Appendix G

Crescent Gardens Cemetery, Noise Impact Analysis
May 16, 2024
prepared by MD Acoustics

Crescent Gardens Cemetery

Noise Impact Study

County of Riverside, CA

Prepared for:

Ms. Julie Gilbert
Compass Consulting Enterprises, Inc.
PO Box 2627
Avalon, CA 90704

Prepared by:

MD Acoustics, LLC
Claire Pincock, INCE-USA
Naomi Jensen
1197 Los Angeles Ave, Ste C-256
Simi Valley, CA 93065

Date: 5/16/2024

MD ACOUSTICS
Sound Solutions for Planning and Design

Noise Study Reports | Vibration Studies | Air Quality | Greenhouse Gas | Health Risk Assessments

P) AZ - 602.774.1950 P) CA - 805.426.4477
www.mdacoustics.com
info@mdacoustics.com

TABLE OF CONTENTS

1.0 Introduction 1
1.1 Purpose of Analysis and Study Objectives 1
1.2 Site Location and Study Area 1
1.3 Proposed Project Description 1

2.0 Fundamentals of Noise 4
2.1 Sound, Noise and Acoustics 4
2.2 Frequency and Hertz 4
2.3 Sound Pressure Levels and Decibels 4
2.4 Addition of Decibels 4
2.5 Human Response to Changes in Noise Levels 5
2.6 Noise Descriptors 5
2.7 Traffic Noise Prediction 6
2.8 Sound Propagation 7

3.0 Ground-Borne Vibration Fundamentals 8
3.1 Vibration Descriptors 8
3.2 Vibration Perception 8

4.0 Regulatory Setting 10
4.1 Federal Regulations 10
4.2 State Regulations 10
4.3 County of Riverside Noise Regulations 11

5.0 Study Method and Procedure 16
5.1 Noise Measurement Procedure and Criteria 16
5.2 Noise Measurement Locations 16
5.3 FHWA Traffic Noise Prediction Model 16
5.4 FHWA Roadway Construction Noise Model 17
5.2 Stationary Noise Modeling 17

6.0 Existing Noise Environment 20
6.1 Short-Term Noise Measurement Results 20

7.0 Future Noise Environment Impacts and Mitigation 21
7.1 Future Exterior Noise 21
7.1.1 Noise Impacts to Off-Site Receptors Due to Stationary Sources 21
7.1.2 Noise Impacts to On/Off-Site Receptors Due to Project Generated Traffic 22

8.0 Construction Noise Impact 24
8.1 Construction Noise 24
8.2 Construction Vibration 26
8.3 Construction Noise Reduction Policies 28

9.0 References 29

LIST OF APPENDICES

Appendix A: Field Measurement Data 1
Appendix B: Traffic Noise Modeling Output 2
Appendix C: Construction Noise Modeling Output 3
Appendix D: SoundPLAN Inputs/Outputs 4

LIST OF EXHIBITS

Exhibit A: Location Map 2
Exhibit B: Site Plan 3
Exhibit C: Typical A-Weighted Noise Levels 4
Exhibit D: Land Use Compatibility Guidelines 11
Exhibit E: Measurements Locations 19
Exhibit F: Operational Noise Level Contours 23

LIST OF TABLES

Table 1: Riverside County Allowable Exterior Noise Level 15
Table 2: Roadway Parameters and Vehicle Distribution 17
Table 3: Short-Term Noise Measurement Data (dBA) 20
Table 4: Worst-Case Predicted Daytime Operational Lmax Noise Levels (dBA) 22
Table 5: Change in Existing Noise Levels as a Result of Project 22
Table 6: Typical Construction Noise Levels[1] 24
Table 7: Construction Noise Levels at Nearest Existing Adjacent Residences 25
Table 8: Construction Noise Levels During Phase 2 and 3 26
Table 9: Guideline Vibration Damage Potential Threshold Criteria 27
Table 10: Vibration Source Levels for Construction Equipment[1] 27

1.0 Introduction

1.1 Purpose of Analysis and Study Objectives

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

1.2 Site Location and Study Area

The project site is near Robert Street and Wallace Avenue in Riverside County, CA, as shown in Exhibit A. The site is currently zoned as rural residential. The land directly surrounding the site is zoned as rural residential in all cardinal directions. There are existing single family residences to the north, south, and west of the project site. Robert Street is to the west and Wallace Avenue is to the north.

1.3 Proposed Project Description

The site is approximately 85.5 acres of undeveloped land in the community Meadowbrook, north of Lake Elsinore, CA. The project proposes to construct a human cemetery, a mortuary (no crematorium), a chapel, a caretaker residence (< 2,000 sqft), an equipment shed and additional infrastructure (e.g. roads, utilities, landscaping, parking and drainage basins).

This study assesses the traffic noise to and from the project site and compares the results to the applicable County noise standards. In addition, the study reviews noise generated by construction activities.

Construction activities within the project area will consist of demolition, site prep, grading, building, paving, and architectural coating.

Exhibit A

Location Map

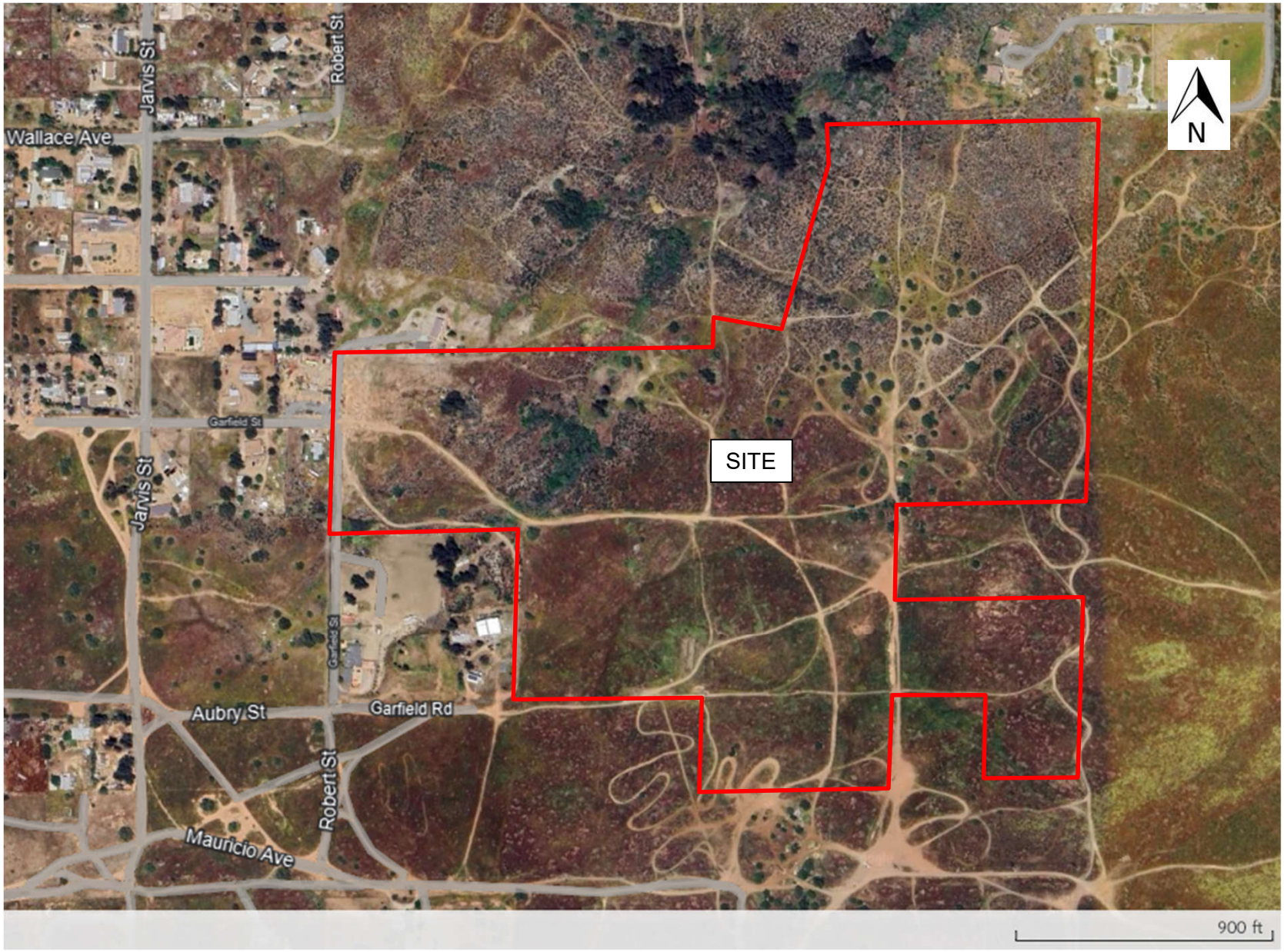
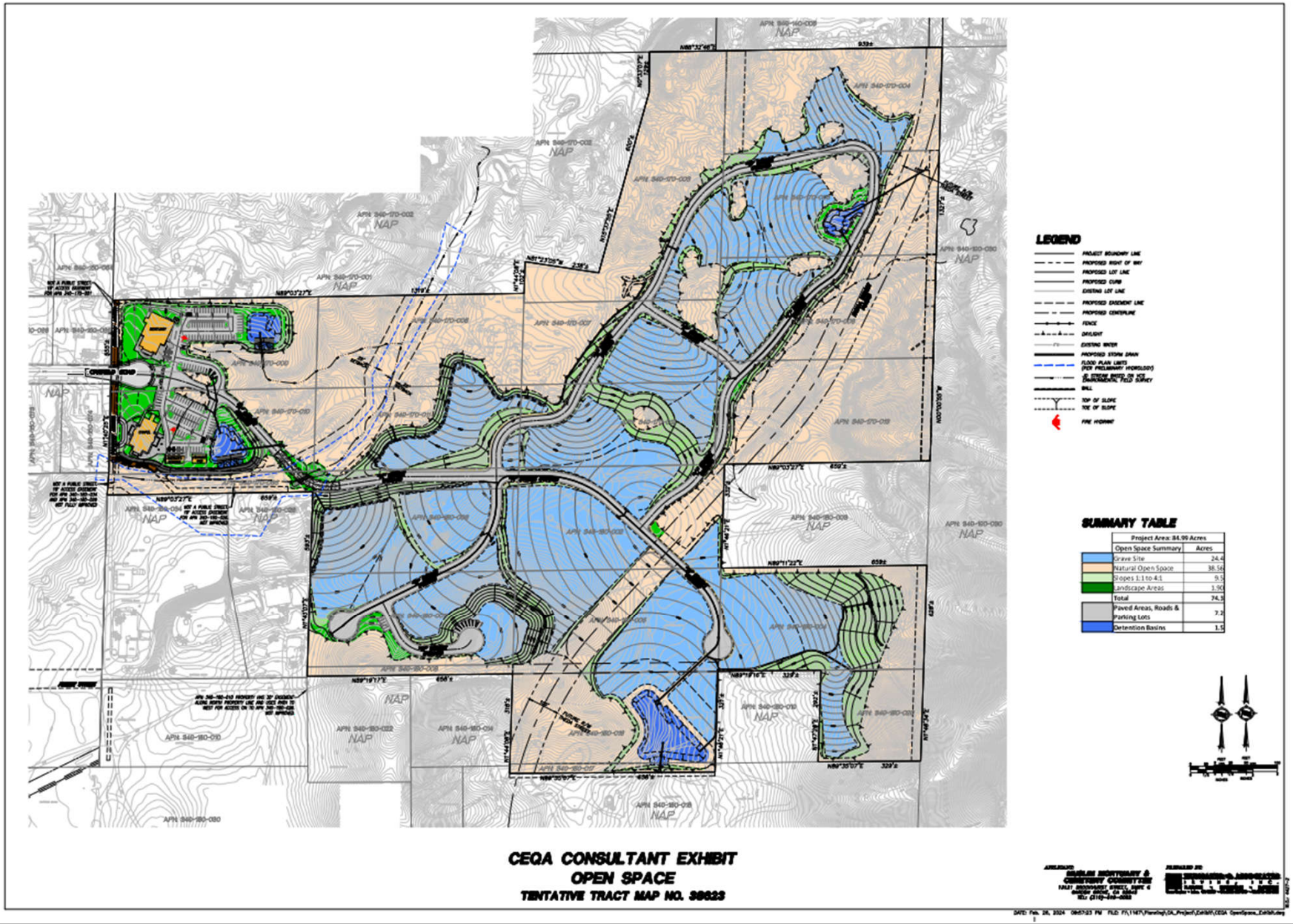


