_{EQ}	L_{MAX}	L_{MIN}	L_2	L_8	L_{25}	L_{50}	L_{90}
1/23/2024	12AM-1AM	57.2	73.1	51.0	62.4	59.2	57.3	55.9	53.8
1/23/2024	1AM-2AM	54.8	70.7	48.6	60.0	56.8	54.9	53.5	51.4
1/23/2024	2AM-3AM	53.5	69.4	47.3	58.7	55.5	53.6	52.2	50.1
1/23/2024	3AM-4AM	51.8	67.7	45.6	57.0	53.8	51.9	50.5	48.4
1/23/2024	4AM-5AM	52.8	68.7	46.6	58.0	54.8	52.9	51.5	49.4
1/23/2024	5AM-6AM	56.6	72.5	50.4	61.8	58.6	56.7	55.3	53.2
1/23/2024	6AM-7AM	63.0	78.9	56.8	68.2	65.0	63.1	61.7	59.6
1/23/2024	7AM-8AM	65.3	81.2	59.1	70.5	67.3	65.4	64.0	61.9
1/23/2024	8AM-9AM	63.4	79.3	57.2	68.6	65.4	63.5	62.1	60.0
1/23/2024	9AM-10AM	62.4	78.3	56.2	67.6	64.4	62.5	61.1	59.0
1/23/2024	10AM-11AM	62.3	78.2	56.1	67.5	64.3	62.4	61.0	58.9
1/23/2024	11AM-12PM	62.5	78.4	56.3	67.7	64.5	62.6	61.2	59.1
1/23/2024	12PM-1PM	62.6	78.5	56.4	67.8	64.6	62.7	61.3	59.2
1/23/2024	1PM-2PM	62.7	78.6	56.5	67.9	64.7	62.8	61.4	59.3
1/23/2024	2PM-3PM	62.9	78.8	56.7	68.1	64.9	63.0	61.6	59.5
1/23/2024	3PM-4PM	64.1	80.0	57.9	69.3	66.1	64.2	62.8	60.7
1/23/2024	4PM-5PM	65.6	81.5	59.4	70.8	67.6	65.7	64.3	62.2
1/23/2024	5PM-6PM	65.3	81.2	59.1	70.5	67.3	65.4	64.0	61.9
1/23/2024	6PM-7PM	63.5	79.4	57.3	68.7	65.5	63.6	62.2	60.1
1/23/2024	7PM-8PM	62.2	78.1	56.0	67.4	64.2	62.3	60.9	58.8
1/23/2024	8PM-9PM	61.1	77.0	54.9	66.3	63.1	61.2	59.8	57.7
1/23/2024	9PM-10PM	60.4	76.3	54.2	65.6	62.4	60.5	59.1	57.0
1/23/2024	10PM-11PM	59.4	75.3	53.2	64.6	61.4	59.5	58.1	56.0
1/23/2024	11PM-12AM	58.8	74.7	52.6	64.0	60.8	58.9	57.5	55.4
CNEL		66.0							

Notes:
[1] Long-term noise monitoring location (LT1) is 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 between 52 and 66 dBA Leq, with an average of 64 dBA for daytime hours and 58 dBA for nighttime. The overall CNEL was 66 dBA CNEL. The field data indicates that the freeway is the dominant noise source.

Exhibit E

Measurement Locations

X = Measurement location

7.0 Future Noise Environment Impacts and Mitigation

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

7.1 Off-Site Traffic Noise Impact

The potential off-site noise impacts caused by the increase in vehicular traffic as a result of the project were calculated at a distance of 50 feet from affected road segments. The noise levels at 50 feet both with and without project-generated vehicle traffic were compared and the increase was calculated. The distance to the 55, 60, 65, and 70 dBA CNEL noise contours are also provided for reference (Appendix C). Noise contours were calculated for the following scenarios and conditions:

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

As shown in Table 7, the addition of project-generated traffic to California Street, and Redlands Blvd would result in negligible increases in ambient noise levels and would not be significant.

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

Roadway	Segment	Modeled Noise Levels (dBA CNEL) at 50 feet from the Centerline			
		Existing without Project	Existing with Project	Change in Noise Level	Increase of 3 dB or more[2]
California St	North of Redlands	71.6	71.8	0.2	No
Redlands Blvd	East of California	75.7	75.7	0.0	No

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

7.2 On-Site Traffic Noise Impact

Exterior Noise

The Project location is currently within the normally acceptable range for the land use proposed. The most sensitive use and also closest to the major noise sources is the hotel building. As shown in Section 6 of this report the noise level at the site is expected to be 66 dBA CNEL. Since the hotel building is located closer to the railroad and freeway, the City's General Plan Figure 7-9 is used as a reference to set the ambient noise to 70 dBA CNEL at the hotel location.

The outdoor noise level at sensitive receivers within the hotel area (i.e., the pool area) is expected to be shielded from the highway and railroad noise by the architectural layout design of the hotel building (see Exhibit B with the updated site plan). The building provides acoustical shielding from the railroad and freeway and will obstruct the line of sight to both the patio and pool area. It is anticipated that the four (4) story hotel will provide a minimum of 10 dBA of insertion loss (conservatively) to the areas which would lower the exterior noise level from 70 dBA CNEL to approximately 60 dBA CNEL. MD has provided the calculations in Appendix C. Table 7-11 from the City's General Plan Noise Element defines the exterior noise limits for hotels, motels, and transient lodging at 65 dBA CNEL. Therefore, the noise limit in the hotel's outdoor noise-sensitive areas complies with the City's exterior noise level requirements and will have a less-than-significant impact.

Interior Noise

In order to achieve the City's 45 dBA interior noise requirement for the hotel use, the project will require a building shell design that achieves STC-30 or higher (70-45 = 25 + 5dBA for construction defects).

Prior to the occupancy for building permits the application shall conduct an exterior to interior noise analysis for the hotel that evaluates the building shell design to ensure compliance to the 45 dBA interior noise requirement.

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

The residential land use located southwest of the project site is a sensitive receptor that may be affected by project operational noise. Worst-case operational noise was modeled using SoundPLAN acoustical modeling software. Four (4) receptors were modeled. Receivers R1 and R2 represent multi-family sites across the canal, and receptors R3 represent the commercial area east of the project site. A receptor is denoted by a yellow dot. All yellow dots represent either an existing building, a property line, or a potential human use space such as an outdoor sensitive area (courtyard, patio, backyard, etc.). The results are in Table 8.

Project Operational Noise Levels

Worst-case "project only" exterior operational noise is presented on Exhibit F. Operational noise levels are expected to range between 46 and 56 dBA Leq. The residential receiver R1 reaches 52 dBA Leq.

Project Plus Ambient Operational Noise Levels

Existing plus project noise level projections are anticipated to reach up to 64 dBA Leq at the nearest residential receptor and up to 65 dBA Leq at the nonresidential receptors. The project-generated operational noise is expected to increase by a maximum of 1 dB at the adjacent nonresidential sites and 0 dB at the residential site. This does not exceed the noise ordinance; therefore, the impact is less than significant.

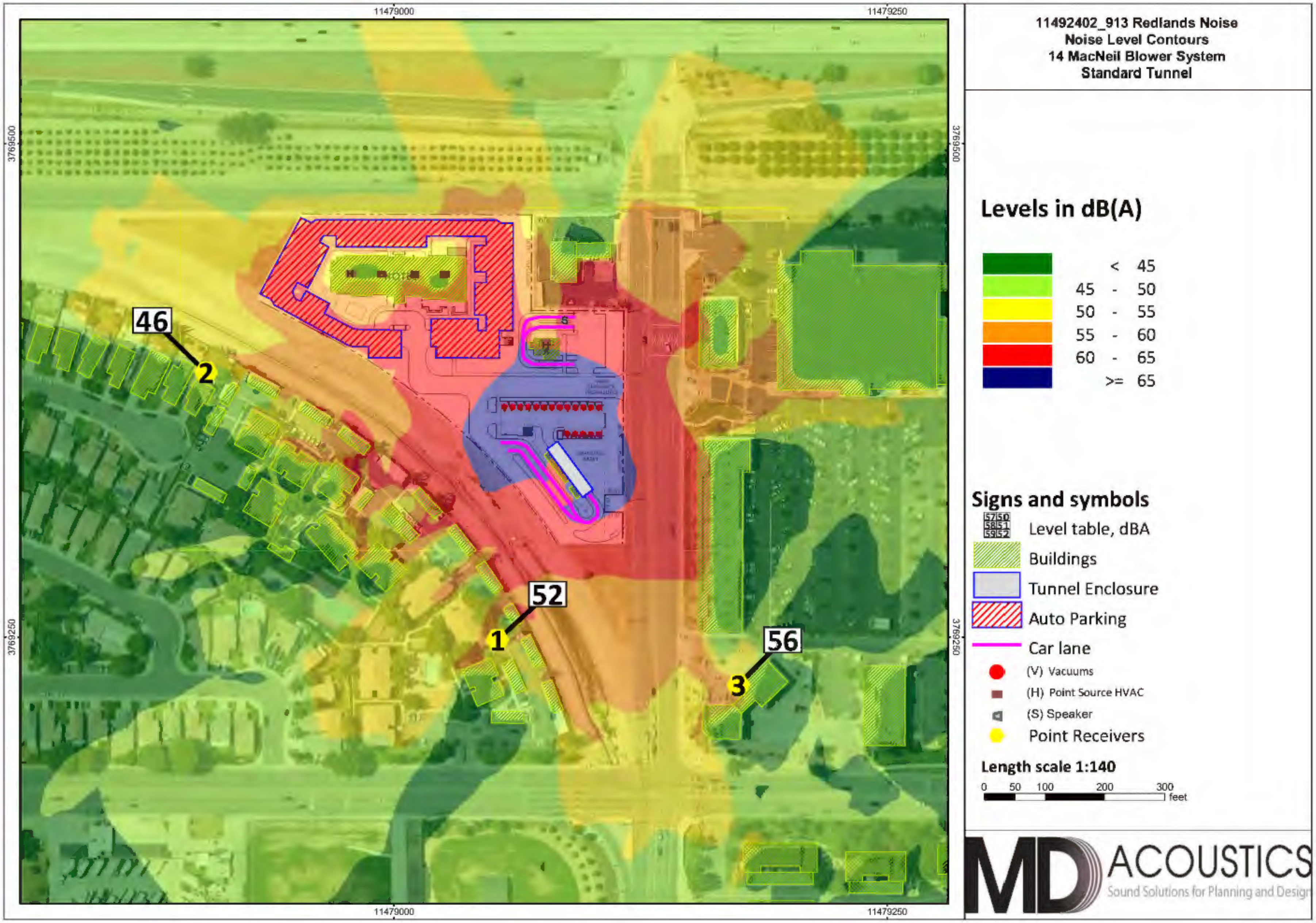
Table 8: Operational Noise Levels (dBA, CNEL)

Receptor[1]	Existing Ambient Noise Level (dBA, Leq)[2]	Project Noise Level (dBA, Leq)[3]	Total Combined Noise Level (dBA, Leq)	Land Use Noise Limit (dBA, Leq)[4]	Change in Noise Level as Result of Project
	Day	Day	Day	Day	Day
R1	64	52	64	**65**	0
R2		46	64		0
R3		56	65	**65**	1

Notes:

[1.] Receptors 1 and 2 are multi-family, and R3 is commercial.
[2.] LT1 Leq average daytime hours
[3.] See Exhibit F for the operational noise level projections at said receptors.
[4] Section 8.06.070.C If the ambient level exceeds the limit, the allowable standard shall be adjusted in five dB increments.

Exhibit F
Project Leq 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 four phases: site preparation, grading, building construction, and paving. This section summarizes and 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 (Ground)	80
Front Loaders	80
Backhoes	80
Tractors	84
Scrapers, Graders	85
Pavers	85
Trucks	84
Materials Handling	
Concrete Mixers	85
Concrete Pumps	82
Cranes	85
Stationary	
Pumps	77
Generators	82
Compressors	80

IMPACT EQUIPMENT

Type	Noise Levels (dBA) at 50 Feet
Concrete Saws	90
Vibratory Pile Driver	95

Notes:
[1] Referenced Noise Levels from the FHWA Construction Noise Handbook

Construction noise associated with each phase of the project was calculated at nearby sensitive receptors utilizing methodology presented in the Federal Highway Administration (FHWA) Construction Noise Model 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 equipment typically moves back and forth across the site, and it is an industry-standard to use the acoustical center of the site to model average construction noise levels.

Construction activities are anticipated to include four phases site preparation, grading, building construction, and architectural coating. Noise levels associated with each phase are shown in Table 10. The construction noise calculation output worksheet is located in Appendix D.

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

Activity	Noise Levels at Receivers	
	Southwestern Residences	East Commercial
Site Preparation	67	67
Grading	67	66
Building Construction	66	66
Paving	69	68
Arch Coating	57	56

Note:
Construction Modeling Worksheets are provided in Appendix D.

As shown in Table 10, project construction noise will range between 57 to 69 dBA Leq at the existing southwestern residential property, 56 to 68 dBA Leq at the eastern businesses façade.

The Project will be required to adhere to Section 8.06.120.G of the City of Redlands Municipal Code which outlines the allowed times for construction. Construction noise is exempt but shall be conducted during the allowed hour between 7:00 A.M and 6:00 PM on weekdays, including Saturdays, with no activities on Sundays or federal holidays. This impact is less than significant. No mitigation is required.

8.2 Construction Vibration

The thresholds from the Caltrans Transportation and Construction Induced Vibration Guidance Manual in Table 3 (Section 4.3) provide general thresholds and guidelines for the vibration damage potential from vibratory impacts.