Exhibit B

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.

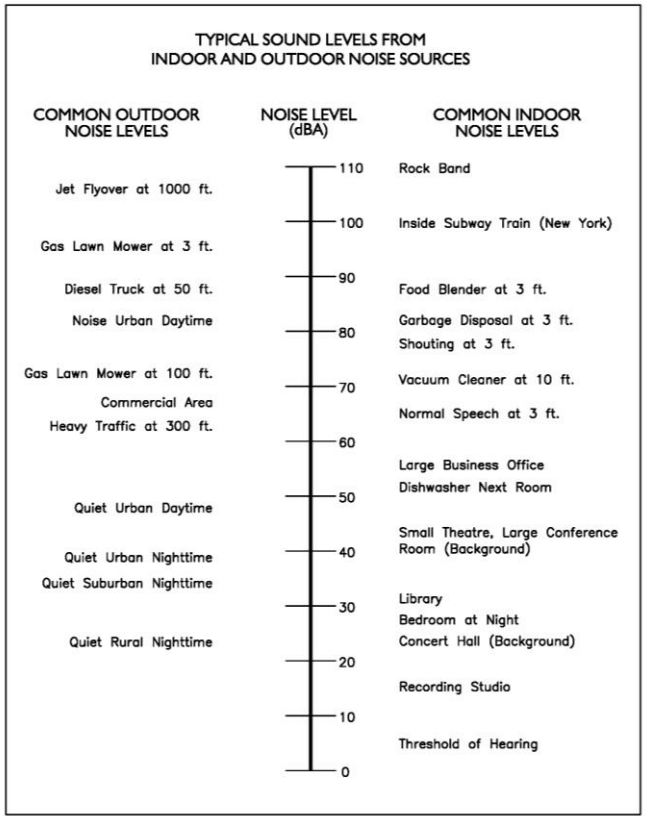
2.1 Sound, Noise and Acoustics

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 from 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 measured 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 reference 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 Human Response to Changes in Noise Levels

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

Changes in Intensity Level, dBA	Changes in Apparent Loudness
1	Not perceptible
3	Just perceptible
5	Clearly noticeable
10	Twice (or half) as loud

https://www.fhwa.dot.gov/environMent/noise/regulations_and_guidance/polguide/polguide02.cfm

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

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

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

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

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

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

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

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

Percent Noise Levels: See L(n).

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

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

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

2.7 Traffic Noise Prediction

Noise levels associated with traffic depend on a variety of factors: (1) volume of traffic, (2) speed of traffic, (3) auto, medium truck (2 axle) and heavy truck percentage (3 axle and greater), and sound propagation. The greater the volume of traffic, higher speeds, and truck percentages equate to a louder

volume in noise. A doubling of the Average Daily Traffic (ADT) along a roadway will increase noise levels by approximately 3 dB; reasons for this are discussed in the sections above.

2.8 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 or more from a noise source. Wind, temperature, air humidity and turbulence can further impact have far sound can travel.

3.0 Ground-Borne Vibration Fundamentals

3.1 Vibration Descriptors

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

Several different methods are used to quantify vibration amplitude.

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

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

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

3.2 Vibration Perception

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

There are three main types of vibration propagation: surface, compression, and shear waves. Surface waves, or Rayleigh waves, travel along the ground's surface. These waves carry most of their energy along an expanding circular wavefront, similar to ripples produced by throwing a rock into a pool of water. P-waves, or compression waves, are body waves that carry their energy along an expanding spherical wavefront. The particle motion in these waves is longitudinal (i.e., in a "push-pull" fashion). P-waves are analogous to airborne sound waves. S-waves, or shear waves, are also body waves that carry energy along an expanding spherical wavefront. However, unlike P-waves, the particle motion is transverse, or side-to-side and perpendicular to the direction of propagation.

As vibration waves propagate from a source, the vibration energy decreases in a logarithmic nature and the vibration levels typically decrease by 6 VdB per doubling of the distance from the vibration source. As stated above, this drop-off rate can vary greatly depending on the soil but has been shown to be

effective enough for screening purposes, in order to identify potential vibration impacts that may need to be studied through actual field tests.

4.0 Regulatory Setting

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

4.1 Federal Regulations

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

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

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

The federal government advocates that local jurisdiction use their land use regulatory authority to arrange new development in such a way that “noise sensitive” uses are either prohibited from being constructed adjacent to a highway or 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 clearly delineate compatibility of sensitive uses with various incremental levels of noise.

The State of California has established noise insulation standards as outlined in Title 24 of the California Building Code (CBC) 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.

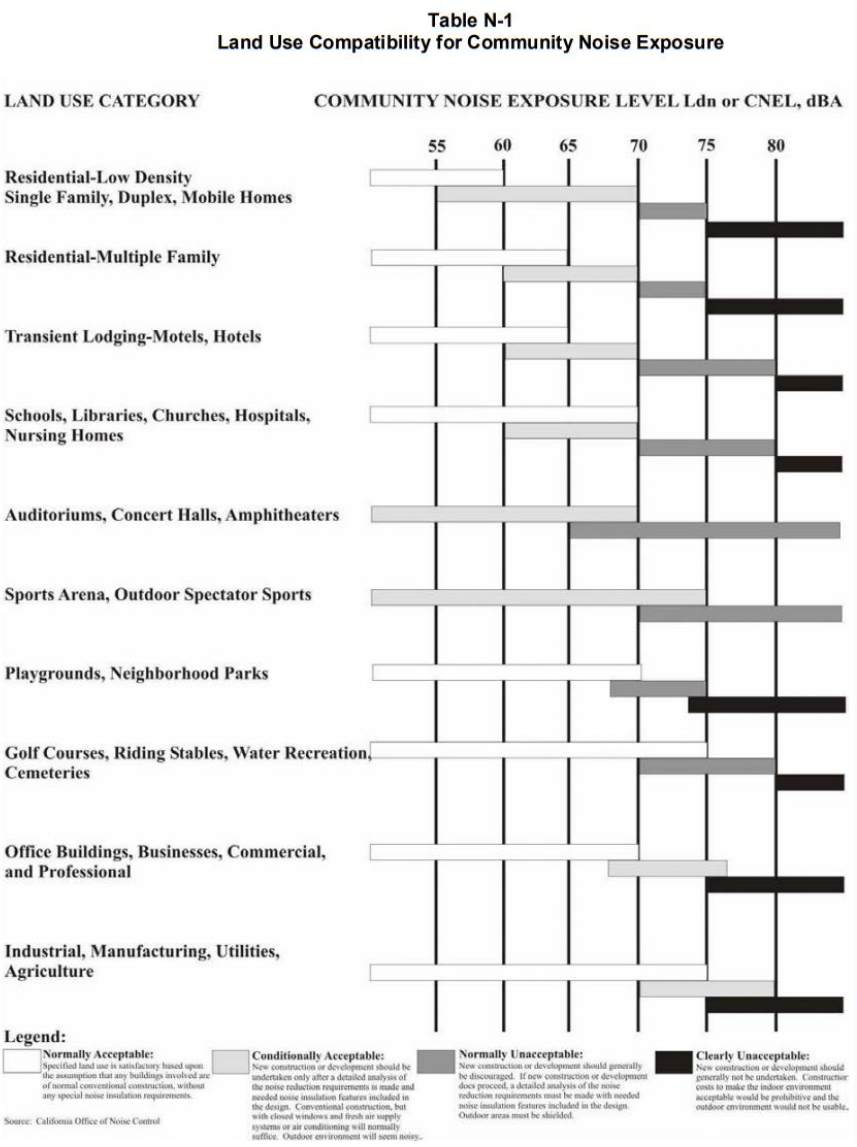
4.3 County of Riverside Noise Regulations

The County of Riverside outlines their noise regulations and standards within the Noise Element from the General Plan and Chapter 9.52 from the Municipal Code.