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

<Table 11, next page>

Table 11: 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 existing building is 175 feet west of the project site. At this distance, a large bulldozer would yield a worst-case 0.010 PPV (in/sec) which would not be perceptible or result in architectural damage. The impact is not significant. No mitigation is required. The ground-borne vibration worksheet is provided in Appendix E.

9.0 CEQA Analysis

The California Environmental Quality Act Guidelines (Appendix D) establishes thresholds for noise impact analysis as presented below:

(a) Would the project result in the 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 Code, or applicable standards of other agencies?

Transportation Noise Impacts

Transportation noise impacts would be considered significant if the existing plus project levels are expected to increase by more than 3 dB. Compared to existing traffic noise levels, future traffic volumes are expected to increase 0.2 dBA CNEL at existing land uses. The impact is therefore less than significant.

Stationary Noise Sources

Stationary noise impacts would be considered significant if they result in exceedances of the Table 8.06.070 from the Municipal Code and General Plan (Table 7-11). Implementation of the proposed project may result in stationary noise related to speakerphones, cars, car wash equipment and mechanical equipment from the project site.

Operational noise levels are expected to reach 46 to 56 dBA Leq at the adjacent commercial and residential receptors. The project does not exceed the City's noise ordinance as project design features will abate the noise impact to below the City's noise limit as the various sensitive receptor locations. uses. Therefore, the impact would be less than significant.

Construction Noise and Vibration

Construction noise will be significant if construction activities occur outside of the permitted construction hours specified in Section 8.06.120.G of the City of Redlands Municipal Code which outlines the allowed times for construction. Construction noise is exempt but shall be conducted during the allowed hour between 7:00 A.M and 6:00 PM on weekdays, including Saturdays, with no activities on Sundays or federal holidays.

Noise due to construction will result in short-term noise impacts associated with construction activities.

The paving phase of on-site construction activities will generate the highest temporary noise levels. The loudest construction equipment on the site will be tractors, graders, scrapers, and dozers. Typical operating cycles for these types of construction equipment may involve 1 or 2 minutes of full power operation followed by 3 or 4 minutes at lower power settings. The maximum Leq level for the loudest phase of construction is expected to be 69 dBA Leq at the nearest existing adjacent commercial building.

b) Generate excessive ground-borne vibration or ground-borne noise levels?

Construction vibration will be significant if vibration exceeds levels that would result in structural damage to existing buildings. Construction activity is not anticipated to occur within 50 feet of sensitive receptors. At a distance of 175 feet, the nearest commercial building to the project property line, a large bulldozer would yield a worst-case 0.010 PPV (in/sec) which is below the threshold of any risk of damage. The project may result in temporary daytime residential annoyance. Construction activity is not expected to fall within the limits of structural damage, and therefore, the impact is less than significant.

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

The nearest airport to the project site is the San Bernardino International Airport. The Airport is approximately 2 miles to the north of the project. The project would be located outside the noise contours of San Bernardino International Airport. Therefore, no substantial noise exposure from airport noise would occur and it would have no impact.

10.0 References

City of Redlands, CA
2035 General Plan
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)
2006 Construction Noise Handbook

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

Ganddini
2024 913 California Street Mixed-Use Center Traffic Impact Analysis

SoundPLAN International, LLC
2019 SoundPLAN Essential 8.1 Manual.

Appendix A:

Field Measurement Data

MD ACOUSTICS
Sound Solutions for Planning and Design
www.mdacoustics.com

AZ Office
4960 S. Gilbert Rd, Ste 1-461
Chandler, AZ 85249

CA Office
1197 E Los Angeles Ave, C-256
Simi Valley, CA 93065

24-Hour Continuous Noise Measurement Datasheet

Project: 913 California St Redlands
Site Address/Location: I-10 & California St
Date: 1/25/2024
Field Tech/Engineer: Jason Schuyler / Francisco Irarrazabal;

Site Observations: Meter was located at the center of the site, about 115 feet from California St CL and approx. 650 from I-10 Hwy. The site is vacant and vegetation is observed. The railroad is about 350 feet from the meter location.

General Location: 115' from California St CL
Sound Meter: XL2, NTi **SN:** A2A-05967-EO
Settings: A-weighted, slow, 1-min, 24-hour duration
Meteorological Con.: Temps high 50's daytime, winds 0 to 3 mph, cloudy
Site ID: LT-1

Site Topo: Flat
Ground Type: Vacant lot with dirt and vegetation

Noise Source(s) w/ Distance:
1 - 115' from California St CL
1 - 650' from Hwy I-10 CL

Figure 1: LT Monitoring Locations

Figure 2: LT-1 Photo

MD ACOUSTICS
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AZ Office
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Chandler, AZ 85249

CA Office
1197 E Los Angeles Ave, C-256
Simi Valley, CA 93065

24-Hour Noise Measurement Datasheet - Cont.

Project: 913 California St Redlands **Day:** 1 of 1
Site Address/Location: I-10 & California St
Site ID: LT-1

Date	Start	Stop	Leq	Lmax	Lmin	L2	L8	L25	L50	L90
1/25/2024	12:00 AM	1:00 AM	57.2	73.1	51.0	62.4	59.2	57.3	55.9	53.8
1/25/2024	1:00 AM	2:00 AM	54.8	70.7	48.6	60.0	56.8	54.9	53.5	51.4
1/25/2024	2:00 AM	3:00 AM	53.5	69.4	47.3	58.7	55.5	53.6	52.2	50.1
1/25/2024	3:00 AM	4:00 AM	51.8	67.7	45.6	57.0	53.8	51.9	50.5	48.4
1/25/2024	4:00 AM	5:00 AM	52.8	68.7	46.6	58.0	54.8	52.9	51.5	49.4
1/25/2024	5:00 AM	6:00 AM	56.6	72.5	50.4	61.8	58.6	56.7	55.3	53.2
1/25/2024	6:00 AM	7:00 AM	63.0	78.9	56.8	68.2	65.0	63.1	61.7	59.6
1/25/2024	7:00 AM	8:00 AM	65.3	81.2	59.1	70.5	67.3	65.4	64.0	61.9
1/25/2024	8:00 AM	9:00 AM	63.4	79.3	57.2	68.6	65.4	63.5	62.1	60.0
1/25/2024	9:00 AM	10:00 AM	62.4	78.3	56.2	67.6	64.4	62.5	61.1	59.0
1/25/2024	10:00 AM	11:00 AM	62.3	78.2	56.1	67.5	64.3	62.4	61.0	58.9
1/25/2024	11:00 AM	12:00 PM	62.5	78.4	56.3	67.7	64.5	62.6	61.2	59.1
1/25/2024	12:00 PM	1:00 PM	62.6	78.5	56.4	67.8	64.6	62.7	61.3	59.2
1/25/2024	1:00 PM	2:00 PM	62.7	78.6	56.5	67.9	64.7	62.8	61.4	59.3
1/25/2024	2:00 PM	3:00 PM	62.9	78.8	56.7	68.1	64.9	63.0	61.6	59.5
1/25/2024	3:00 PM	4:00 PM	64.1	80.0	57.9	69.3	66.1	64.2	62.8	60.7
1/25/2024	4:00 PM	5:00 PM	65.6	81.5	59.4	70.8	67.6	65.7	64.3	62.2
1/25/2024	5:00 PM	6:00 PM	65.3	81.2	59.1	70.5	67.3	65.4	64.0	61.9
1/25/2024	6:00 PM	7:00 PM	63.5	79.4	57.3	68.7	65.5	63.6	62.2	60.1
1/25/2024	7:00 PM	8:00 PM	62.2	78.1	56.0	67.4	64.2	62.3	60.9	58.8
1/25/2024	8:00 PM	9:00 PM	61.1	77.0	54.9	66.3	63.1	61.2	59.8	57.7
1/25/2024	9:00 PM	10:00 PM	60.4	76.3	54.2	65.6	62.4	60.5	59.1	57.0
1/25/2024	10:00 PM	11:00 PM	59.4	75.3	53.2	64.6	61.4	59.5	58.1	56.0
1/25/2024	11:00 PM	12:00 AM	58.8	74.7	52.6	64.0	60.8	58.9	57.5	55.4

CNEL 66.0

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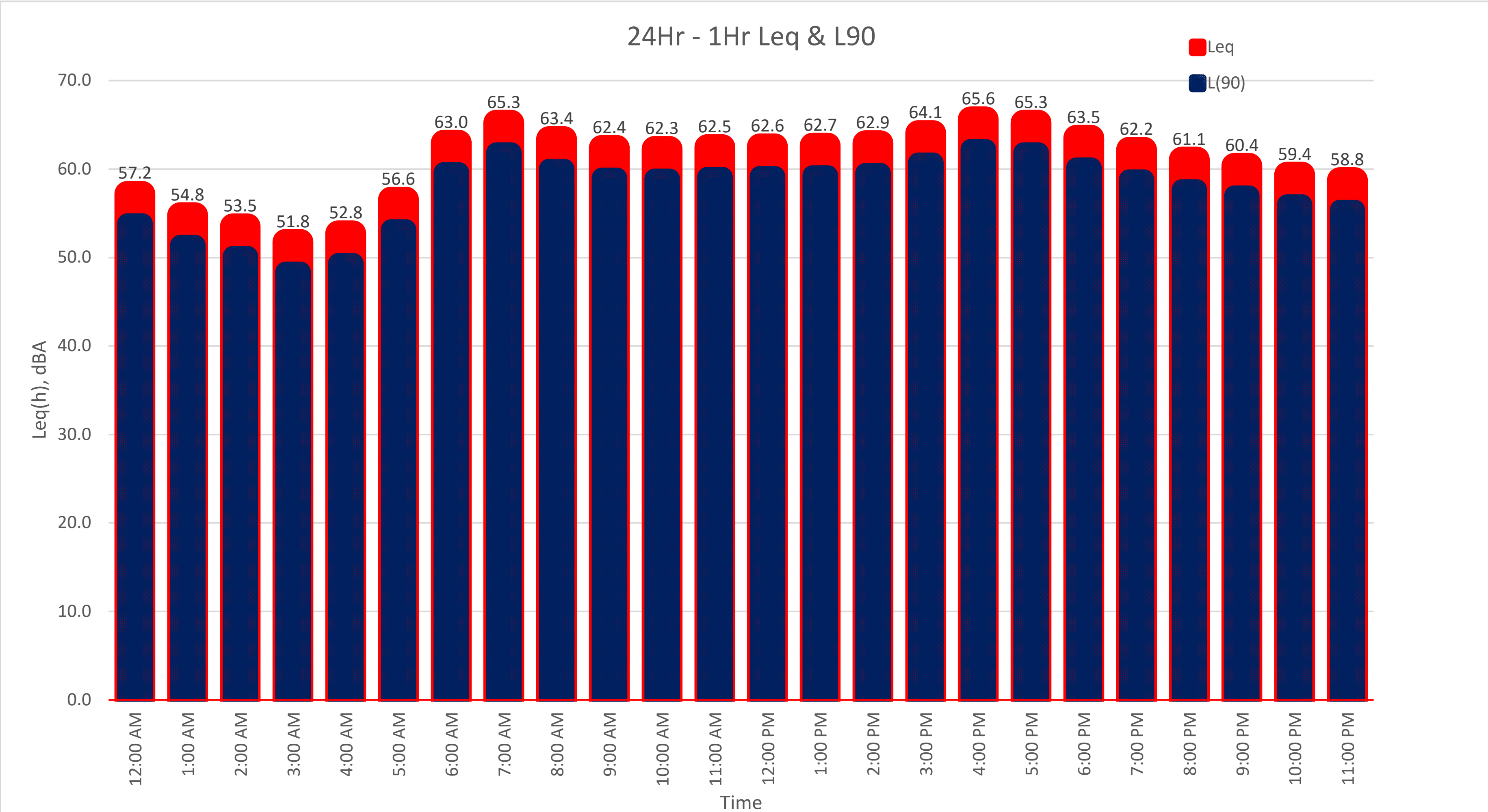
Simi Valley, CA 93065

24-Hour Continuous Noise Measurement Datasheet - Cont.