County of Riverside General Plan

Table N-1 (Exhibit D of this report) of the Noise Element outlines the exterior noise standards for community noise environments.

Exhibit D: Land Use Compatibility Guidelines



Policies and Implementation Measures

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

Policies

N 1.1 Protect noise-sensitive land uses from high levels of noise by restricting noise-producing land uses from these areas. If the noise-producing land use cannot be relocated, then noise buffers such as setbacks, landscaping, or block walls shall be used.

N 1.2 Guide noise-tolerant land uses into areas irrevocably committed to land uses that are noise-producing, such as transportation corridors or within the projected noise contours of any adjacent airports.

N 1.4 Determine if existing land uses will present noise compatibility issues with proposed projects by undertaking site surveys.

N 1.5 Prevent and mitigate the adverse impacts of excessive noise exposure on the residents, employees, visitors, and noise-sensitive uses of Riverside County.

N 1.6 Minimize noise spillover or encroachment from commercial and industrial land uses into adjoining residential neighborhoods or noise-sensitive uses.

N 1.7 Require proposed land uses, affected by unacceptably high noise levels, to have an acoustical specialist prepare a study of the noise problems and recommend structural and site design features that will adequately mitigate the noise problem.

N 2.2 Require a qualified acoustical specialist to prepare acoustical studies for proposed noise-sensitive projects within noise impacted areas to mitigate existing noise.

N 2.3 Mitigate exterior and interior noises to the levels listed in the table below to the extent feasible, for stationary sources.

Stationary Source Land Use Noise Standards[1]

Land Use	Interior Standards	Exterior Standards
Residential		
10:00 p.m. to 7:00 a.m.	40 L_{eq} (10 minute)	45 L_{eq} (10 minute)
7:00 a.m. to 10:00 p.m.	55 L_{eq} (10 minute)	65 L_{eq} (10 minute)

1 These are only preferred standards; final decision will be made by the Riverside County Planning Department and Office of Public Health.

N 3.2 Require acoustical studies and subsequent approval by the Planning Department and the Office of Industrial Hygiene, to help determine effective noise mitigation strategies in noise-producing areas.

N 3.3 Ensure compatibility between industrial development and adjacent land uses. To achieve compatibility, industrial development projects may be required to include noise mitigation measures to avoid or minimize project impacts on adjacent uses.

N 3.4 Identify point-source noise producers such as manufacturing plants, truck transfer stations, and commercial development by conducting a survey of individual sites.

N 3.5 Require that a noise analysis be conducted by an acoustical specialist for all proposed projects that are noise producers. Include recommendations for design mitigation if the project is to be located either within proximity of a noise-sensitive land use, or land designated for noise sensitive land uses.

N 3.6 Discourage projects that are incapable of successfully mitigating excessive noise.

N 4.1 Prohibit facility-related noise received by any sensitive use from exceeding the following worstcase noise levels:

a. 45 dBA-10-minute Leq between 10:00 p.m. and 7:00 a.m.
b. 65 dBA-10-minute Leq between 7:00 a.m. and 10:00 p.m.

N 4.2 Develop measures to control non-transportation noise impacts.
N 4.3 Ensure any use determined to be a potential generator of significant stationary noise impacts be properly analyzed and ensure that the recommended mitigation measures are implemented.
N 4.4 Require that detailed and independent acoustical studies be conducted for any new or renovated land uses or structures determined to be potential major stationary noise sources.
N 4.5 Encourage major stationary noise-generating sources throughout the County of Riverside to install additional noise buffering or reduction mechanisms within their facilities to reduce noise generation levels to the lowest extent practicable prior to the renewal of conditional use permits or business licenses or prior to the approval and/or issuance of new conditional use permits for said facilities.
N 4.7 Evaluate noise producers for the possibility of pure-tone producing noises. Mitigate any pure tones that may be emitted from a noise source.
N 4.8 Require that the parking structures, terminals, and loading docks of commercial or industrial land uses be designed to minimize the potential noise impacts of vehicles on the site as well as on adjacent land uses.
N 6.3 Require commercial or industrial truck delivery hours be limited when adjacent to noise-sensitive land uses unless there is no feasible alternative or there are overriding transportation benefits.
N 9.3 Require development that generates increased traffic and subsequent increases in the ambient noise level adjacent to noise-sensitive land uses to provide for appropriate mitigation measures.
N 9.4 Require that the loading and shipping facilities of commercial and industrial land uses, which abut residential parcels be located and designed to minimize the potential noise impacts upon residential parcels.
N 13.1 Minimize the impacts of construction noise on adjacent uses within acceptable practices.
N 13.2 Ensure that construction activities are regulated to establish hours of operation in order to prevent and/or mitigate the generation of excessive or adverse noise impacts on surrounding areas.
N 13.3 Condition subdivision approval adjacent to developed/occupied noise-sensitive land uses (see policy N 1.3) by requiring the developer to submit a construction-related noise mitigation plan to the County for review and approval prior to issuance of a grading permit. The plan must depict the location of construction equipment and how the noise from this equipment will be mitigated during construction of this project, through the use of such methods as: a. Temporary noise attenuation fences; b. Preferential location of equipment; and c. Use of current noise suppression technology and equipment.
N 13.4 Require that all construction equipment utilizes noise reduction features (e.g. mufflers and engine shrouds) that are no less effective than those originally installed by the manufacturer.

N 14.5 Consider the issue of adjacent residential land uses when designing and configuring all new, nonresidential development. Design and configure on-site ingress and egress points that divert traffic away from nearby noise-sensitive land uses to the greatest degree practicable. (AI 106, 107)
N 14.8 Review all development applications for consistency with the standards and policies of the Noise Element of the General Plan.
N 16.2 Consider the following land uses sensitive to vibration:

- Hospitals;
- Residential areas;
- Concert halls;
- Libraries;
- Sensitive research operations;
- Schools; and
- Offices

N 19.5 Require new developments that have the potential to generate significant noise impacts to inform impacted users on the effects of these impacts during the environmental review process.

County of Riverside Code of Ordinances

CHAPTER 9.52 – Noise Regulations

9.52.010. - Intent

At certain levels, sound becomes noise and may jeopardize the health, safety, or general welfare of Riverside County residents and degrade their quality of life. Pursuant to its police power, the board of supervisors declares that noise shall be regulated in the manner described in this chapter. This chapter is intended to establish county-wide standards regulating noise. This chapter is not intended to establish thresholds of significance for the purpose of any analysis required by the California Environmental Quality Act and no such thresholds are established.
(Ord. 847 § 1, 2006)

9.52.020. - Exemptions

A. Sound emanating from the following sources is exempt from the provisions of this chapter:
B. Facilities owned or operated by or for a governmental agency;
C. Capital improvement projects of a governmental agency;
D. The maintenance or repair of public properties;
E. Public safety personnel in the course of executing their official duties, including, but not limited to, sworn peace officers, emergency personnel and public utility personnel. This exemption includes, without limitation, sound emanating from all equipment used by such personnel, whether stationary or mobile;
F. Public or private schools and school-sponsored activities;
G. Agricultural operations on land designated "Agriculture" in the Riverside County general plan, or land zoned A-l (light agriculture), A-P (light agriculture with poultry), A-2 (heavy agriculture), A-D (agriculture-dairy) or C/V (citrus/vineyard), provided such operations are carried out in a manner consistent with accepted industry standards. This exemption includes, without

limitation, sound emanating from all equipment used during such operations, whether stationary or mobile;

H. Wind energy conversion systems (WECS), provided such systems comply with the WECS noise provisions of Riverside County Ordinance No. 348;

I. Private construction projects located one-quarter of a mile or more from an inhabited dwelling;

J. Private construction projects located within one-quarter of a mile from an inhabited dwelling, provided that:

1. Construction does not occur between the hours of six p.m. and six a.m. during the months of June through September, and

2. Construction does not occur between the hours of six p.m. and seven a.m. during the months of October through May;

K. Property maintenance, including, but not limited to, the operation of lawnmowers, leaf blowers, etc., provided such maintenance occurs between the hours of seven a.m. and eight p.m.;

L. Motor vehicles, other than off-highway vehicles. This exemption does not include sound emanating from motor vehicle sound systems;

M. Heating and air conditioning equipment;
Safety, warning and alarm devices, including, but not limited to, house and car alarms, and other warning devices that are designed to protect the public health, safety, and welfare;

N. The discharge of firearms consistent with all state laws.

(Ord. 847 § 2, 2006)

County of Riverside – Noise Ordinance

No person shall create any sound, or allow the creation of any sound, on any property that causes the exterior sound level on any other occupied property to exceed the sound level standards set forth in Table 1.

Table 1: Riverside County Allowable Exterior Noise Level

Sound Level Standards (dBA Lmax)

General Plan Land Use Designation	Maximum Decibel Level	
	7 a.m. - 10 p.m.	10 p.m. - 7 a.m.
Low Density Residential	55	45
Medium Density Residential	55	45
Medium High Density Residential	55	45
Commercial Retail	65	55
Light Industrial	75	55

(Ord. 847 § 4, 2006)

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

MD conducted the sound level measurements in accordance to the County's and Caltrans (TeNS) technical noise specifications. All measurement equipment meets American National Standards Institute (ANSI) specifications for sound level meters (S1.4-1983 identified in Chapter 19.68.020.AA). The following gives a brief description of the Caltrans Technical Noise Supplement procedures for sound level measurements:

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

5.2 Noise Measurement Locations

MD conducted three (3) short-term 15-minute noise measurements at the Project site, representing the noise level from the traffic conditions and residences along Garfield Road and Robert Street. The noise measurement locations are illustrated in Exhibit E. Appendix A includes photos, the field sheet, and measured noise data.