Project: 913 California St Redlands **Day:** 1 of 1
Site Address/Location: I-10 & California St
Site ID: LT-1



Appendix B:

SoundPLAN Noise Modeling Data

Project: Whataburger
Job Number: 0792-2021-01
Site Address/Location: 20151 S. Ellsworth Road
Date: 03/09/2021
Field Tech/Engineer: Robert Pearson
Source/System: Drive Thru Speaker Phone

General Location: 3-feet
Sound Meter: NTi **SN:** A2A-16164-E0
Settings: A-weighted, Slow, 1-sec, 10-sec duration
Meteorological Cond.: Clear Skies, 60 degrees

Site Observations:

3-feet from drive-thru speakerphone

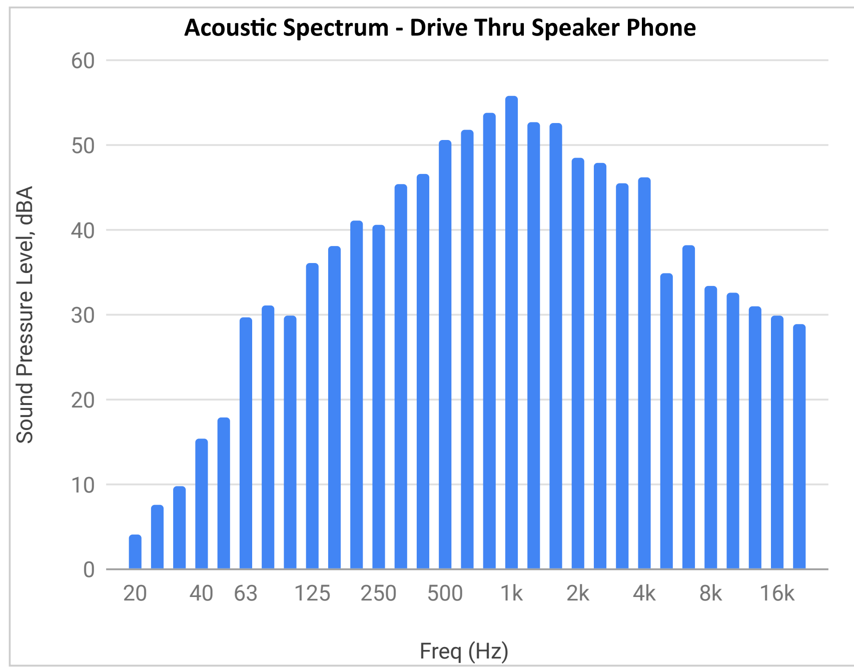
Leq	Lmin	Lmax
62.1	56.5	66.8

Ln 2	Ln 5	Ln 10	Ln 50	Ln 90	Ln 99
0.0	68.0	66.2	58.5	55.7	0.0

Table 1: Summary Measurement Data

Source/System	Overall Source	Overall	3rd Octave Band Data (dBA)																													
		dB(A)	20	25	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1k	12.5l	1.6k	2k	2.5k	3.15l	4k	5k	6.3k	8k	10k	12.5l	16k	20k
Drive Thru Speaker Phone	Drive Thru Spea	62.1	4.2	7.7	9.9	15.5	18.0	29.8	31.2	30.0	36.2	38.2	41.2	40.7	45.5	46.7	50.7	51.9	53.9	55.9	52.8	52.7	48.6	48.0	45.6	46.3	35.0	38.3	33.5	32.7	31.1	30.0	29.0

Figure 1:



Project: Sound Library
Job Number: 0000-2020-02
Site Address/Location: Gilbert, AZ
Date: 09/18/2018
Field Tech/Engineer: Robert Pearson
Source/System: Carrier 50TFQ0006 - 5 Ton

General Location: Measured @ 3'
Sound Meter: NTi XL2 **SN:** A2A-05967-E0
Settings: A-weighted, slow, 1-sec, 10-sec duration
Meteorological Cond.: 90 degrees, 0 mph wind

Site Observations:

Clear sky, measurements were performed at 3ft from source.

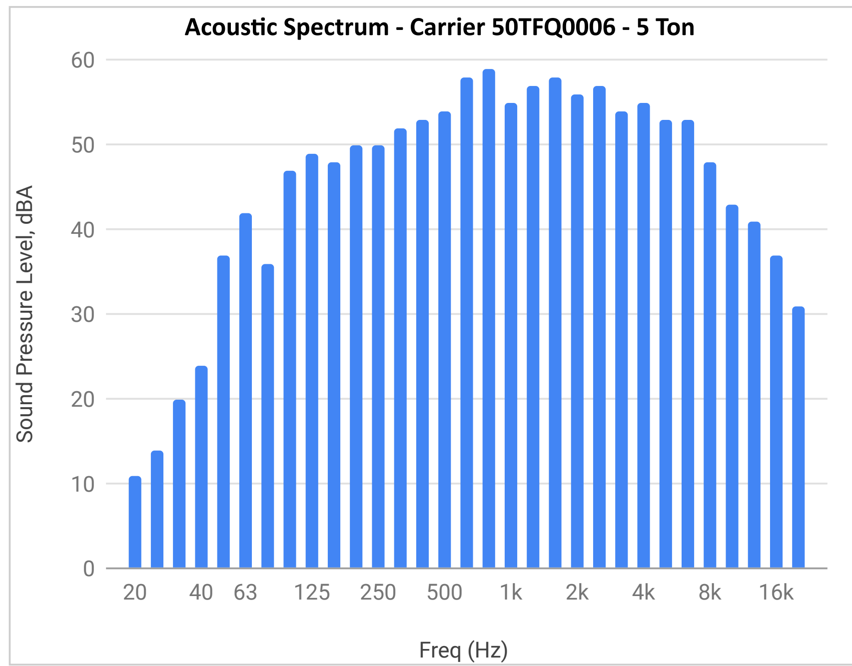
Leq	Lmin	Lmax
67.7	66.9	68.5

Ln 2	Ln 8	Ln 25	Ln 50	Ln 90	Ln 99
0.0	0.0	0.0	0.0	0.0	0.0

Table 1: Summary Measurement Data

Source/System	Overall Source	Overall	3rd Octave Band Data (dBA)																														
		dB(A)	20	25	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1k	12.5l	1.6k	2k	2.5k	3.15l	4k	5k	6.3k	8k	10k	12.5l	16k	20k
Carrier 50TFQ0006 - 5 Ton	HVAC	67.7	11.0	14.0	20.0	24.0	37.0	42.0	36.0	47.0	49.0	48.0	50.0	50.0	52.0	53.0	54.0	58.0	59.0	55.0	57.0	58.0	56.0	57.0	54.0	55.0	53.0	53.0	48.0	43.0	41.0	37.0	31.0

Figure 1: Commercial Air Conditioner - Carrier 50TFQ0006 - 5 Ton



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Simi Valley, CA 93065
p. (805) 426-4477

Project: Car idle Ref Level
Site Location: Gilbert, AZ
Date: 9/18/2018
Field Tech/Engineer: Robert Pearson
Source/System: Hyundai Sonata

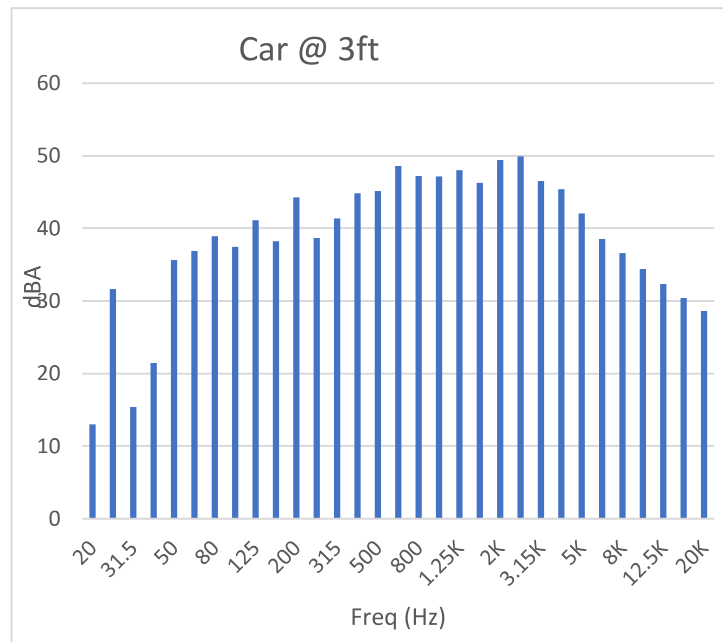
Site Observations:
Clear sky, measurements were performed at 3ft of source. Two measurments taken one in the front and one in the back and then Averaged out.

Location: Parking Lot
Sound Meter: NTi XL2 **SN:** A2A-05967-E0
Settings: A-weighted, slow, 1-sec, 10-sec duration
Meteorological Cond.: 90 degrees F, 0 mph wind

Table 1: Summary Measurement Data

Source	System	Overall dB(A)	3rd Octave Band Data (dBA)																													
			20	25	32	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1K	1.25K	1.6K	2K	2.5K	3.15K	4K	5K	6.3K	8K	10K	12.5K	16K	20K
Hyundai Sonata	Motor/Tailpipe	58.7	13	32	15	21	36	37	39	37	41	38	44	39	41	45	45	49	47	47	48	46	49	50	47	45	42	39	37	34	32	30	29

Figure 1: Example Measurement Position



Project:	SuperStar Valencia Rd Tucson	**Site Observations:**	
Job Number:	02222124	Meter 5.5' off ground a 5' from edge of blower	
Site Address/Location:	1511 W Valencia Rd		
Date:	12/16/2021		
Field Tech/Engineer:	Robert Pearson		
Source/System:	MacNeil Tech 21 - 15 Blowers		
General Location:	Measured @ 5'		
Sound Meter:	XL2 NTi	**SN:** A2A-16164-E0	
Settings:			
Meteorological Cond.:			

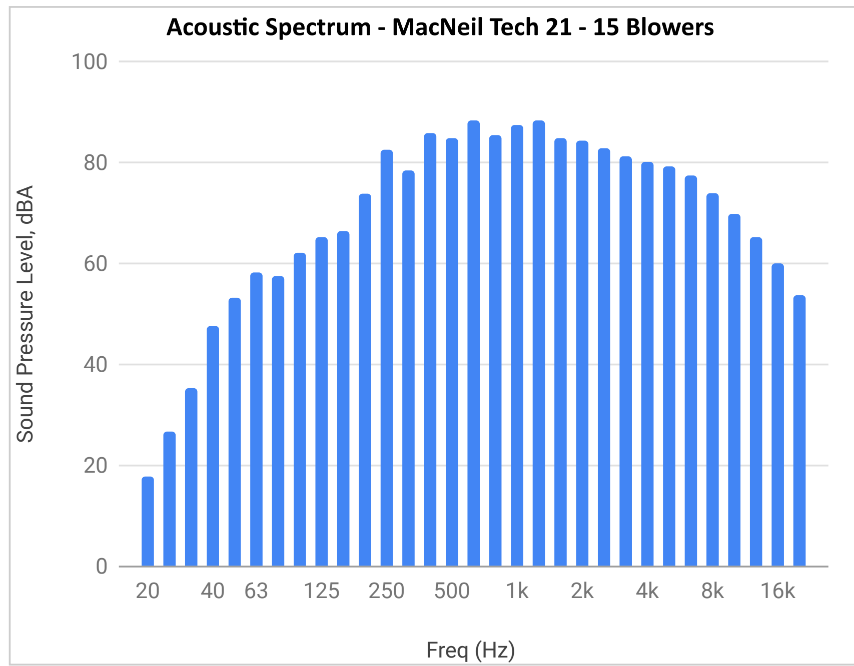
Leq	Lmin	Lmax
96.6	96.3	97.0

Ln 1	Ln 5	Ln 10	Ln 50	Ln 90	Ln 99
97.1	97.0	96.9	96.5	96.2	0.0

Table 1: Summary Measurement Data

Source/System	Overall Source	Overall dB(A)	3rd Octave Band Data (dBA)																													
			20	25	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1k	12.5l	1.6k	2k	2.5k	3.15l	4k	5k	6.3k	8k	10k	12.5l	16k	20k
MacNeil Tech 21 - 15 Blowers	Car Wash Blowe	96.6	18.0	26.9	35.5	47.8	53.4	58.4	57.7	62.3	65.4	66.6	74.0	82.7	78.6	86.0	85.0	88.5	85.6	87.6	88.5	85.0	84.5	83.0	81.4	80.3	79.4	77.6	74.1	70.0	65.4	60.2	53.9

Figure 1:



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Project: SuperStar Car Wash Chula Vista
Site Location: 1555 W Warner Rd, Gilbert, AZ 85233
Date: 4/5/2018
Field Tech/Engineer: Robert Pearson
Source/System: Vacutec System

Site Observations:
Clear sky, measurements were performed within 1.5ft of source. Measurements were performed while the vacuum was positiioned at three (3) different positions. Holstered, unholstered and inside a car. This data is utilized for acoustic modeling purposes and represents an average sound level at a vacuum station.

Location: Vac Bay 1
Sound Meter: NTi XL2 **SN:** A2A-05967-E0
Settings: A-weighted, slow, 1-sec, 10-sec duration
Meteorological Cond.: 80 degrees F, 2 mph wind

Table 1: Summary Measurement Data

Source	System	Overall dB(A)	3rd Octave Band Data (dBA)																														
			20	25	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1K	1.25K	1.6K	2K	2.5K	3.15K	4K	5K	6.3K	8K	10K	12.5K	16K	20K
Vacutech (Holstered)	**Vacuum**	**63.3**	9	17	22	29	31	35	40	41	44	43	46	48	47	49	51	51	51	52	53	52	52	50	52	53	50	47	47	48	45	39	30
Vacutech (Unholstered)	**Vacuum**	**80.7**	6	19	22	28	34	37	40	43	47	46	48	48	48	49	54	55	58	58	62	65	68	70	74	75	73	69	67	65	63	60	55
Vacutech (Inside Car)	**Vacuum**	**69.6**	16	28	31	38	42	45	49	51	52	55	60	61	57	55	59	53	55	56	54	57	57	57	57	57	55	54	51	48	46	42	36
Average Level*	**Vacuum**	**76.3**	13	24	28	34	38	41	45	47	49	51	56	57	53	52	56	54	56	56	59	61	64	66	69	70	68	64	62	60	58	55	50

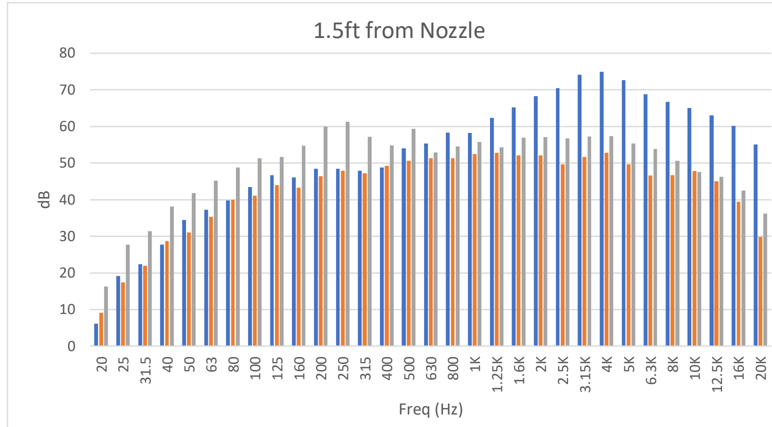
* Refers to the logarithmic average of all measurements. This measurement represents an average of the multiple vacuum positions.

Figure 1: Example Measurement Position

Figure 1: Holstered

Figure 2: Unholstered

Figure 3: Inside Car



SOUND LEVEL METER READINGS

MODEL: FT-DD-T340HP4 (40hp VACSTAR TURBINE VACUUM PRODUCER)

READING ONE: 43 DB-A, 3 FEET FROM TURBINE @ 45° ANGLE
AND NO BACKGROUND NOISE OR OUTSIDE INTERFERENCE.

READING TWO: 36 DB-A, 10 FEET FROM TURBINE @ 45° ANGLE
AND NO BACKGROUND NOISE OR OUTSIDE INTERFERENCE.

READING THREE: 24 DB-A, 20 FEET FROM TURBINE @ 45° ANGLE
AND NO BACKGROUND NOISE OR OUTSIDE INTERFERENCE.

READING FOUR: 12 DB-A, 30 FEET FROM TURBINE @ 45° ANGLE
AND NO BACKGROUND NOISE OR OUTSIDE INTERFERENCE.

NOTE: THESE READINGS WERE TAKEN OUTSIDE OF 8'x10'x8' CINDER BLOCK ENCLOSURE WITH CONCRETE SLAB AND WOOD JOIST ROOF.

SOUND LEVEL METER USED:

SIMPSON MODEL #40003 – MSHA APPROVED.
MEETS OSHA & WALSH-HEALY REQUIREMENTS FOR NOISE CONTROL.
CONFORMS TO ANSI S1.4-1983, IEC 651 SPECS FOR METER TYPE.

Vacutech
1350 Hi-Tech Drive, Sheridan WY, 82801
PHONE: (800) 917-9444 FAX: (303) 675-1988
EMAIL: info@vacutechllc
WEB SITE: vacutechllc.com

913 Redlands Noise
Octave spectra of the sources in dB(A) - 001 - 913 Redlands: Outdoor SP

Name	Source type	I or A	Li	R'w	L'w	Lw	KI	KT	LwMax	DO-Wall	Time histogram	Emission spectrum	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	16kHz
		m,m²	dB(A)	dB	dB(A)	dB(A)	dB	dB	dB(A)	dB			dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
Auto Parking	PLot	3953.85			55.9	91.9	0.0	0.0		0	100%/24h	Typical spectrum	75.2	86.8	79.3	83.8	83.9	84.3	81.6	75.4	62.6
001 - 14 MacNeil - Standard Tunnel-Facade 01	Area	24.31	78.5	57.0	27.0	40.9	0.0	0.0		3	100%/24h	1082_Facade 01	30.6	24.7	36.0	38.1	24.7	15.5	5.1	-6.8	
001 - 14 MacNeil - Standard Tunnel-Facade 02	Area	182.06	88.0	57.0	34.1	56.7	0.0	0.0		3	100%/24h	1083_Facade 02	47.3	41.8	50.2	54.2	44.3	38.7	31.9	27.0	
001 - 14 MacNeil - Standard Tunnel-Facade 03	Area	30.63	92.4	57.0	38.2	53.1	0.0	0.0		3	100%/24h	1084_Facade 03	43.6	38.2	46.4	50.5	41.0	35.6	29.0	24.7	
001 - 14 MacNeil - Standard Tunnel-Facade 04	Area	182.06	88.0	57.0	34.1	56.7	0.0	0.0		3	100%/24h	1085_Facade 04	47.3	41.8	50.2	54.1	44.3	38.7	31.9	27.0	
001 - 14 MacNeil - Standard Tunnel-Roof 01	Area	201.88	87.7	0.0	87.7	110.7	0.0	0.0		0	100%/24h	1080_Roof 01_	77.1	85.7	96.1	106.1	105.4	104.0	100.4	93.9	
001 - 14 MacNeil - Standard Tunnel-Transmissive area 01	Area	9.29	94.1	0.0	94.1	103.8	0.0	0.0		3	100%/24h	1068_Transmissive area 01_	70.0	78.6	88.9	99.0	98.4	97.1	93.6	87.6	
001 - 14 MacNeil - Standard Tunnel-Transmissive area 01	Area	15.61	76.8	0.0	76.8	88.7	0.0	0.0		3	100%/24h	1069_Transmissive area 01_	56.9	65.2	78.7	86.6	82.0	75.9	67.6	53.8	
Car lane	Line	28.22			62.8	77.3	0.0	0.0		0	100%/24h	Drive-Thru - Idiling Car @ 6ft	61.3	62.8	66.3	70.0	70.9	72.1	68.6	60.4	54.0
Car lane	Line	71.08			62.8	81.3	0.0	0.0		0	100%/24h	Drive-Thru - Idiling Car @ 6ft	65.3	66.8	70.3	74.0	74.9	76.1	72.6	64.4	58.0
Car lane	Line	82.58			62.8	82.0	0.0	0.0		0	100%/24h	Drive-Thru - Idiling Car @ 6ft	66.0	67.5	71.0	74.7	75.5	76.8	73.2	65.0	58.7
Car lane	Line	55.70			62.8	80.3	0.0	0.0		0	100%/24h	Drive-Thru - Idiling Car @ 6ft	64.3	65.8	69.3	73.0	73.8	75.0	71.5	63.3	57.0
HVAC	Point				74.9	74.9	0.0	0.0		0	100%/24h	HVAC: 67.7dB @ 3ft - Carrier 50TFQ0006 -	52.0	60.5	62.9	67.2	69.5	69.1	66.1	61.2	48.9
HVAC	Point				74.9	74.9	0.0	0.0		0	100%/24h	HVAC: 67.7dB @ 3ft - Carrier 50TFQ0006 -	52.0	60.5	62.9	67.2	69.5	69.1	66.1	61.2	48.9
HVAC	Point				74.9	74.9	0.0	0.0		0	100%/24h	HVAC: 67.7dB @ 3ft - Carrier 50TFQ0006 -	52.0	60.5	62.9	67.2	69.5	69.1	66.1	61.2	48.9
HVAC	Point				74.9	74.9	0.0	0.0		0	100%/24h	HVAC: 67.7dB @ 3ft - Carrier 50TFQ0006 -	52.0	60.5	62.9	67.2	69.5	69.1	66.1	61.2	48.9

913 Redlands Noise
Octave spectra of the sources in dB(A) - 001 - 913 Redlands: Outdoor SP

Name	Source type	I or A m,m²	Li dB(A)	R'w dB	L'w dB(A)	Lw dB(A)	KI dB	KT dB	LwMax dB(A)	DO-Wall dB	Time 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)
HVAC	Point				74.9	74.9	0.0	0.0		0	100%/24h	HVAC: 67.7dB @ 3ft - Carrier 50TFQ0006 -	52.0	60.5	62.9	67.2	69.5	69.1	66.1	61.2	48.9
HVAC	Point				74.9	74.9	0.0	0.0		0	100%/24h	HVAC: 67.7dB @ 3ft - Carrier 50TFQ0006 -	52.0	60.5	62.9	67.2	69.5	69.1	66.1	61.2	48.9
HVAC	Point				74.9	74.9	0.0	0.0		0	100%/24h	HVAC: 67.7dB @ 3ft - Carrier 50TFQ0006 -	52.0	60.5	62.9	67.2	69.5	69.1	66.1	61.2	48.9
HVAC	Point				74.9	74.9	0.0	0.0		0	100%/24h	HVAC: 67.7dB @ 3ft - Carrier 50TFQ0006 -	52.0	60.5	62.9	67.2	69.5	69.1	66.1	61.2	48.9
HVAC	Point				74.9	74.9	0.0	0.0		0	100%/24h	HVAC: 67.7dB @ 3ft - Carrier 50TFQ0006 -	52.0	60.5	62.9	67.2	69.5	69.1	66.1	61.2	48.9
HVAC	Point				74.9	74.9	0.0	0.0		0	100%/24h	HVAC: 67.7dB @ 3ft - Carrier 50TFQ0006 -	52.0	60.5	62.9	67.2	69.5	69.1	66.1	61.2	48.9
HVAC	Point				74.9	74.9	0.0	0.0		0	100%/24h	HVAC: 67.7dB @ 3ft - Carrier 50TFQ0006 -	52.0	60.5	62.9	67.2	69.5	69.1	66.1	61.2	48.9
HVAC	Point				74.9	74.9	0.0	0.0		0	100%/24h	HVAC: 67.7dB @ 3ft - Carrier 50TFQ0006 -	52.0	60.5	62.9	67.2	69.5	69.1	66.1	61.2	48.9
HVAC	Point				74.9	74.9	0.0	0.0		0	100%/24h	HVAC: 67.7dB @ 3ft - Carrier 50TFQ0006 -	52.0	60.5	62.9	67.2	69.5	69.1	66.1	61.2	48.9
HVAC	Point				74.9	74.9	0.0	0.0		0	100%/24h	HVAC: 67.7dB @ 3ft - Carrier 50TFQ0006 -	52.0	60.5	62.9	67.2	69.5	69.1	66.1	61.2	48.9
HVAC	Point				74.9	74.9	0.0	0.0		0	100%/24h	HVAC: 67.7dB @ 3ft - Carrier 50TFQ0006 -	52.0	60.5	62.9	67.2	69.5	69.1	66.1	61.2	48.9
HVAC	Point				74.9	74.9	0.0	0.0		0	100%/24h	HVAC: 67.7dB @ 3ft - Carrier 50TFQ0006 -	52.0	60.5	62.9	67.2	69.5	69.1	66.1	61.2	48.9
HVAC	Point				74.9	74.9	0.0	0.0		0	100%/24h	HVAC: 67.7dB @ 3ft - Carrier 50TFQ0006 -	52.0	60.5	62.9	67.2	69.5	69.1	66.1	61.2	48.9
HVAC	Point				74.9	74.9	0.0	0.0		0	100%/24h	HVAC: 67.7dB @ 3ft - Carrier 50TFQ0006 -	52.0	60.5	62.9	67.2	69.5	69.1	66.1	61.2	48.9
HVAC	Point				74.9	74.9	0.0	0.0		0	100%/24h	HVAC: 67.7dB @ 3ft - Carrier 50TFQ0006 -	52.0	60.5	62.9	67.2	69.5	69.1	66.1	61.2	48.9
HVAC	Point				74.9	74.9	0.0	0.0		0	100%/24h	HVAC: 67.7dB @ 3ft - Carrier 50TFQ0006 -	52.0	60.5	62.9	67.2	69.5	69.1	66.1	61.2	48.9

913 Redlands Noise
Octave spectra of the sources in dB(A) - 001 - 913 Redlands: Outdoor SP

Name	Source type	I or A m,m²	Li dB(A)	R'w dB	L'w dB(A)	Lw dB(A)	KI dB	KT dB	LwMax dB(A)	DO-Wall dB	Time 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)
HVAC	Point				74.9	74.9	0.0	0.0		0	100%/24h	HVAC: 67.7dB @ 3ft - Carrier 50TFQ0006 -	52.0	60.5	62.9	67.2	69.5	69.1	66.1	61.2	48.9
HVAC	Point				74.9	74.9	0.0	0.0		0	100%/24h	HVAC: 67.7dB @ 3ft - Carrier 50TFQ0006 -	52.0	60.5	62.9	67.2	69.5	69.1	66.1	61.2	48.9
HVAC	Point				74.9	74.9	0.0	0.0		0	100%/24h	HVAC: 67.7dB @ 3ft - Carrier 50TFQ0006 -	52.0	60.5	62.9	67.2	69.5	69.1	66.1	61.2	48.9

913 Redlands Noise
Contribution level - 001 - 913 Redlands: Outdoor SP

Source group	Source ty	Tr. lane	Leq,d dB(A)	A dB
Receiver R1 Fl G Lr,lim dB(A) Leq,d 52.3 dB(A) Sigma(Leq,d) 0.0 dB(A)				
Default industrial noise	Point		15.1	0.0
Default industrial noise	Point		14.9	0.0
Default industrial noise	Point		13.7	0.0
Default industrial noise	Point		13.6	0.0
Default industrial noise	Point		20.0	0.0
Default industrial noise	Line		24.3	0.0
Default industrial noise	Line		15.1	0.0
Default parking lot noise	PLot		31.6	0.0
Default industrial noise	Line		29.0	0.0
Default industrial noise	Line		26.7	0.0
Default industrial noise	Point		17.2	0.0
Default industrial noise	Point		18.9	0.0
Default industrial noise	Point		22.6	0.0
Default industrial noise	Point		22.7	0.0
Default industrial noise	Point		21.0	0.0
Default industrial noise	Point		20.9	0.0
Default industrial noise	Point		19.3	0.0
Default industrial noise	Point		10.4	0.0
Default industrial noise	Point		10.0	0.0
Default industrial noise	Point		6.5	0.0
Default industrial noise	Point		5.7	0.0
Default industrial noise	Point		5.9	0.0
Default industrial noise	Point		12.7	0.0
Default industrial noise	Point		12.6	0.0
Default industrial noise	Point		14.2	0.0
Default industrial noise	Point		13.9	0.0
Default industrial noise	Point		14.1	0.0
Default industrial noise	Point		15.5	0.0
Default industrial noise	Area		51.3	0.0
Default industrial noise	Area		-13.1	0.0
Default industrial noise	Area		35.0	0.0
Default industrial noise	Area		-4.9	0.0
Default industrial noise	Area		-6.8	0.0
Default industrial noise	Area		44.8	0.0
Default industrial noise	Area		-3.0	0.0
Receiver R2 Fl G Lr,lim dB(A) Leq,d 46.3 dB(A) Sigma(Leq,d) 0.0 dB(A)				
Default industrial noise	Point		23.0	0.0
Default industrial noise	Point		21.4	0.0
Default industrial noise	Point		20.4	0.0
Default industrial noise	Point		19.5	0.0
Default industrial noise	Point		18.0	0.0
Default industrial noise	Line		26.4	0.0
Default industrial noise	Line		22.4	0.0