5.3 FHWA Traffic Noise Prediction Model

Traffic noise from vehicular traffic was projected using the FHWA Traffic Noise Prediction Model (FHWA-RD-77-108) standards. The FHWA model arrives at the predicted noise level through a series of adjustments to the Reference Energy Mean Emission Level (REMEL). Roadway volumes and percentages correspond to the project's scoping agreement for traffic impact analysis as prepared Integrated Engineering Group (IEG) and Riverside County counts and vehicle distribution. The referenced traffic data was applied to the model and is in Appendix B. The following outlines the key adjustments made to the REMEL for the roadway inputs:

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

Table 2 indicates the roadway parameters and vehicle distribution utilized for this study.

Table 2: Roadway Parameters and Vehicle Distribution

Roadway	Segment	Existing ADT[1]	Existing + Project ADT[1]	Speed (MPH)	Site Conditions
Greenwald Ave	North of Suzan St	6,027	6,117	50	Hard
Vehicle Distribution and Mix[2]					
Motor-Vehicle Type		**Daytime % (7AM to 7 PM)**	**Evening % (7 PM to 10 PM)**	**Night % (10 PM to 7 AM)**	**Total % of Traffic Flow**
Automobiles		77.7	14.0	10.5	97.42
Medium Trucks		87.4	2.2	48.9	1.84
Heavy Trucks		89.1	5.4	47.3	0.74

Notes:
[1] Existing ADT from 2019 County traffic counts.
[2] Riverside County Secondary Roadway Mix.

5.4 FHWA Roadway Construction Noise Model

The construction noise analysis utilizes the Federal Highway Administration (FHWA) Roadway Construction Noise Model (RNCM), together with several key construction parameters. Key inputs include distance to the sensitive receiver, equipment usage, % usage factor, and baseline parameters for the project site.

The project was analyzed based on the different construction phases. The construction noise calculation output worksheet is in Appendix C.

5.2 Stationary Noise Modeling

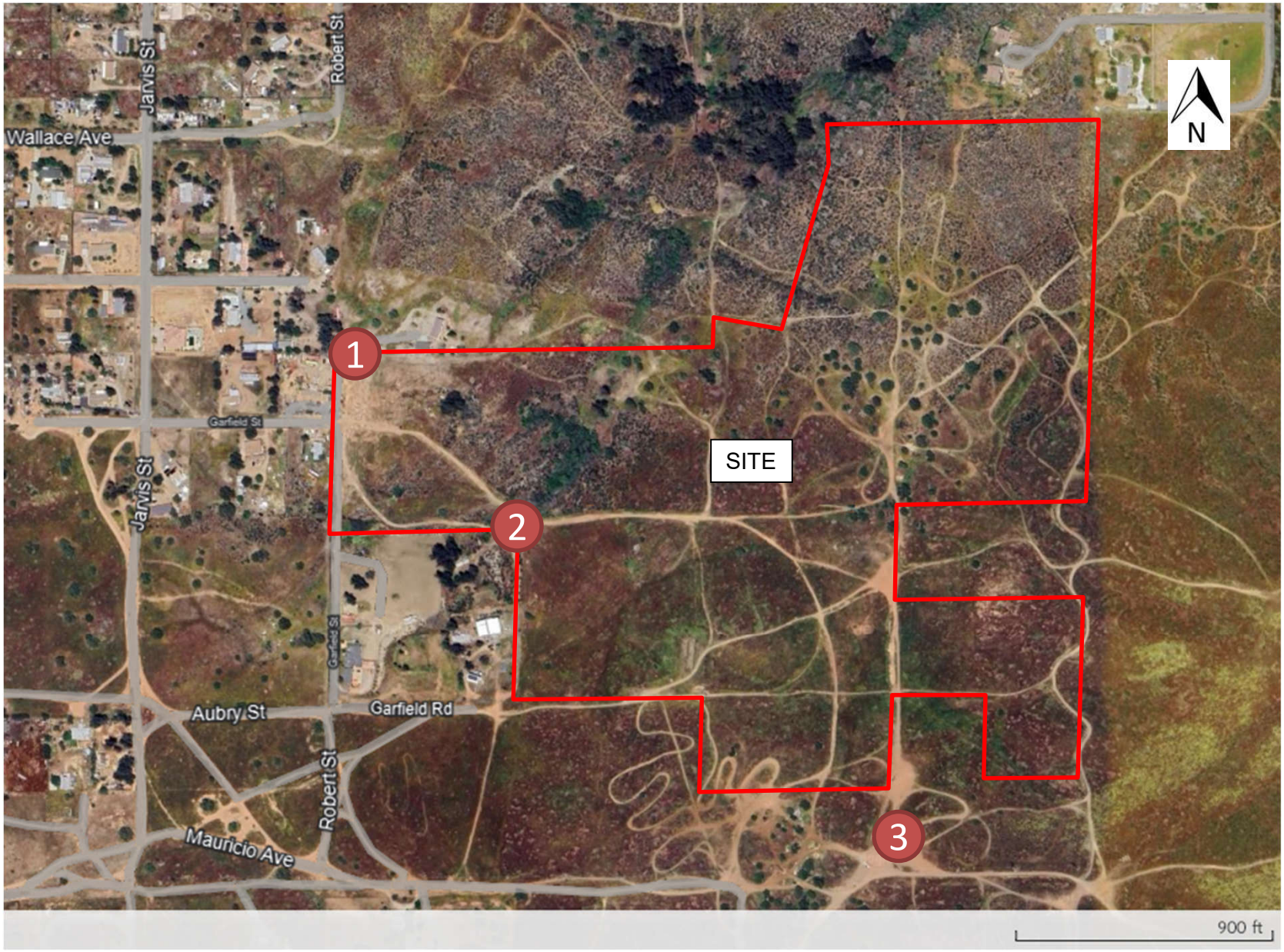
SoundPLAN (SP) acoustical modeling software was utilized to model future worst-case stationary noise impacts to the adjacent land uses. SP is capable of evaluating multiple stationary noise source impacts at various receiver locations. SP's software utilizes algorithms (based on the inverse square law and reference equipment noise level data) to calculate noise level projections. The software allows the user to input specific noise sources, spectral content, sound barriers, building placement, topography, and sensitive receptor locations.

The future worst-case noise level projections were modeled using referenced sound level data for the HVAC units and parking. The Chapel and Mortuary are assumed to each have 2 12.5 ton HVAC units and the caretaker's residence and equipment shed are assumed to each have a 5 ton HVAC unit. The parking lot is assumed to have 1 movement per hour per parking spot. References are in Appendix D.

Exhibit E

Measurement Locations

= Short-Term 15-minute Monitoring Location



6.0 Existing Noise Environment

Three (3) 15-minute ambient noise measurements were taken at the project site to determine the existing ambient noise levels. Noise data indicates that traffic along Greenwald Ave, SR-72, and I-15 are the primary sources of noise impacting the site and the surrounding area.

6.1 Short-Term Noise Measurement Results

The results of the 15-minute measurements are presented in Table 3.

Table 3: Short-Term Noise Measurement Data (dBA)

Location	Start Time	Stop Time	Leq	Lmax	Lmin	L(2)	L(8)	L(25)	L(50)	L(90)
NM1	2:01 PM	2:16 PM	47.5	58.5	39.5	55.3	52.6	46.4	44.5	41.3
NM2	2:50 PM	3:05 PM	42.0	46.7	38.1	44.8	43.9	42.7	41.7	40.1
NM3	3:12 PM	3:27 PM	45.6	68.7	35.0	53.8	47.5	42.5	39.9	37.2
Notes: 1. Short-term noise monitoring locations are illustrated in Exhibit E.										

For this evaluation, MD has utilized the measured ambient noise level of 42-48 dBA Leq and has compared them to the Project's projected noise levels. Field data is in Appendix A.

7.0 Future Noise Environment Impacts and Mitigation

This assessment analyzes future noise impacts to the project and compares the results to the County's Noise Standards. The analysis details the estimated exterior noise levels associated with traffic from adjacent roadway sources. Stationary noise impacts are analyzed from the on-site noise sources such as HVAC and parking noise. References are in Appendix D.

7.1 Future Exterior Noise

The following outlines the exterior noise levels associated with the proposed project.

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

Sensitive receptors that may be affected by project operational noise include existing residences to the west and south. The worst-case stationary noise was modeled using SoundPLAN acoustical modeling software.

A total of four (4) receptors were modeled to evaluate the proposed project's operational impact. A receptor is denoted by a yellow dot. All yellow dots represent either a property line or a sensitive receptor such as a building facade. Receptors 1 and 2 represent residential uses to the west and receptors 3 and 4 represent the property line to the south. See Exhibit F.

Project-Only Levels

Exhibit F shows the "Project-Only" noise levels and contours at the nearest sensitive receptors. The project-only hourly noise levels during daytime operation range from 46 to 51 dBA Lmax at the various adjacent receptors. Noise levels at the receptors fall below the County of Riverside's 55 dBA Lmax residential daytime noise standard.

Project Plus Ambient Operational Noise Levels

Table 4 demonstrates the Project plus the ambient noise levels during daytime conditions. Ambient noise levels were determined by the short-term noise measurements taken near the project site. Project plus ambient noise level projections are anticipated to be 47 to 52 dBA Lmax during daytime operation. With the addition of the project, the noise levels at the receptors still fall below the County of Riverside's 55 dBA Lmax residential daytime noise standard. Thus, the impact will be less than significant.