Source group	Source ty	Tr. lane	Leq,d dB(A)	A dB	
Default parking lot noise	PLot		42.9	0.0	
Default industrial noise	Line		16.2	0.0	
Default industrial noise	Line		13.8	0.0	
Default industrial noise	Point		14.9	0.0	
Default industrial noise	Point		14.8	0.0	
Default industrial noise	Point		14.8	0.0	
Default industrial noise	Point		16.8	0.0	
Default industrial noise	Point		16.7	0.0	
Default industrial noise	Point		15.5	0.0	
Default industrial noise	Point		15.4	0.0	
Default industrial noise	Point		17.0	0.0	
Default industrial noise	Point		16.2	0.0	
Default industrial noise	Point		14.8	0.0	
Default industrial noise	Point		14.5	0.0	
Default industrial noise	Point		14.4	0.0	
Default industrial noise	Point		13.1	0.0	
Default industrial noise	Point		13.2	0.0	
Default industrial noise	Point		13.9	0.0	
Default industrial noise	Point		11.6	0.0	
Default industrial noise	Point		12.8	0.0	
Default industrial noise	Point		15.0	0.0	
Default industrial noise	Area		40.1	0.0	
Default industrial noise	Area		-29.7	0.0	
Default industrial noise	Area		11.8	0.0	
Default industrial noise	Area		-12.2	0.0	
Default industrial noise	Area		-6.0	0.0	
Default industrial noise	Area		40.6	0.0	
Default industrial noise	Area		-9.3	0.0	
Receiver R3 Fl G Lr,lim dB(A) Leq,d 56.1 dB(A) Sigma(Leq,d) 0.0 dB(A)					
Default industrial noise	Point		15.1	0.0	
Default industrial noise	Point		17.0	0.0	
Default industrial noise	Point		13.8	0.0	
Default industrial noise	Point		15.1	0.0	
Default industrial noise	Point		18.5	0.0	
Default industrial noise	Line		24.3	0.0	
Default industrial noise	Line		15.8	0.0	
Default parking lot noise	PLot		33.2	0.0	
Default industrial noise	Line		33.6	0.0	
Default industrial noise	Line		31.2	0.0	
Default industrial noise	Point		11.8	0.0	
Default industrial noise	Point		16.8	0.0	
Default industrial noise	Point		15.5	0.0	
Default industrial noise	Point		15.0	0.0	
Default industrial noise	Point		21.3	0.0	
Default industrial noise	Point		21.8	0.0	

913 Redlands Noise
Contribution level - 001 - 913 Redlands: Outdoor SP

Source group	Source ty	Tr. lane	Leq,d dB(A)	A dB
Default industrial noise	Point		20.4	0.0
Default industrial noise	Point		20.1	0.0
Default industrial noise	Point		20.1	0.0
Default industrial noise	Point		20.2	0.0
Default industrial noise	Point		20.2	0.0
Default industrial noise	Point		12.8	0.0
Default industrial noise	Point		21.0	0.0
Default industrial noise	Point		21.0	0.0
Default industrial noise	Point		20.9	0.0
Default industrial noise	Point		21.1	0.0
Default industrial noise	Point		21.3	0.0
Default industrial noise	Point		19.4	0.0
Default industrial noise	Area		55.9	0.0
Default industrial noise	Area		-6.5	0.0
Default industrial noise	Area		41.8	0.0
Default industrial noise	Area		-1.9	0.0
Default industrial noise	Area		-11.7	0.0
Default industrial noise	Area		33.4	0.0
Default industrial noise	Area		-1.1	0.0

913 Redlands Noise
Contribution spectra - 001 - 913 Redlands: Outdoor SP

Time slice	Sum dB(A)	25Hz dB(A)	31.5Hz dB(A)	40Hz dB(A)	50Hz dB(A)	63Hz dB(A)	80Hz dB(A)	100Hz dB(A)	125Hz dB(A)	160Hz dB(A)	200Hz dB(A)	250Hz dB(A)	315Hz dB(A)	400Hz dB(A)	500Hz dB(A)	630Hz dB(A)	800Hz dB(A)	1kHz dB(A)	1.25kHz dB(A)	1.6kHz dB(A)	2kHz dB(A)	2.5kHz dB(A)	3.15kHz dB(A)	4kHz dB(A)	5kHz dB(A)	6.3kHz dB(A)	8kHz dB(A)	10kHz dB(A)	12.5kHz dB(A)	16kHz dB(A)	20kHz dB(A)
Receiver R1 Fl G Lr,lim dB(A) Leq,d 52.3 dB(A) Sigma(Leq,d) 0.0 dB(A)																														
Leq,d	31.6					20.5			28.5			16.7			21.3			22.5			23.4			15.6			-7.8			-65.2	
Leq,d	-13.1					-16.7			-26.7			-19.7			-20.2			-23.3			-33.1			-46.6			-69.6				
Leq,d	-4.9					-9.5			-20.4			-16.6			-15.0			-9.3			-14.9			-26.0			-45.9				
Leq,d	-6.8					-9.4			-19.7			-16.3			-14.0			-22.2			-18.6			-29.7			-49.5				
Leq,d	-3.0					-5.8			-15.8			-11.6			-10.2			-14.7			-20.6			-30.7			-45.9				
Leq,d	51.3					23.4			27.8			35.1			41.8			48.2			46.2			38.3			18.3				
Leq,d	44.8					16.0			19.7			23.5			31.9			32.1			43.6			35.6			13.9				
Leq,d	35.0					9.8			14.1			22.3			27.3			32.8			26.6			15.2			-9.7				
Leq,d	15.1	-3.0	-20.2	-14.5	0.2	0.8	2.5	-2.3	1.3	-2.1	-0.3	-5.7	-4.1	-0.1	-0.6	3.0	4.3	3.9	4.8	3.4	5.7	5.7	1.2	-2.9	-9.0	-16.7	-25.4	-38.0	-53.1	-72.5	-95.1
Leq,d	24.3	3.1	-14.1	-8.2	7.0	7.8	9.7	5.1	8.9	6.0	7.6	2.4	4.2	8.2	8.0	11.8	13.5	13.7	14.5	13.2	15.6	15.9	11.6	7.9	2.2	-4.9	-12.9	-24.5	-38.3	-56.0	-76.4
Leq,d	29.0	9.1	-9.7	-4.0	10.7	11.3	13.0	9.1	12.6	9.1	11.1	5.5	6.9	10.4	9.9	13.9	16.6	18.1	19.4	18.6	21.2	21.7	17.7	14.4	9.4	3.5	-2.6	-11.3	-21.0	-32.9	-45.8
Leq,d	26.7	7.6	-11.0	-5.2	9.5	10.2	11.9	7.8	11.4	8.1	10.3	4.9	6.4	10.1	9.7	13.4	15.7	15.5	16.2	15.5	18.2	18.6	14.6	11.2	6.2	0.3	-5.8	-14.5	-24.3	-36.6	-50.1
Leq,d	12.7	-32.1	-26.9	-23.9	-11.9	-8.0	-15.0	-7.2	-6.2	-8.2	-9.7	-10.6	-9.6	-9.6	-9.6	-4.6	6.0	2.1	3.7	5.4	3.0	3.1	-1.4	-2.5	-7.7	-12.5	-24.6	-39.4	-53.8	-72.2	-94.5
Leq,d	12.6	-32.3	-27.2	-24.2	-12.3	-8.4	-15.4	-7.5	-6.6	-8.6	-10.0	-11.0	-10.0	-10.0	-9.9	-7.0	5.6	2.4	4.0	5.6	2.9	2.9	-1.6	-2.7	-8.0	-12.9	-25.0	-39.9	-54.0	-71.8	-93.6
Leq,d	5.9	-32.3	-27.1	-24.1	-12.0	-8.1	-15.0	-7.3	-6.3	-8.3	-9.7	-10.6	-9.6	-9.6	-9.6	-6.6	-3.0	-4.6	-3.8	-3.0	-6.5	-7.2	-12.2	-12.7	-18.1	-22.8	-33.9	-47.1	-60.0	-78.1	
Leq,d	5.7	-32.2	-27.1	-24.0	-12.0	-8.0	-15.0	-7.2	-6.3	-8.3	-9.8	-10.7	-9.7	-9.7	-9.6	-6.7	-3.0	-5.0	-4.2	-3.4	-6.9	-7.2	-11.1	-12.8	-18.3	-22.8	-33.8	-46.9	-59.5	-77.4	
Leq,d	15.5	-28.3	-22.5	-18.7	-5.9	-1.2	-7.4	1.1	2.7	1.2	-0.8	-1.3	0.0	0.4	0.6	3.9	7.4	4.1	5.4	6.7	3.7	3.5	-1.2	-2.6	-8.0	-12.8	-24.0	-37.2	-49.7	-67.3	-90.0
Leq,d	14.1	-32.3	-27.4	-24.5	-12.7	-8.9	-16.0	-8.2	-7.3	-9.3	-11.3	-12.3	-11.3	-11.3	-11.3	-2.5	7.7	3.4	5.1	7.0	4.4	4.4	-0.1	-1.3	-6.7	-11.9	-24.4	-39.5	-53.3	-70.1	-91.2
Leq,d	13.9	-32.6	-27.6	-24.7	-12.8	-9.0	-16.0	-8.2	-7.3	-9.3	-10.9	-11.9	-10.9	-10.9	-10.9	-7.9	7.4	3.2	5.0	6.8	4.2	4.4	-0.1	-1.1	-6.5	-11.7	-24.2	-39.4	-53.5	-70.7	-91.9
Leq,d	14.2	-32.5	-27.4	-24.5	-12.6	-8.7	-15.7	-7.9	-6.9	-9.0	-10.4	-11.4	-10.4	-10.4	-10.4	-7.4	7.6	3.9	5.6	7.3	4.6	4.7	0.2	-1.0	-6.4	-11.5	-24.0	-39.2	-53.6	-71.2	-92.7
Leq,d	20.0	-35.0	-28.9	-24.9	-11.9	-6.8	-12.7	-3.9	-1.8	-2.7	-1.1	-0.7	1.8	3.5	5.6	10.2	12.8	8.7	10.8	11.7	9.3	9.9	5.6	4.9	0.1	-4.1	-15.2	-29.0	-43.3	-63.7	-90.1
Leq,d	17.2	-28.4	-22.5	-18.7	-5.8	-1.1	-7.3	1.3	3.0	1.7	-0.2	-0.6	1.0	1.6	2.1	5.6	9.5	5.9	7.4	8.8	5.9	5.8	1.2	0.0	-5.0	-9.3	-20.2	-33.1	-45.5	-63.2	-86.0
Leq,d	18.9	-28.4	-22.5	-18.7	-5.8	-1.0	-7.2	1.4	3.2	1.9	0.0	-0.2	1.5	2.3	3.0	6.6	10.9	7.4	9.1	10.9	8.3	8.6	4.6	4.0	-0.3	-3.7	-13.7	-25.8	-37.6	-54.6	-76.8
Leq,d	13.6	-34.0	-28.2	-24.5	-11.8	-7.1	-13.4	-5.1	-3.5	-4.9	-4.1	-4.4	-0.6	0.1	0.8	4.4	6.5	1.9	3.4	4.8	1.7	1.8	-3.4	-5.5	-12.0	-18.4	-32.4	-50.0	-69.0	-95.0	
Leq,d	15.1	-34.7	-28.9	-25.2	-12.5	-7.8	-14.0	-5.7	-3.9	-5.2	-4.2	-2.3	-0.5	0.4	1.3	5.1	7.5	3.2	5.7	6.8	4.3	4.2	-0.7	-2.3	-8.4	-14.5	-28.3	-45.8	-65.0	-91.6	
Leq,d	14.9	-33.9	-28.1	-24.3	-11.6	-6.9	-13.1	-4.7	-3.1	-4.4	-3.5	-3.6	-0.1	0.8	1.6	5.4	7.7	3.4	5.7	6.3	3.5	3.3	-1.5	-3.2	-9.2	-15.1	-28.7	-45.9	-64.6	-90.5	
Leq,d	13.7	-34.0	-28.3	-24.5	-11.8	-7.2	-13.5	-5.2	-3.6	-5.0	-4.1	-4.4	-0.6	0.2	0.9	4.5	6.6	2.1	3.6	4.9	1.8	1.6	-3.6	-5.6	-12.0	-18.4	-32.4	-50.0	-69.1	-95.2	
Leq,d	22.6	-27.1	-21.1	-17.1	-4.1	0.8	-5.2	3.7	5.6	4.5	1.6	1.7	3.6	4.8	5.8	9.7	14.8	11.0	13.0	14.9	12.4	12.9	8.9	8.5	4.4	1.1	-8.7	-20.6	-32.3	-49.2	-71.3
Leq,d	10.4	-30.9	-25.5	-22.3	-10.1	-6.0	-12.9	-5.0	-3.9	-5.9	-8.4	-9.3	-8.3	-8.2	-8.2	-4.3	-1.5	0.4	1.8	3.5	0.6	0.5	-4.1	-5.5	-10.9	-16.3	-28.8	-43.6	-57.1	-75.0	-97.9
Leq,d	10.0	-31.5	-26.3	-23.3	-11.3	-7.3	-14.3	-6.5	-5.5	-7.5	-9.5	-10.4	-9.4	-9.4	-9.4	-5.1	-1.1	0.0	1.5	3.1	0.3	0.6	-4.1	-5.2	-10.9	-16.5	-29.2	-44.3	-58.1	-76.0	-98.9
Leq,d	6.5	-32.0	-26.8	-23.8	-11.8	-7.8	-14.8	-7.0	-6.1	-8.1	-9.7	-10.7	-9.7	-9.6	-9.6	-6.7	-2.6	-3.8	-2.9	-2.0	-5.5	-5.9	-10.3	-12.3	-18.1	-22.9	-33.9	-46.7	-59.1	-76.8	-99.8
Leq,d	19.3	-30.1	-24.4	-20.8	-8.3	-3.8	-10.2	-1.9	-0.5	-2.1	-4.9	-5.5	-4.3	-3.9	2.8	6.6	11.6	8.5	10.3	12.1	9.5	9.6	5.3	4.3	-0.8	-5.5	-17.4	-32.3	-47.7	-68.5	-93.7
Leq,d	22.7	-27.2	-21.1	-17.1	-4.1	0.8	-5.2	3.6	5.6	4.5	1.6	1.6	3.6	4.8	5.7	9.7	14.8	11.0	13.0	14.8	12.4	12.9	10.0	9.4	5.1	1.6	-8.4	-20.6	-32.5	-49.5	-71.6
Leq,d	21.0	-27.2	-22.9	-19.0	-6.2	-1.5	-7.7	0.9	2.7	1.4	-0.7	-1.0	0.7	1.6	2.3	6.0	13.6	9.9	11.8	13.6	11.1	11.4	7.2	6.5	1.8	-2.1	-12.7	-25.4	-37.7	-55.0	-77.5
Leq,d	20.9	-29.3	-23.4	-19.5	-6.7	-1.9	-8.0	0.6	2.3	1.0	-1.1	-1.3	0.3	4.2	5.0	8.8	13.5	10.0	11.7	13.3	10.7	10.8	6.4	5.5	0.5	-3.9	-15.3	-29.2	-43.0	-61.7	-85.2

913 Redlands Noise
Contribution spectra - 001 - 913 Redlands: Outdoor SP

Time slice	Sum dB(A)	25Hz dB(A)	31.5Hz dB(A)	40Hz dB(A)	50Hz dB(A)	63Hz dB(A)	80Hz dB(A)	100Hz dB(A)	125Hz dB(A)	160Hz dB(A)	200Hz dB(A)	250Hz dB(A)	315Hz dB(A)	400Hz dB(A)	500Hz dB(A)	630Hz dB(A)	800Hz dB(A)	1kHz dB(A)	1.25kHz dB(A)	1.6kHz dB(A)	2kHz dB(A)	2.5kHz dB(A)	3.15kHz dB(A)	4kHz dB(A)	5kHz dB(A)	6.3kHz dB(A)	8kHz dB(A)	10kHz dB(A)	12.5kHz dB(A)	16kHz dB(A)	20kHz dB(A)
Receiver R2 Fl G Lr,lim dB(A) Leq,d 46.3 dB(A) Sigma(Leq,d) 0.0 dB(A)																															
Leq,d	42.9					27.5			37.9			27.4			33.1			36.0			36.5			31.9			19.2			-10.0	
Leq,d	-29.7					-32.4			-43.9			-36.2			-36.8			-49.7			-58.9			-74.5							
Leq,d	-12.2					-14.2			-25.2			-21.6			-19.9			-29.5			-35.5			-46.7			-68.5				
Leq,d	-6.0					-9.0			-18.4			-14.2			-12.1			-21.7			-30.7			-35.7			-58.6				
Leq,d	-9.3					-12.2			-22.4			-17.3			-15.3			-25.6			-32.6			-45.4			-67.5				
Leq,d	40.1					16.3			20.2			27.9			35.2			35.4			33.7			25.0			-0.5				
Leq,d	40.6					18.1			22.7			27.7			35.8			35.6			34.6			25.7			1.2				
Leq,d	11.8					-8.1			-5.8			2.5			8.2			6.6			2.0			-11.6			-43.4				
Leq,d	22.4	-0.3	-17.3	-11.3	3.7	4.7	6.7	2.1	6.0	3.3	4.5	-0.6	1.3	5.4	5.3	9.1	11.3	11.1	12.3	11.9	14.5	14.7	10.8	7.5	1.5	-6.2	-15.1	-28.2	-44.1	-64.5	-88.2
Leq,d	26.4	3.8	-13.2	-7.2	7.8	8.8	10.8	6.2	10.1	7.4	8.8	3.7	5.5	9.7	9.6	13.4	15.7	15.5	16.5	15.6	18.1	18.5	14.2	10.5	4.5	-3.0	-11.6	-24.3	-40.0	-60.2	-83.6
Leq,d	16.2	0.8	-16.3	-10.6	4.0	4.6	6.1	0.9	4.4	0.7	2.9	-2.9	-1.9	1.4	0.5	3.5	3.2	2.5	4.6	3.4	5.5	5.3	0.5	-3.9	-10.5	-18.8	-28.5	-42.6	-59.9	-81.7	
Leq,d	13.8	-0.6	-17.8	-12.1	2.5	3.0	4.5	-0.8	2.4	-1.4	0.6	-4.7	-3.4	-0.3	-1.3	1.9	1.4	0.8	1.4	-0.6	1.1	0.6	-4.4	-9.2	-16.1	-24.7	-34.8	-49.0	-66.2	-87.9	
Leq,d	13.1	-33.1	-27.2	-23.3	-10.5	-5.7	-11.9	-4.0	-2.4	-3.9	-6.0	-6.7	-5.6	-5.3	-5.2	-1.1	2.2	-2.9	-2.0	7.0	4.1	4.0	2.7	1.1	-4.9	-11.2	-25.4	-43.9	-64.6	-93.4	
Leq,d	13.2	-33.0	-27.0	-23.2	-10.3	-5.6	-11.8	-3.9	-2.3	-3.8	-6.0	-6.7	-5.5	-5.3	-5.2	-1.1	2.2	-2.9	-2.0	7.1	4.3	4.1	2.9	1.3	-4.7	-10.8	-24.9	-43.1	-63.6	-92.0	
Leq,d	14.4	-30.9	-26.0	-22.1	-9.3	-4.5	-10.7	-2.8	-1.1	-2.4	-4.5	-4.8	-3.3	-1.8	-1.4	1.9	5.8	1.2	2.4	3.7	6.5	6.4	1.8	0.2	-5.7	-11.7	-25.6	-43.4	-63.3	-90.9	
Leq,d	14.5	-30.8	-25.8	-22.0	-9.2	-4.4	-10.6	-2.6	-0.9	-2.2	-4.4	-4.7	-3.2	-1.7	-1.4	1.9	5.9	1.2	2.5	3.8	6.6	6.5	2.0	0.4	-5.4	-11.3	-25.1	-42.7	-62.3	-89.5	
Leq,d	15.0	-28.9	-24.0	-20.2	-7.4	-2.7	-8.9	-0.7	0.9	-0.5	-2.8	-3.3	-2.0	-1.1	-0.9	2.3	6.3	1.5	2.6	3.8	6.9	6.9	2.4	1.2	-4.1	-9.2	-21.6	-37.4	-54.2	-77.3	
Leq,d	12.8	-32.5	-26.6	-22.8	-10.0	-5.2	-11.5	-3.5	-2.0	-3.5	-5.7	-6.5	-5.4	-5.2	-5.1	-1.0	2.2	-2.9	-2.0	-1.1	-4.5	8.1	3.5	2.0	-3.8	-9.6	-23.3	-41.0	-60.6	-87.8	
Leq,d	11.6	-32.7	-26.8	-22.9	-10.1	-5.3	-11.6	-3.6	-2.1	-3.7	-5.8	-6.5	-5.4	-5.2	-5.1	-1.1	2.2	-2.9	-2.0	-1.1	-4.6	5.9	1.2	-0.3	-6.1	-12.0	-25.7	-43.4	-63.1	-90.4	
Leq,d	13.9	-32.8	-26.9	-23.0	-10.2	-5.4	-11.7	-3.8	-2.2	-3.7	-5.9	-6.6	-5.5	-5.3	-5.1	-1.1	2.2	-2.9	-2.0	7.2	4.4	7.8	3.1	1.6	-4.4	-10.4	-24.4	-42.4	-62.6	-90.6	
Leq,d	18.0	-36.2	-30.2	-26.2	-13.1	-8.2	-14.1	-5.4	-3.4	-4.4	-1.9	-1.8	0.2	1.3	2.6	7.0	10.2	7.5	9.3	10.2	7.7	7.9	3.6	2.7	-2.3	-7.0	-18.9	-34.0	-50.1	-72.8	
Leq,d	14.9	-29.1	-24.2	-20.4	-7.6	-2.9	-9.1	-0.9	0.7	-0.7	-3.0	-3.5	-2.1	-1.2	-1.0	2.2	6.2	1.4	2.6	3.7	6.8	6.8	2.2	1.0	-4.4	-9.5	-22.1	-38.1	-55.2	-75.1	
Leq,d	14.8	-29.3	-24.3	-20.5	-7.8	-3.0	-9.3	-1.1	0.6	-0.9	-3.1	-3.6	-2.2	-1.3	-1.0	2.2	6.2	1.4	2.6	3.8	6.6	6.6	2.1	0.8	-4.7	-9.9	-22.6	-38.8	-56.1	-80.0	
Leq,d	19.5	-33.9	-27.8	-23.9	-10.9	-5.9	-11.9	-3.1	1.1	0.1	1.3	1.4	3.3	4.3	5.3	9.3	11.9	7.8	9.7	10.8	8.6	9.1	5.4	5.2	1.4	-1.5	-11.2	-23.7	-36.0	-53.8	-77.7
Leq,d	23.0	-30.5	-24.4	-20.5	-7.5	-2.5	-8.5	0.4	4.5	3.5	4.6	4.6	6.6	7.7	8.7	12.6	15.0	10.9	12.8	14.5	12.2	12.8	9.0	9.0	5.3	2.7	-6.0	-16.5	-25.9	-39.8	-58.0
Leq,d	21.4	-31.7	-25.7	-21.7	-8.7	-3.7	-9.7	-0.9	3.3	2.2	3.4	3.4	5.4	6.4	7.4	11.4	13.8	9.7	11.6	12.6	10.3	10.8	7.1	7.0	3.1	0.3	-9.0	-20.0	-30.6	-45.9	-65.9
Leq,d	20.4	-32.9	-26.9	-22.9	-9.9	-4.9	-10.9	-2.1	2.1	1.0	2.3	2.3	4.3	5.3	6.3	10.2	12.7	8.6	10.6	11.6	9.3	9.9	6.1	6.0	2.1	-0.8	-10.0	-21.6	-33.5	-50.6	-72.8
Leq,d	14.8	-29.4	-24.5	-20.7	-7.9	-3.2	-9.4	-1.3	0.4	-1.0	-3.3	-3.7	-2.3	-1.1	-0.8	2.4	6.3	1.5	2.7	3.9	0.7	7.9	3.3	2.1	-3.3	-8.4	-21.1	-37.1	-54.4	-78.6	
Leq,d	17.0	-30.3	-25.3	-21.5	-8.7	-4.0	-10.2	-2.1	-0.4	-1.8	-3.9	-4.3	-2.9	-1.5	-1.1	2.1	6.1	1.4	2.6	11.6	8.9	8.9	4.3	2.9	-2.8	-8.4	-21.9	-39.0	-57.9	-84.3	
Leq,d	16.2	-30.4	-25.5	-21.7	-8.9	-4.1	-10.3	-2.3	-0.6	-1.9	-4.1	-4.5	-3.0	-1.6	-1.2	2.1	6.0	1.3	2.5	8.6	8.8	8.7	4.1	2.7	-3.1	-8.8	-22.4	-39.8	-59.0	-85.7	
Leq,d	14.8	-30.6	-25.6	-21.8	-9.0	-4.3	-10.5	-2.4	-0.7	-2.1	-4.2	-4.6	-3.1	-1.6	-1.3	2.0	6.0	1.3	2.5	3.8	6.7	6.7	3.9	2.4	-3.4	-9.3	-22.9	-40.6	-60.1	-87.2	
Leq,d	15.4	-30.1	-25.2	-21.4	-8.6	-3.8	-10.0	-1.9	-0.3	-1.6	-3.8	-4.2	-2.8	-1.4	-0.6	2.6	6.5	1.8	2.9	9.0	6.2	6.1	1.4	-0.1	-5.8	-11.5	-24.9	-42.1	-60.8	-86.6	
Leq,d	16.8	-29.6	-24.7	-20.9	-8.1	-3.3	-9.6	-1.4	0.2	-1.2	-3.4	-3.8	-2.4	-1.1	-0.8	2.4	6.3	1.5	7.6	9.2	6.5	9.5	5.0	3.8	-1.7	-7.0	-19.8	-36.2	-54.1	-78.9	
Leq,d	16.7	-29.8	-24.9	-21.0	-8.2	-3.5	-9.7	-1.6	0.1	-1.3	-3.5	-4.0	-2.5	-1.2	-0.9	2.3	6.2	1.5	2.6	9.1	6.3	10.1	6.3	4.9	-0.7	-6.3	-19.6	-36.4	-54.8	-80.2	
Leq,d	15.5	-30.0	-25.0	-21.2	-8.4	-3.7	-9.9	-1.8	-0.1	-1.5	-3.7	-4.1	-2.6	-1.3	-0.5	2.7	6.5	1.8	3.0	9.1	6.3	6.5	1.8	0.4	-5.4	-11.0	-24.3	-41.3	-59.7	-85.2	