Table 4: Worst-Case Predicted Daytime Operational Lmax Noise Levels (dBA)

Receptor[1]	Existing Ambient Noise Level (dBA, Leq)[2]	Project Noise Level (dBA, Lmax)[3]	Daytime (7 a.m. - 10 p.m.) Non Transp. Noise Limit (dBA, Lmax)	Total Combined Noise Level (dBA, Lmax)
1	48	50	**55**	52
2	45	51	**55**	52
3	42	48	**55**	49
4	42	46	**55**	47

Notes:
[1.] Receptors 1 and 2 represent residential uses to the west. Receptors 3 and 4 represent the southern property line.
[2.] See Appendix A for the ambient noise measurement.
[3.] See Exhibit F for the operational noise level projections at said receptors.

7.1.2 Noise Impacts to On/Off-Site Receptors Due to Project Generated Traffic

A worst-case project generated traffic noise level was modeled utilizing the FHWA Traffic Noise Prediction Model - FHWA-RD-77-108. Greenwald is the closest arterial roadway to the project site. Traffic noise levels were calculated 50 feet from the centerline of the analyzed roadways. The modeling is theoretical and does not take into account any existing barriers, structures, and/or topographical features that may further reduce noise levels. Therefore, the levels are shown for comparative purposes only to show the difference in with and without project conditions. The potential off-site noise impacts caused by an increase of traffic from operation of the proposed project on the nearby roadways were calculated for the following scenarios:

Existing Year (without Project): This scenario refers to existing year traffic noise conditions.

Existing Year (Plus Project): This scenario refers to existing year + project traffic noise conditions.

Table 5 compares the without and with project scenario and shows the change in traffic noise levels as a result of the proposed project. It takes a change of 3 dB or more to hear a perceptible difference. Although there is an increase in traffic noise levels, the impact is considered to have no impact as the change in noise levels will be less than 3 dBA.

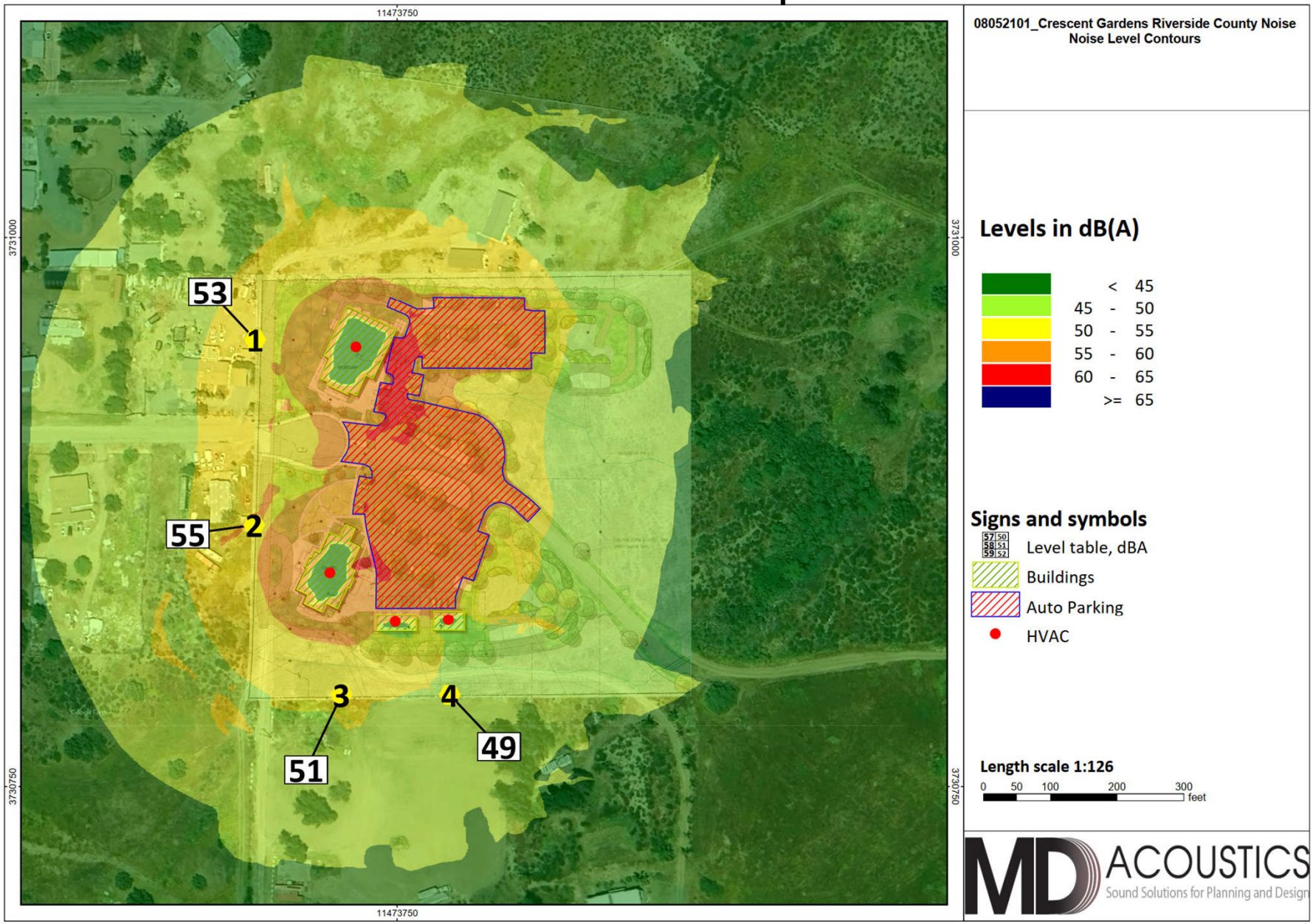
Table 5: Change in Existing Noise Levels as a Result of Project

Roadway[1]	Segment	CNEL at 50 Feet dBA[2]			
		Existing Without Project	Existing With Project	Change in Noise Level	Potential Significant Impact
Greenwald Ave	North of Suzan St	68.1	68.2	0.1	No

Notes:
[1] Exterior noise levels calculated at 5 feet above ground level.
[2] Noise levels calculated from centerline of subject roadway.

Exhibit F

Operational Noise Levels Contours Lmax



8.0 Construction Noise Impact

The degree of construction noise may vary for different areas of the project site and also vary depending on the construction activities. MD understands that construction for the project will take place in three major phases. Noise levels associated with the construction will vary with the different phases of construction.

8.1 Construction Noise

The construction noise and vibration level projections associated with each phase of construction are provided in the sections below.

8.1.1 Phase 1

Phase 1 of construction will include the development of an approximately 9-acre entry area located directly off Garfield Road. This area will include a mortuary, chapel, caretaker's residence, and equipment shed. While the mortuary building will be constructed during Phase 1, only the pads for the chapel and caretaker's residence would be built in this phase. There will be no import or export of material during Phase 1.

The Environmental Protection Agency (EPA) has compiled data regarding the noise characteristics of typical construction activities. The data is presented in Table 6.

Table 6: Typical Construction Noise Levels[1]

Equipment Powered by Internal Combustion Engines

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

Impact Equipment

Type	Noise Levels (dBA) at 50 Feet
Saws	71 - 82
Vibrators	68 - 82
Notes: [1] Referenced Noise Levels from the Environmental Protection Agency (EPA)	

Construction noise associated with 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.

Typical operating cycles for these types of construction equipment may involve one or two minutes of full power operation followed by three to four minutes at lower power settings. The distance to the closer receiver from the center of the site represents an average of equipment moving around the site per the FTA Noise and Vibration Manual. Additionally, the FTA Noise and Vibration Manual gives a daytime noise criterium of 80 dBA Leq of residential land uses. Noise levels associated with each phase are shown in Table 7.

Table 7: Construction Noise Levels at Nearest Existing Adjacent Residences

Activity	Noise Levels at Nearest Sensitive Receptor (Leq, dBA)	Distance (ft)	Criteria	Criteria Exceeded?
Demolition	66	300 – West of Center of Project Site	80	No
Site Prep	63		80	No
Grading	68		80	No
Building Construction	66		80	No
Paving	62		80	No
Arch coat	53		80	No
Note: Construction Modeling Worksheets are provided in Appendix C.				

Construction noise will range from 53 to 68 dBA Leq at the residential use located 300 feet to the west of the center of the project site. If construction does not occur outside the permitted hours outlined in section 9.52.020, the Project will be exempt from the provisions of the County of Riverside Municipal Code. Thus, the Project will adhere to the local noise guidelines for construction activities and the impact is less than significant. Additionally, the construction noise is below the FTA Noise and Vibration Manual criterium for daytime residential construction noise. Construction calculation worksheet is presented in Appendix C.

8.1.2 Phases 2 and 3

Phase 2 of project construction involves the development of approximately 16 acres of cemetery land located northeast of the mortuary/chapel area. Phase 3 involves the development of approximately 10

acres of cemetery land located southeast of the mortuary/chapel area. Both phases involve the import of soil material.

During portions of soil import, MD expects a maximum of two (2) pieces of equipment (such as excavators or trucks) operating at 85 dB Lmax each. Construction noise associated with each phase of the project was calculated using methodology presented in the Federal Highway Administration (FHWA) Construction Noise Model. Noise levels associated with Phases 2 and 3 are shown in Table 8.

Table 8: Construction Noise Levels During Phase 2 and 3

Phase	Noise Levels at Nearest Sensitive Receptor (Leq, dBA)	Distance (ft)	Criteria	Criteria Exceeded?
Phase 2	40	2,200 – North of Site Center	80	No
Phase 3	52	800 – West of Site Center	80	No
Note: Construction Modeling Worksheets are provided in Appendix C.				

Construction noise will range from 40 to 52 dBA Leq at the residential uses located to the north and west of the project site, respectively. If construction does not occur outside the permitted hours outlined in section 9.52.020, the Project will be exempt from the provisions of the County of Riverside Municipal Code. Thus the Project will adhere to the local noise guidelines for construction activities and the impact is less than significant. Additionally, the construction noise is below the FTA Noise and Vibration Manual criterium for daytime residential construction noise. Construction calculation worksheet is presented in Appendix C.

8.2 Construction Vibration

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

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

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

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

The thresholds from the Caltrans Transportation and Construction Induced Vibration Guidance Manual in Table 9 (below) provides general thresholds and guidelines as to the vibration damage potential from vibratory impacts.

Table 9: Guideline Vibration Damage Potential Threshold Criteria

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

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

Table 10 gives approximate vibration levels for particular construction activities. This data provides a reasonable estimate for a wide range of soil conditions.

Table 10: Vibration Source Levels for Construction Equipment[1]

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

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

At a distance of 40 feet (distance from the site to the nearest residences), a vibratory roller would yield a worst-case 0.125 PPV (in/sec) which may be perceptible but below any risk of damage (0.5 in/sec PPV is the threshold of old residential structures). The impact is less than significant, and no mitigation is required.

8.3 Construction Noise Reduction Policies

Construction operations must follow the County's General Plan and the Noise Ordinance, which states that construction, repair or excavation work performed must occur within the permissible hours. To further ensure that construction activities do not disrupt the adjacent land uses, the following policies should be taken:

1. Construction shall occur during the permissible hours as defined Section 9.52.020 (7 AM to 6 PM October thru May, and 6 AM to 6 PM June thru September).
2. During construction, the contractor shall ensure all construction equipment is equipped with appropriate noise-attenuating devices.
3. The contractor shall locate equipment staging areas that will create the greatest distance between construction-related noise/vibration sources and sensitive receptors nearest the project site during all project construction.
4. Idling equipment shall be turned off when not in use.
5. Equipment shall be maintained so vehicles and their loads are secured from rattling and banging.

9.0 References

County of Riverside
General Plan Chapter 7-Noise Element
Code of Ordinances Chapter 9.52-Noise Regulations

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

Appendix A:

Field Measurement Data

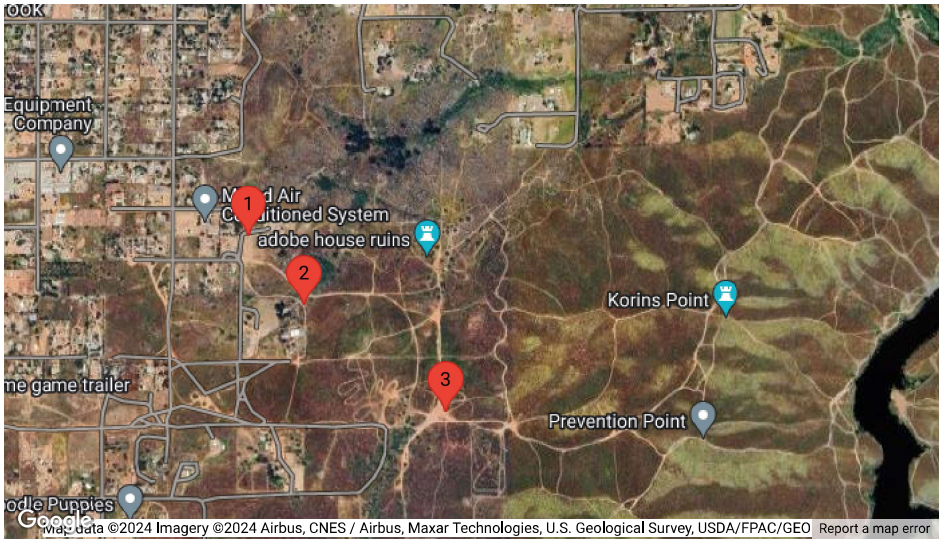
15-Minute Continuous Noise Measurement Datasheet

Project Name:	Crescent Gardens
Project: #/Name:	0805-2021-001
Site Address/Location:	Robert Street and Wallace Avenue
Date:	02/08/2024
Field Tech/Engineer:	Jason Schuyler/ Claire Pincock

Site Observations:

Hilly, with open fields, trees, and large rocks. The site generally reflects sound from the N and the surrounding homes live in an acoustic shadow, provided by the rocks and hills. Temps are in the low 50's F when the sun is out and 44F when it is not, and winds are 1-12MPH gusty. Snow on the surrounding mountains.

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



MD ACOUSTICS

15-Minute Continuous Noise Measurement Datasheet - Cont.

Project Name:	Crescent Gardens
Site Address/Location:	Robert Street and Wallace Avenue
Site Id:	NM1, NM2, NM3

Figure 1: NM1



Figure 2: NM2



Figure 3: NM3

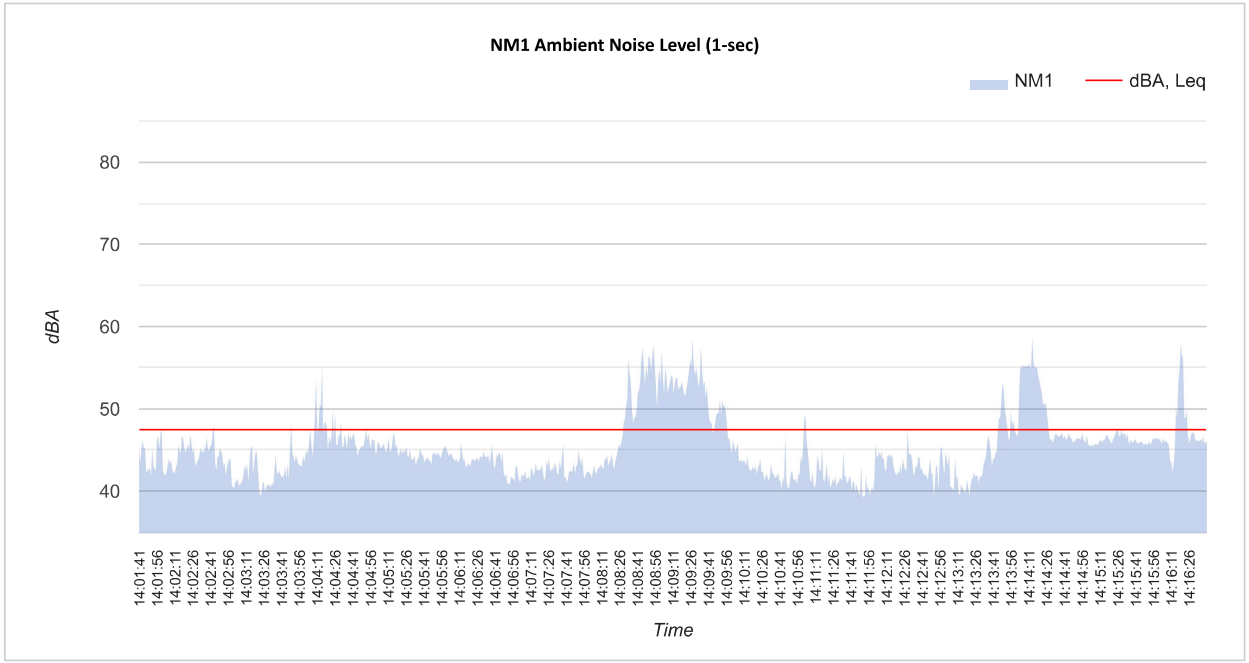


Table 1: Baseline Noise Measurement Summary

Location	Start	Stop	Leq	Lmax	Lmin	L2	L8	L25	L50	L90
NM1	2:01 PM	2:16 PM	47.5	58.5	39.5	55.3	52.6	46.4	44.5	41.3
NM2	2:50 PM	3:05 PM	42	46.7	38.1	44.8	43.9	42.7	41.7	40.1
NM3	3:12 PM	3:27 PM	45.6	68.7	35.0	53.8	47.5	42.5	39.9	37.2

15-Minute Continuous Noise Measurement Datasheet - Cont.

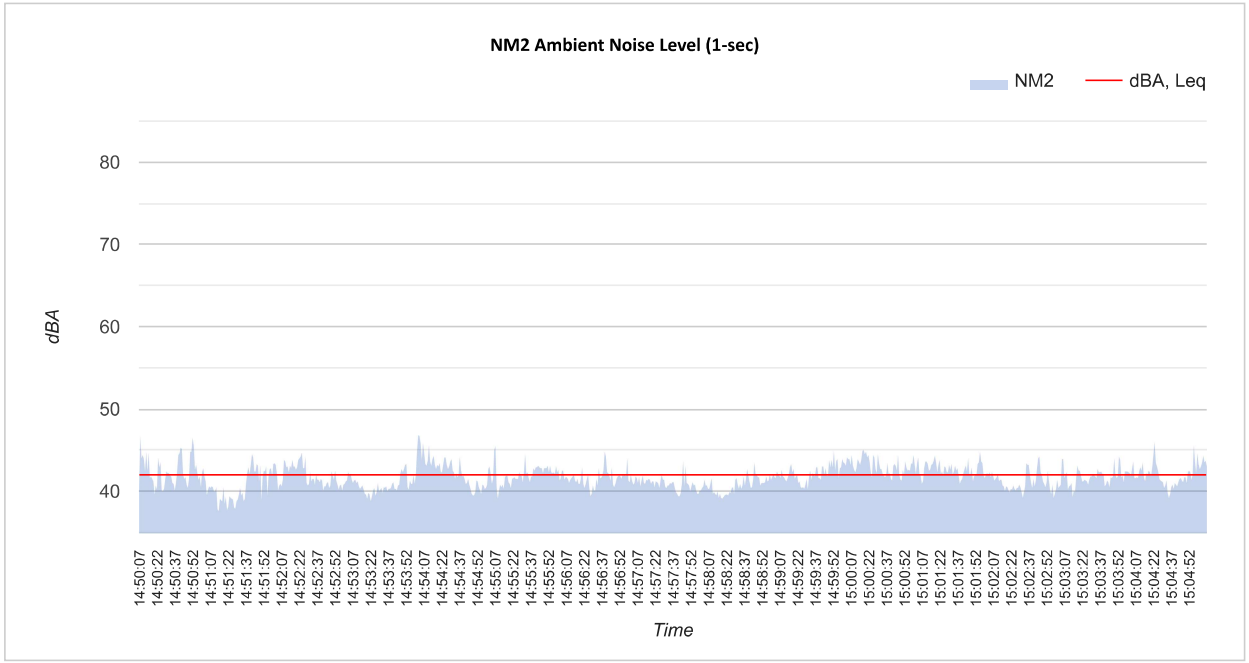
Project Name:	Crescent Gardens	**Site Topo:**	Hills and Valleys mostly open	**Noise Source(s) w/ Distance:**
Site Address/Location:	Robert Street and Wallace Avenue	**Meteorological Cond.:**	47F winds 13MPH overcast	road noise and residential noise
Site Id:	NM1	**Ground Type:**	Sandy soil and clay with large rocks	



MD ACOUSTICS

15-Minute Continuous Noise Measurement Datasheet - Cont.