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 R3 Fl G Lr,lim dB(A) Leq,d 56.1 dB(A) Sigma(Leq,d) 0.0 dB(A)																															
Leq,d	33.2					18.0			26.8			18.0			23.8			27.2			28.1			19.0			-10.0			-85.3	
Leq,d	-6.5					-16.7			-24.4			-12.7			-8.8			-20.0			-29.5			-43.3			-66.8				
Leq,d	-1.9					-6.4			-14.7			-8.5			-6.8			-17.7			-17.8			-30.9			-55.1				
Leq,d	-11.7					-14.7			-25.1			-19.2			-18.0			-26.6			-33.7			-44.9			-63.8				
Leq,d	-1.1					-9.0			-17.6			-7.5			-4.0			-13.0			-19.8			-30.2			-47.0				
Leq,d	55.9					21.4			28.3			40.9			50.6			51.5			49.9			42.5			23.4				
Leq,d	33.4					10.5			13.3			19.6			27.3			29.3			27.7			20.0			-0.5				
Leq,d	41.8					10.7			17.2			29.4			38.7			37.4			31.4			19.8			-5.5				
Leq,d	15.8	-6.6	-24.0	-18.5	-3.9	-3.5	-2.1	-7.5	-4.3	-8.2	-2.8	-7.5	-6.0	-1.6	-1.3	3.5	4.9	5.0	6.5	6.1	8.3	8.2	3.3	-1.4	-8.7	-18.0	-29.4	-45.8	-66.2	-92.3	
Leq,d	24.3	-0.5	-17.7	-12.0	2.7	3.4	5.2	0.0	3.4	-0.2	5.1	2.0	4.0	7.9	7.7	11.5	13.7	13.6	15.0	14.5	16.8	16.7	12.1	7.5	0.7	-8.3	-19.0	-34.5	-53.8	-78.5	
Leq,d	33.6	6.2	-10.7	-4.8	10.2	11.2	13.2	9.9	13.9	11.1	13.4	10.3	12.3	16.6	16.7	20.6	22.8	23.4	24.4	23.2	25.8	26.1	22.0	18.4	13.0	6.2	-1.3	-12.0	-24.3	-39.7	-56.9
Leq,d	31.2	4.3	-12.7	-6.7	8.3	9.2	11.2	8.0	12.0	9.0	11.1	7.9	10.0	14.2	14.3	18.3	20.4	21.0	21.9	20.8	23.4	23.7	19.6	15.9	10.3	3.4	-4.2	-15.2	-28.0	-43.9	-61.6
Leq,d	21.0	-31.1	-25.3	-21.5	-8.8	-4.2	-10.6	-2.5	-1.2	-3.0	-0.9	0.9	2.9	4.0	4.9	8.7	13.9	9.7	11.6	13.5	10.9	11.2	6.9	6.1	1.2	-3.2	-14.8	-29.4	-44.7	-66.4	-94.5
Leq,d	21.0	-31.1	-25.2	-21.4	-8.6	-4.0	-10.3	-2.2	-0.8	-2.5	-0.8	0.9	3.0	4.0	4.9	8.7	13.9	9.7	11.6	13.4	10.8	11.1	6.8	5.9	1.0	-3.4	-15.1	-29.8	-45.2	-67.1	-95.4
Leq,d	12.8	-31.9	-26.1	-22.4	-9.7	-5.2	-11.7	-3.8	-2.6	-4.5	-3.9	-4.6	-3.4	-3.2	-3.0	0.0	2.3	1.5	3.2	5.0	2.7	3.4	-0.4	-1.9	-7.8	-13.8	-27.7	-45.3	-63.8	-87.5	
Leq,d	20.2	-31.8	-26.0	-22.3	-9.6	-5.0	-11.4	-3.5	-2.2	-4.1	-1.7	0.1	2.2	3.3	4.1	8.0	13.2	9.0	10.9	12.7	10.1	10.3	6.0	5.0	-0.2	-5.0	-17.1	-32.5	-48.9	-72.1	
Leq,d	19.4	-32.4	-26.5	-22.6	-9.8	-5.1	-11.4	-2.5	-1.0	-2.5	-4.8	-0.5	1.5	2.7	3.7	7.5	12.3	8.4	10.2	11.9	9.2	9.3	4.7	3.4	-2.1	-7.5	-20.5	-37.2	-55.5	-81.2	
Leq,d	21.3	-31.1	-25.2	-21.3	-8.4	-3.6	-9.8	-1.3	0.4	-1.0	-0.2	1.2	3.2	4.3	5.2	8.9	14.0	9.8	12.0	14.1	11.4	11.5	7.1	6.0	0.8	-3.9	-15.9	-30.9	-46.9	-69.4	-98.5
Leq,d	21.1	-31.1	-25.2	-21.3	-8.5	-3.7	-9.9	-1.7	-0.1	-1.5	-0.4	1.0	3.1	4.2	5.1	8.8	13.9	9.7	11.8	13.5	10.9	11.1	6.8	5.8	0.8	-3.8	-15.7	-30.6	-46.3	-68.7	-97.4
Leq,d	20.9	-31.0	-25.1	-21.3	-8.5	-3.8	-10.1	-1.9	-0.4	-2.0	-0.6	1.0	3.0	4.1	4.9	8.7	13.9	9.6	11.5	13.3	10.8	11.0	6.7	5.8	0.9	-3.7	-15.4	-30.2	-45.8	-67.9	-96.4
Leq,d	18.5	-35.0	-29.1	-25.2	-12.4	-7.7	-14.0	-5.7	-4.2	-5.8	-2.4	-1.0	1.0	2.3	3.9	9.1	11.5	7.8	9.5	10.3	7.5	7.5	2.8	1.2	-4.6	-10.6	-24.3	-41.9	-61.5	-88.9	
Leq,d	11.8	-32.6	-26.7	-23.0	-10.3	-5.9	-12.5	-3.7	-2.7	-4.6	-6.8	-5.9	-4.9	-4.8	-4.8	-1.9	0.6	-4.6	3.4	5.1	2.3	2.2	-2.4	-3.9	-9.8	-15.7	-29.5	-47.2	-67.6	-95.2	
Leq,d	16.8	-33.0	-27.3	-23.8	-11.3	-7.1	-13.9	-6.1	-5.2	-7.3	-9.3	-7.8	-6.8	-6.8	-6.8	3.4	6.0	1.7	9.2	11.0	8.2	8.2	3.5	1.9	-4.0	-10.1	-23.9	-42.2	-63.0	-91.3	
Leq,d	15.1	-36.8	-30.8	-26.9	-13.9	-9.0	-15.1	-6.5	-4.8	-6.0	-5.2	-2.7	-1.0	0.1	0.9	4.5	6.9	2.5	4.0	8.5	5.5	5.1	-0.1	-2.5	-9.6	-17.5	-33.9	-55.4	-80.2		
Leq,d	15.1	-40.3	-34.3	-30.3	-17.3	-12.3	-18.3	-7.7	-5.7	-6.8	-5.4	-3.0	-1.0	0.1	1.1	5.0	7.7	3.6	5.5	6.6	4.5	4.7	0.4	-0.6	-7.8	-15.8	-32.6	-54.7	-80.7		
Leq,d	17.0	-40.1	-34.0	-30.0	-17.0	-12.1	-18.1	-7.4	-5.4	-6.5	-5.1	-2.6	-0.6	0.5	1.6	5.6	8.4	4.5	6.7	10.0	8.5	8.1	2.9	0.6	-6.6	-14.4	-31.0	-52.8	-78.0		
Leq,d	13.8	-37.2	-31.2	-27.3	-14.5	-9.7	-15.9	-7.3	-5.7	-7.1	-6.1	-3.3	-1.5	-0.5	0.3	4.1	6.6	2.3	4.0	5.7	2.8	2.5	-2.7	-5.0	-11.9	-19.4	-35.5	-56.4	-80.5		
Leq,d	15.5	-34.4	-29.1	-25.8	-13.7	-9.7	-16.8	-8.7	-7.8	-9.9	-11.8	-9.0	-8.1	-8.1	-8.1	3.2	5.8	1.5	7.7	9.5	6.7	6.7	2.0	0.4	-5.6	-11.8	-25.9	-43.9	-63.8	-91.7	
Leq,d	20.1	-31.8	-25.9	-22.0	-9.2	-4.5	-10.8	-2.7	-1.2	-2.8	-1.4	0.2	2.2	3.4	4.2	8.0	13.1	8.9	10.8	12.5	9.9	10.1	5.7	4.6	-0.4	-5.3	-17.8	-33.6	-50.5	-74.3	
Leq,d	20.1	-31.8	-25.9	-22.1	-9.3	-4.6	-11.0	-2.9	-1.5	-3.2	-1.5	0.1	2.2	3.3	4.1	7.9	13.1	8.9	10.8	12.6	10.0	10.1	5.8	4.7	-0.5	-5.4	-17.6	-33.2	-50.0	-73.6	
Leq,d	20.2	-31.8	-25.9	-22.2	-9.4	-4.8	-11.2	-3.2	-1.9	-3.6	-1.6	0.1	2.2	3.3	4.1	7.9	13.1	8.9	10.8	12.6	10.1	10.2	5.9	4.8	-0.3	-5.2	-17.4	-32.8	-49.4	-72.8	
Leq,d	20.4	-31.8	-25.9	-22.0	-9.2	-4.4	-10.6	-2.5	-0.9	-2.4	-1.2	0.3	2.3	3.4	4.2	8.0	13.1	8.9	11.3	13.1	10.4	10.5	6.0	4.8	-0.6	-5.7	-18.2	-34.0	-51.1	-75.1	
Leq,d	15.0	-31.9	-26.0	-22.1	-9.2	-4.3	-10.4	-2.0	-0.3	-1.6	-3.6	-3.0	-1.6	-0.9	-0.4	3.1	7.3	2.8	5.6	7.1	4.3	4.1	0.6	-1.1	-7.1	-12.9	-26.0	-42.0	-58.9	-82.5	
Leq,d	21.3	-31.8	-25.9	-22.0	-9.1	-4.3	-10.4	-2.0	-0.3	-1.7	-3.7	0.4	2.5	3.6	4.4	8.2	13.3	9.1	12.7	14.4	11.7	11.8	7.2	5.9	0.3	-5.1	-18.0	-34.3	-51.8	-76.3	
Leq,d	21.8	-31.8	-25.9	-22.0	-9.1	-4.3	-10.5	-2.1	-0.5	-1.9	-1.0	0.4	2.4	3.5	4.3	8.0	13.2	10.2	13.5	15.2	12.5	12.6	8.0	6.7	1.1	-4.4	-17.3	-33.7	-51.3	-75.7	

Appendix C:

FHWA Roadway Noise Modeling Worksheets

Noise Input Data

Observer Distance (ft):

470

Distance to Wall(ft):

10

Height of Wall (ft):

40

Barrier:

Wall

Height of Observer:

5

Height of Noise:

5

Observer Elevation (ft):

0

Noise Elevation (ft):

0

Drop-off:

3 dBA per distance doubling

OUTPUT

	Distance	Leq	Lmax	L2	L8	L25	L50
Reference Level	470	70	70	70	70	70	70
Projected Level	470	70	70	70	70	70	70
Adjusted Level	470	50	50	50	50	50	50

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

PROJECT:	913 California St Redlands	JOB #:	1149-2024-02
ROADWAY:	California St north of Redlands Blvd	DATE:	10-May-24
LOCATION:	913 California St, Redlands CA	ENGINEER:	F. Irarrazabal

NOISE INPUT DATA Existing

ROADWAY CONDITIONS

ADT =	19,500
SPEED =	40
PK HR % =	10
NEAR LANE/FAR LANE DIS	48
ROAD ELEVATION =	0.0
GRADE =	0.0 %
PK HR VOL =	1,950

RECEIVER INPUT DATA

RECEIVER DISTANCE =		50
DIST C/L TO WALL =		30
RECEIVER HEIGHT =		5.0
WALL DISTANCE FROM RECEIVER		20
PAD ELEVATION =		0.0
ROADWAY VIEW:	LF ANGLE=	-90
	RT ANGLE=	90
	DF ANGLE=	180

SITE CONDITIONS

AUTOMOBILES =	10
MEDIUM TRUCKS =	10
HEAVY TRUCKS =	10

(10 = HARD SITE, 15 = SOFT SITE)

WALL INFORMATION

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

VEHICLE MIX DATA

VEHICLE TYPE	DAY	EVENING	NIGHT	DAILY
AUTOMOBILES	0.755	0.140	0.104	0.9200
MEDIUM TRUCK	0.480	0.020	0.500	0.0300
HEAVY TRUCKS	0.480	0.020	0.500	0.0500

MISC. VEHICLE INFO

VEHICLE TYPE	HEIGHT	SLE DISTANCE	GRADE ADJUSTMENT
AUTOMOBILES	2.0	43.97	- -
MEDIUM TRUCKS	4.0	43.87	- -
HEAVY TRUCKS	8.0	43.97	0.00

NOISE OUTPUT DATA

NOISE IMPACTS (WITHOUT TOPO OR BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	69.1	67.0	65.8	59.7	68.1	68.8
MEDIUM TRUCKS	63.2	59.2	51.4	60.6	66.8	66.8
HEAVY TRUCKS	70.2	66.2	58.5	67.7	73.8	73.8
NOISE LEVELS (dBA)	73.1	70.0	66.6	69.0	75.5	75.6

NOISE IMPACTS (WITH TOPO AND BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	69.1	67.0	65.8	59.7	68.1	68.8
MEDIUM TRUCKS	63.2	59.2	51.4	60.6	66.8	66.8
HEAVY TRUCKS	70.2	66.2	58.5	67.7	73.8	73.8
NOISE LEVELS (dBA)	73.1	70.0	66.6	69.0	75.5	75.6

NOISE CONTOUR (FT)				
NOISE LEVELS	70 dBA	65 dBA	60 dBA	55 dBA
CNEL	183	578	1827	5779
LDN	177	558	1765	5582

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

PROJECT:	913 California St Redlands	JOB #:	1149-2024-02
ROADWAY:	California St north of Redlands Blvd	DATE:	10-May-24
LOCATION:	913 California St, Redlands CA	ENGINEER:	F. Irarrazabal

NOISE INPUT DATA Existing + Project

ROADWAY CONDITIONS

ADT =	20,500
SPEED =	40
PK HR % =	10
NEAR LANE/FAR LANE DIS	48
ROAD ELEVATION =	0.0
GRADE =	0.0 %
PK HR VOL =	2,050

RECEIVER INPUT DATA

RECEIVER DISTANCE =		50
DIST C/L TO WALL =		30
RECEIVER HEIGHT =		5.0
WALL DISTANCE FROM RECEIVER		20
PAD ELEVATION =		0.0
ROADWAY VIEW:	LF ANGLE=	-90
	RT ANGLE=	90
	DF ANGLE=	180

SITE CONDITIONS

AUTOMOBILES =	10
MEDIUM TRUCKS =	10
HEAVY TRUCKS =	10

(10 = HARD SITE, 15 = SOFT SITE)

WALL INFORMATION

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

VEHICLE MIX DATA

VEHICLE TYPE	DAY	EVENING	NIGHT	DAILY
AUTOMOBILES	0.755	0.140	0.104	0.9200
MEDIUM TRUCK	0.480	0.020	0.500	0.0300
HEAVY TRUCKS	0.480	0.020	0.500	0.0500

MISC. VEHICLE INFO

VEHICLE TYPE	HEIGHT	SLE DISTANCE	GRADE ADJUSTMENT
AUTOMOBILES	2.0	43.97	- -
MEDIUM TRUCKS	4.0	43.87	- -
HEAVY TRUCKS	8.0	43.97	0.00

NOISE OUTPUT DATA

NOISE IMPACTS (WITHOUT TOPO OR BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	69.3	67.3	66.0	59.9	68.3	69.0
MEDIUM TRUCKS	63.4	59.4	51.6	60.8	67.0	67.0
HEAVY TRUCKS	70.4	66.5	58.7	67.9	74.0	74.1
NOISE LEVELS (dBA)	73.4	70.3	66.8	69.2	75.7	75.8

NOISE IMPACTS (WITH TOPO AND BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	69.3	67.3	66.0	59.9	68.3	69.0
MEDIUM TRUCKS	63.4	59.4	51.6	60.8	67.0	67.0
HEAVY TRUCKS	70.4	66.5	58.7	67.9	74.0	74.1
NOISE LEVELS (dBA)	73.4	70.3	66.8	69.2	75.7	75.8

NOISE CONTOUR (FT)				
NOISE LEVELS	70 dBA	65 dBA	60 dBA	55 dBA
CNEL	192	608	1921	6075
LDN	186	587	1856	5869

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

PROJECT:	913 California St Redlands	JOB #:	1149-2024-02
ROADWAY:	Redlands Blvd east of California	DATE:	10-May-24
LOCATION:	913 California St, Redlands CA	ENGINEER:	F. Irarrazabal

NOISE INPUT DATA Existing

ROADWAY CONDITIONS

ADT =	21,300
SPEED =	40
PK HR % =	10
NEAR LANE/FAR LANE DIS	48
ROAD ELEVATION =	0.0
GRADE =	0.0 %
PK HR VOL =	2,130

RECEIVER INPUT DATA

RECEIVER DISTANCE =		50
DIST C/L TO WALL =		30
RECEIVER HEIGHT =		5.0
WALL DISTANCE FROM RECEIVER		20
PAD ELEVATION =		0.0
ROADWAY VIEW:	LF ANGLE=	-90
	RT ANGLE=	90
	DF ANGLE=	180

SITE CONDITIONS

AUTOMOBILES =	10
MEDIUM TRUCKS =	10
HEAVY TRUCKS =	10

(10 = HARD SITE, 15 = SOFT SITE)

WALL INFORMATION

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

VEHICLE MIX DATA

VEHICLE TYPE	DAY	EVENING	NIGHT	DAILY
AUTOMOBILES	0.755	0.140	0.104	0.9200
MEDIUM TRUCK	0.480	0.020	0.500	0.0300
HEAVY TRUCKS	0.480	0.020	0.500	0.0500

MISC. VEHICLE INFO

VEHICLE TYPE	HEIGHT	SLE DISTANCE	GRADE ADJUSTMENT
AUTOMOBILES	2.0	43.97	- -
MEDIUM TRUCKS	4.0	43.87	- -
HEAVY TRUCKS	8.0	43.97	0.00

NOISE OUTPUT DATA

NOISE IMPACTS (WITHOUT TOPO OR BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	69.4	67.4	66.1	60.1	68.5	69.1
MEDIUM TRUCKS	63.5	59.6	51.8	61.0	67.1	67.2
HEAVY TRUCKS	70.6	66.6	58.8	68.0	74.2	74.2
NOISE LEVELS (dBA)	73.5	70.4	67.0	69.4	75.9	76.0

NOISE IMPACTS (WITH TOPO AND BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	69.4	67.4	66.1	60.1	68.5	69.1
MEDIUM TRUCKS	63.5	59.6	51.8	61.0	67.1	67.2
HEAVY TRUCKS	70.6	66.6	58.8	68.0	74.2	74.2
NOISE LEVELS (dBA)	73.5	70.4	67.0	69.4	75.9	76.0

NOISE CONTOUR (FT)				
NOISE LEVELS	70 dBA	65 dBA	60 dBA	55 dBA
CNEL	200	631	1996	6312
LDN	193	610	1928	6098

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

PROJECT: 913 California St Redlands
ROADWAY: Redlands Blvd easat of California St
LOCATION: 913 California St, Redlands CA

JOB #: 1149-2024-02
DATE: 10-May-24
ENGINEER: F. Irarrazabal

NOISE INPUT DATA Existing + Project

ROADWAY CONDITIONS

ADT = 21,700
SPEED = 40
PK HR % = 10
NEAR LANE/FAR LANE DIS 48
ROAD ELEVATION = 0.0
GRADE = 0.0 %
PK HR VOL = 2,170

RECEIVER INPUT DATA

RECEIVER DISTANCE = 50
DIST C/L TO WALL = 30
RECEIVER HEIGHT = 5.0
WALL DISTANCE FROM RECEIVER 20
PAD ELEVATION = 0.0
ROADWAY VIEW: LF ANGLE= -90
RT ANGLE= 90
DF ANGLE= 180

SITE CONDITIONS

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

WALL INFORMATION

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

VEHICLE MIX DATA

VEHICLE TYPE	DAY	EVENING	NIGHT	DAILY
AUTOMOBILES	0.755	0.140	0.104	0.9200
MEDIUM TRUCK	0.480	0.020	0.500	0.0300
HEAVY TRUCKS	0.480	0.020	0.500	0.0500

MISC. VEHICLE INFO

VEHICLE TYPE	HEIGHT	SLE DISTANCE	GRADE ADJUSTMENT
AUTOMOBILES	2.0	43.97	- -
MEDIUM TRUCKS	4.0	43.87	- -
HEAVY TRUCKS	8.0	43.97	0.00

NOISE OUTPUT DATA

NOISE IMPACTS (WITHOUT TOPO OR BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	69.5	67.5	66.2	60.2	68.6	69.2
MEDIUM TRUCKS	63.6	59.6	51.9	61.1	67.2	67.3
HEAVY TRUCKS	70.7	66.7	58.9	68.1	74.3	74.3
NOISE LEVELS (dBA)	73.6	70.5	67.1	69.4	75.9	76.1

NOISE IMPACTS (WITH TOPO AND BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	69.5	67.5	66.2	60.2	68.6	69.2
MEDIUM TRUCKS	63.6	59.6	51.9	61.1	67.2	67.3
HEAVY TRUCKS	70.7	66.7	58.9	68.1	74.3	74.3
NOISE LEVELS (dBA)	73.6	70.5	67.1	69.4	75.9	76.1

NOISE CONTOUR (FT)				
NOISE LEVELS	70 dBA	65 dBA	60 dBA	55 dBA
CNEL	203	643	2034	6431
LDN	196	621	1964	6212

Appendix D:

Construction Noise Modeling Output

Receptor - 315 ft to the Southwest of property line

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	Muffler
SITE PREP										
Tractors/Loaders/Backhoes	4	80	175	315	37	0.5	0.37	66.4	55.7	40.7
Rubber Tired Dozer	3	85	175	315	40	0.5	0.40	71.4	61.0	46.0
							Log Sum	72.6	67.2	47.2
GRADE										
Excavator	1	85	175	315	38	0.5	0.38	71.4	60.8	45.8
Rubber Tired Dozer	1	85	175	315	40	0.5	0.40	71.4	61.0	46.0
Graders	1	85	175	315	40	0.5	0.40	71.4	61.0	46.0
Tractor/Loader/Backhoe	3	80	175	315	37	0.5	0.37	66.4	55.7	40.7
								76.6	66.9	51.1
BUILD										
Crane	1	81	175	315	20	0.5	0.20	67.4	54.0	39.0
Forklifts	3	65	175	315	20	0.5	0.20	51.4	38.0	23.0
Generator Set	1	81	175	315	74	0.5	0.74	67.4	59.7	44.7
Tractor/Loader/Backhoe	3	84	175	315	40	0.5	0.40	70.4	60.0	45.0
Welder	1	73	175	315	40	0.5	0.40	59.4	49.0	49.0
								73.6	66.3	51.8
PAVE										
Tractor/Loader/Backhoe	1	80	175	315	37	0.5	0.37	66.4	55.7	40.7
Pavers	1	85	175	315	42	0.5	0.42	71.4	61.2	46.2
Rollers	1	85	175	315	38	0.5	0.38	71.4	60.8	45.8
Paving Equipment	2	85	175	315	36	0.5	0.36	71.4	60.6	45.6
Cement and Mortar Mixers	2	85	175	315	40	0.5	0.40	71.4	61.0	46.0
								77.7	68.9	52.3
ARCH COATING										
Air Compressor	1	80	175	315	48	0.5	0.48	66.4	56.8	41.8

Receptor - 335 ft to the East of property line

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	Muffler
SITE PREP										
Tractors/Loaders/Backhoes	4	80	140	335	37	0.5	0.37	68.8	55.0	40.0
Rubber Tired Dozer	3	85	140	335	40	0.5	0.40	73.8	60.4	45.4
							Log Sum	75.0	66.6	46.5
GRADE										
Excavator	1	85	140	335	38	0.5	0.38	73.8	60.1	45.1
Rubber Tired Dozer	1	85	140	335	40	0.5	0.40	73.8	60.4	45.4
Graders	1	85	140	335	40	0.5	0.40	73.8	60.4	45.4
Tractor/Loader/Backhoe	3	80	140	335	37	0.5	0.37	68.8	55.0	40.0
								79.0	66.2	50.5
BUILD										
Crane	1	81	140	335	20	0.5	0.20	69.8	53.4	38.4
Forklifts	3	65	140	335	20	0.5	0.20	53.8	37.4	22.4
Generator Set	1	81	140	335	74	0.5	0.74	69.8	59.0	44.0
Tractor/Loader/Backhoe	3	84	140	335	40	0.5	0.40	72.8	59.4	44.4
Welder	1	73	140	335	40	0.5	0.40	61.8	48.4	48.4
								76.0	65.7	51.1
PAVE										
Tractor/Loader/Backhoe	1	80	140	335	37	0.5	0.37	68.8	55.0	40.0
Pavers	1	85	140	335	42	0.5	0.42	73.8	60.6	45.6
Rollers	1	85	140	335	38	0.5	0.38	73.8	60.1	45.1
Paving Equipment	2	85	140	335	36	0.5	0.36	73.8	59.9	44.9
Cement and Mortar Mixers	2	85	140	335	40	0.5	0.40	73.8	60.4	45.4
								80.2	68.2	51.6
ARCH COATING										
Air Compressor	1	80	140	335	48	0.5	0.48	68.8	56.2	41.2

Appendix E:

Construction Vibration Modeling Output

VIBRATION LEVEL IMPACT

Project:	913 California Street	Date: 5/14/24
Source:	Large Bulldozer	
Scenario:	Unmitigated	
Location:	175 feet to the west of the project site	
Address:	913 California Street, Redlands, CA	

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

DATA INPUT

Equipment = Type	2	Large Bulldozer	INPUT SECTION IN BLUE
PPVref =	0.089	Reference PPV (in/sec) at 25 ft.	
D =	175.00	Distance from Equipment to Receiver (ft)	
n =	1.10	Vibration attenuation rate through the ground	

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

DATA OUT RESULTS

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