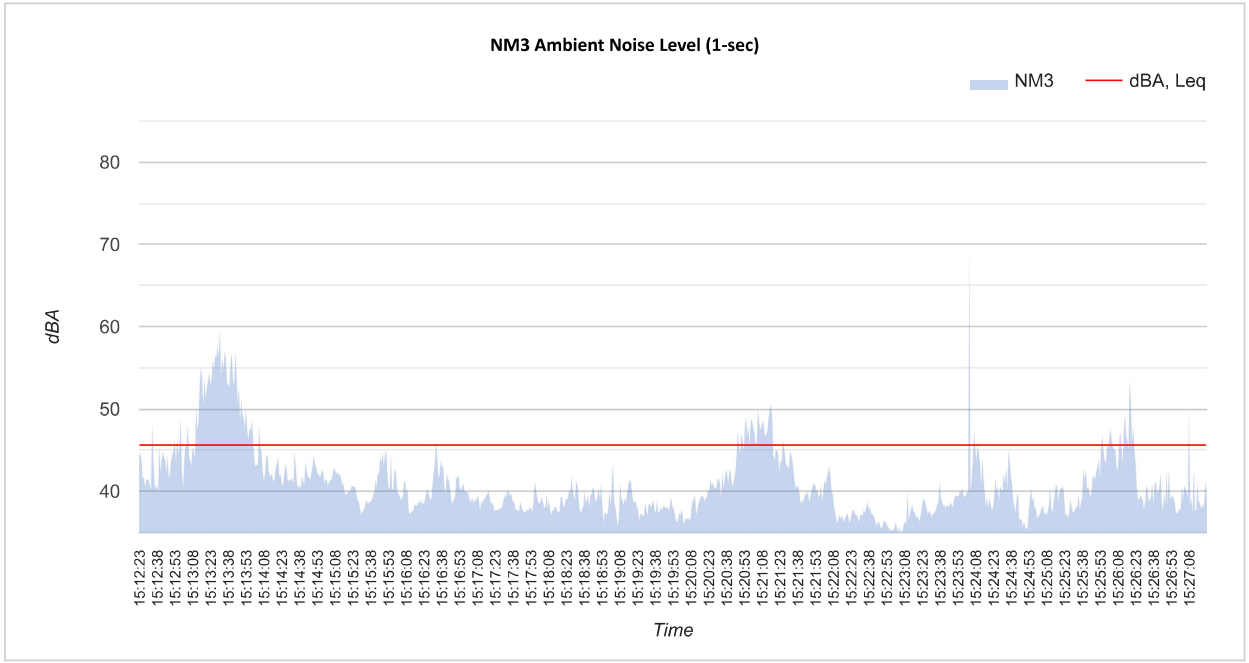
Project Name:	Crescent Gardens	**Site Topo:**	Hills and Valleys mostly open	**Noise Source(s) w/ Distance:**
Site Address/Location:	Robert Street and Wallace Avenue	**Meteorological Cond.:**	47F winds 13MPH overcast	road noise and residential noise
Site Id:	NM2	**Ground Type:**	Sandy soil and clay with large rocks	



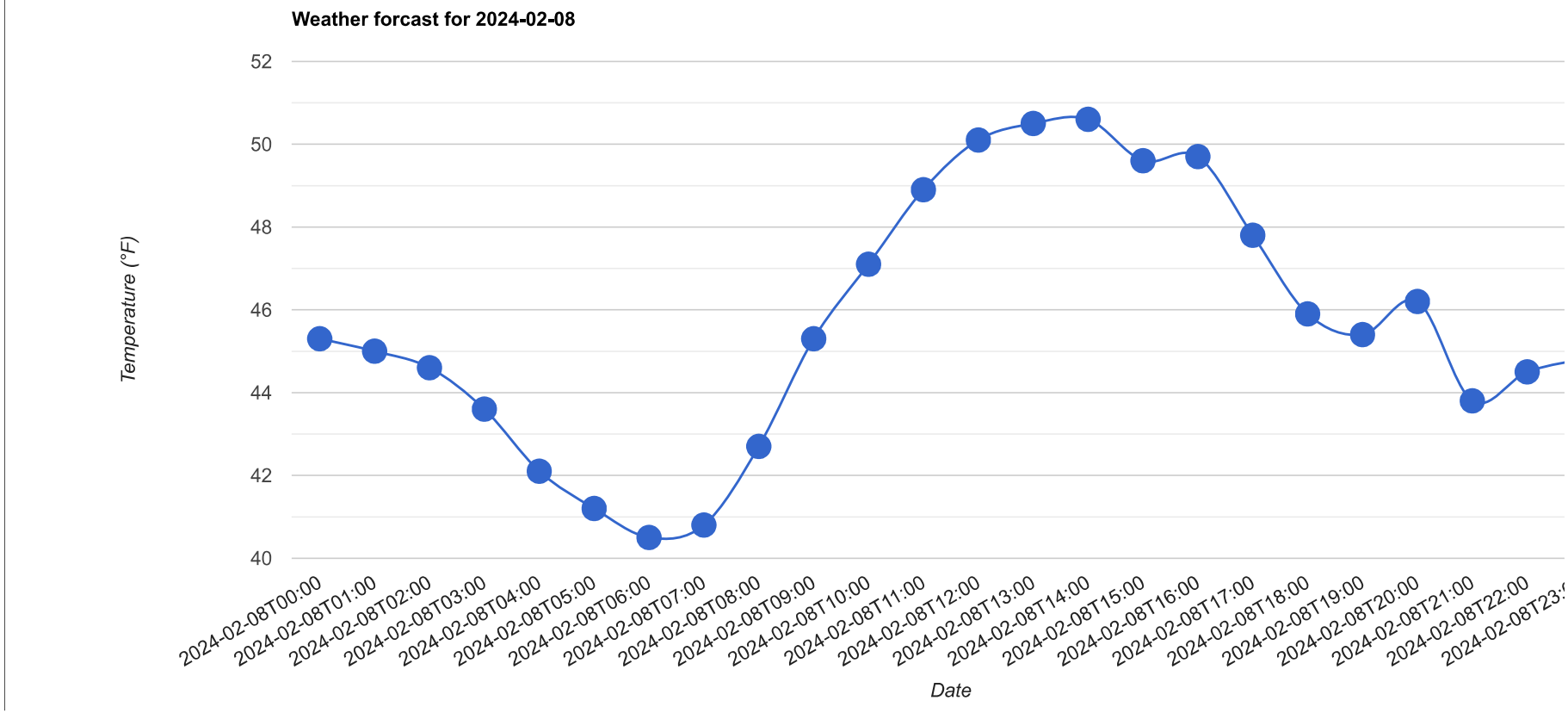
MD ACOUSTICS

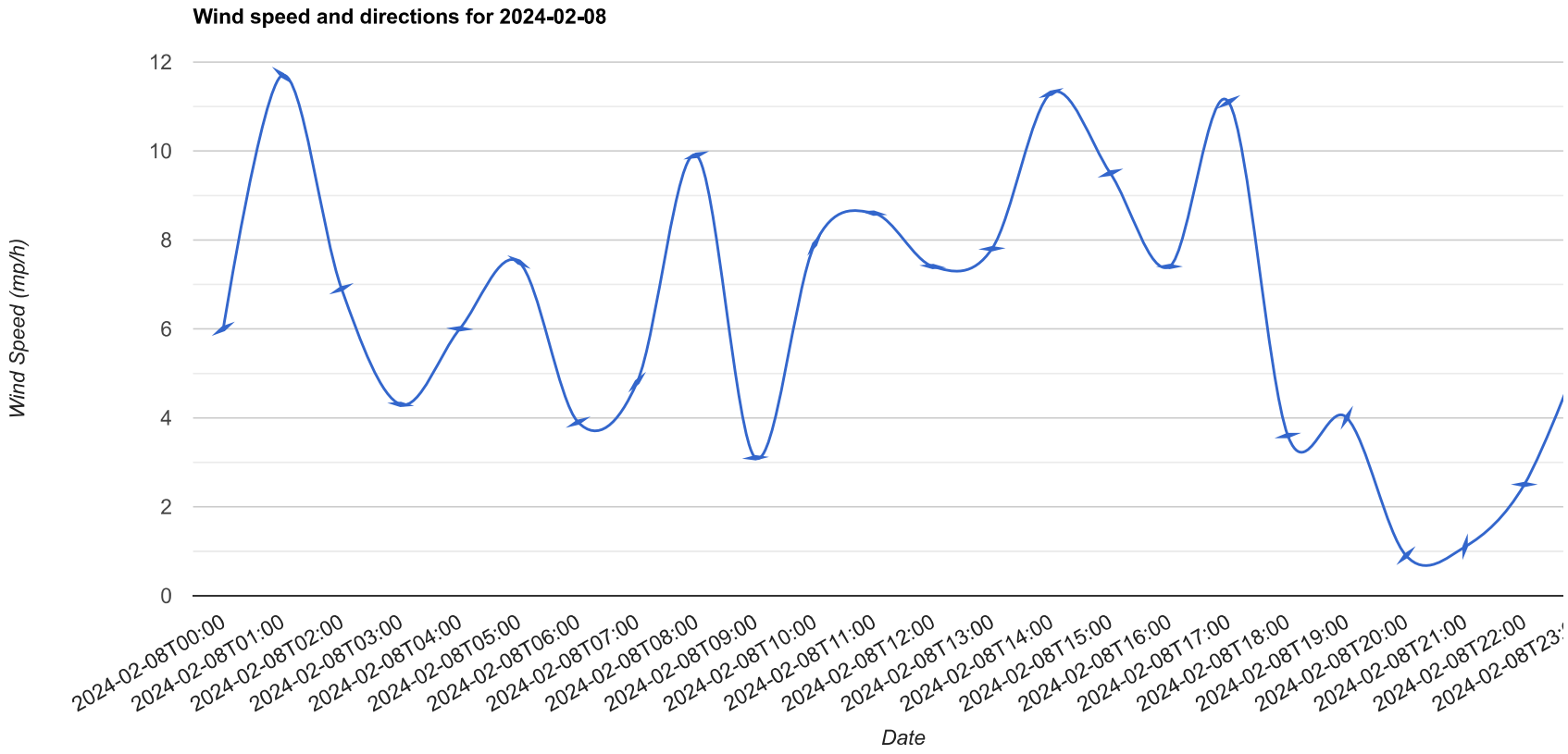
15-Minute Continuous Noise Measurement Datasheet - Cont.

Project Name:	Crescent Gardens	**Site Topo:**	Hills and Valleys mostly open	**Noise Source(s) w/ Distance:**
Site Address/Location:	Robert Street and Wallace Avenue	**Meteorological Cond.:**	47F winds 13MPH overcast	road noise and residential noise
Site Id:	NM3	**Ground Type:**	Sandy soil and clay with large rocks	



MD ACOUSTICS


Weather forcast for 2024-02-08
Temperature (°F)
52
50
48
46
44
42
40
2024-02-08T00:00
2024-02-08T01:00
2024-02-08T02:00
2024-02-08T03:00
2024-02-08T04:00
2024-02-08T05:00
2024-02-08T06:00
2024-02-08T07:00
2024-02-08T08:00
2024-02-08T09:00
2024-02-08T10:00
2024-02-08T11:00
2024-02-08T12:00
2024-02-08T13:00
2024-02-08T14:00
2024-02-08T15:00
2024-02-08T16:00
2024-02-08T17:00
2024-02-08T18:00
2024-02-08T19:00
2024-02-08T20:00
2024-02-08T21:00
2024-02-08T22:00
Date



Source: Global Forecast System (GFS) weather forcast model

Appendix B:

Traffic Noise Modeling Output

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

PROJECT:	CRESCENT GARDENS CEMETERY	JOB #:	0805-2021-01
ROADWAY:	GREENWALD AVE	DATE:	22-Mar-24
LOCATION:	NORTH OF SUZAN ST	ENGINEER:	N. JENSEN

NOISE INPUT DATA - EXISTING

ROADWAY CONDITIONS

ADT =	6,027	
SPEED =	50	
PK HR % =	10	
NEAR LANE/FAR LANE DIS	13	
ROAD ELEVATION =	0.0	
GRADE =	0.0	%
PK HR VOL =	603	

RECEIVER INPUT DATA

RECEIVER DISTANCE =	50	
DIST C/L TO WALL =	50	
RECEIVER HEIGHT =	5.0	
WALL DISTANCE FROM RECEIVER	0	
PAD ELEVATION =	0.0	
ROADWAY VIEW: LF ANGLE=	-90	
RT ANGLE=	90	
DF ANGLE=	180	

SITE CONDITIONS

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

WALL INFORMATION

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

VEHICLE MIX DATA

VEHICLE TYPE	DAY	EVENING	NIGHT	DAILY
AUTOMOBILES	0.755	0.140	0.105	0.9742
MEDIUM TRUCK	0.489	0.022	0.489	0.0184
HEAVY TRUCKS	0.473	0.054	0.473	0.0074

MISC. VEHICLE INFO

VEHICLE TYPE	HEIGHT	SLE DISTANCE	GRADE ADJUSTMENT
AUTOMOBILES	2.0	49.67	- -
MEDIUM TRUCKS	4.0	49.59	- -
HEAVY TRUCKS	8.0	49.67	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	66.5	64.5	63.2	57.1	65.6	66.2
MEDIUM TRUCKS	56.9	53.0	45.6	54.3	60.4	60.5
HEAVY TRUCKS	57.2	53.1	49.7	54.4	60.6	60.7
NOISE LEVELS (dBA)	67.4	65.0	63.4	60.2	67.7	68.1

NOISE IMPACTS (WITH TOPO AND BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	66.5	64.5	63.2	57.1	65.6	66.2
MEDIUM TRUCKS	56.9	53.0	45.6	54.3	60.4	60.5
HEAVY TRUCKS	57.2	53.1	49.7	54.4	60.6	60.7
NOISE LEVELS (dBA)	67.4	65.0	63.4	60.2	67.7	68.1

NOISE CONTOUR (FT)				
NOISE LEVELS	70 dBA	65 dBA	60 dBA	55 dBA
CNEL	32	102	322	1018
LDN	29	92	292	924

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

PROJECT: CRESCENT GARDENS CEMETERY
ROADWAY: GREENWALD AVE
LOCATION: NORTH OF SUZAN ST

JOB #: 0805-2021-01
DATE: 22-Mar-24
ENGINEER: N. JENSEN

NOISE INPUT DATA - EXISTING + PROJECT

ROADWAY CONDITIONS

ADT =	6,117	
SPEED =	50	
PK HR % =	10	
NEAR LANE/FAR LANE DIS	13	
ROAD ELEVATION =	0.0	
GRADE =	0.0	%
PK HR VOL =	612	

RECEIVER INPUT DATA

RECEIVER DISTANCE =		50
DIST C/L TO WALL =		50
RECEIVER HEIGHT =		5.0
WALL DISTANCE FROM RECEIVER		0
PAD ELEVATION =		0.0
ROADWAY VIEW:	LF ANGLE=	-90
	RT ANGLE=	90
	DF ANGLE=	180

SITE CONDITIONS

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

WALL INFORMATION

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

VEHICLE MIX DATA

VEHICLE TYPE	DAY	EVENING	NIGHT	DAILY
AUTOMOBILES	0.755	0.140	0.105	0.9742
MEDIUM TRUCK	0.489	0.022	0.489	0.0184
HEAVY TRUCKS	0.473	0.054	0.473	0.0074

MISC. VEHICLE INFO

VEHICLE TYPE	HEIGHT	SLE DISTANCE	GRADE ADJUSTMENT
AUTOMOBILES	2.0	49.67	- -
MEDIUM TRUCKS	4.0	49.59	- -
HEAVY TRUCKS	8.0	49.67	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	66.5	64.5	63.2	57.2	65.6	66.2
MEDIUM TRUCKS	57.0	53.1	45.6	54.3	60.5	60.5
HEAVY TRUCKS	57.2	53.2	49.8	54.4	60.6	60.7
NOISE LEVELS (dBA)	67.4	65.1	63.5	60.3	67.7	68.2

NOISE IMPACTS (WITH TOPO AND BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	66.5	64.5	63.2	57.2	65.6	66.2
MEDIUM TRUCKS	57.0	53.1	45.6	54.3	60.5	60.5
HEAVY TRUCKS	57.2	53.2	49.8	54.4	60.6	60.7
NOISE LEVELS (dBA)	67.4	65.1	63.5	60.3	67.7	68.2

NOISE CONTOUR (FT)				
NOISE LEVELS	70 dBA	65 dBA	60 dBA	55 dBA
CNEL	33	103	327	1033
LDN	30	94	297	938

Appendix C:

Construction Noise Modeling Output

Receptor - Residence to the West

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
DEMOLITION									
Concrete Saw	1	90	40	300	20	0.66	0.20	92.6	62.3
Dozer	2	82	40	300	40	0.66	0.40	84.6	57.3
Excavator	3	81	40	300	40	0.66	0.40	83.6	56.3
								92.6	66.1
SITE PREP									
Tractor	4	84	40	385	40	1.66	0.40	87.5	47.6
Dozer	3	82	40	300	40	0.66	0.40	84.6	57.3
								87.5	62.7
GRADE									
Excavator	2	81	40	300	40	0.66	0.40	83.6	56.3
Grader	1	85	40	300	40	0.66	0.40	87.6	60.3
Dozer	1	82	40	300	40	0.66	0.40	84.6	57.3
Scraper	2	84	40	300	40	0.66	0.40	86.6	59.3
Tractor	2	84	40	300	40	0.66	0.40	86.6	59.3
								87.6	67.7
BUILD									
Crane	1	81	40	300	16	0.66	0.16	83.6	52.3
Man lift	3	75	40	300	20	0.66	0.20	77.6	47.3
Generator	1	81	40	300	50	0.66	0.50	83.6	57.3
Tractor	3	84	40	300	40	0.66	0.40	86.6	59.3
Welder/Torch	1	74	40	300	40	0.66	0.40	76.6	49.3
								86.6	65.5
PAVE									
Paver	2	77	40	300	50	0.66	0.50	79.6	53.3
Compactor (ground)	2	83	40	300	20	0.66	0.20	85.6	55.3
Roller	2	80	40	300	20	0.66	0.20	82.6	52.3
								85.6	61.6
ARCH COAT									
Compressor (air)	1	78	40	300	40	0.66	0.40	80.6	53.3
								80.6	53.3

Receptor - Residence to the North

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
GRADE									
Excavator	2	85	200	2200	40	0.66	0.40	69.0	37.3
								69.0	40.3

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

Receptor - Residence to the West

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
GRADE									
Excavator	2	85	60	800	40	0.66	0.40	82.9	49.0
								82.9	52.0

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

VIBRATION LEVEL IMPACT

Project:	Crescent Gardens Cemetery	Date: 3/22/24
Source:	Vibratory Roller	
Scenario:	Unmitigated	
Location:	Adjacent residences	
Address:	Chino Hills	

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

DATA INPUT

Equipment = Type	1	Vibratory Roller	INPUT SECTION IN BLUE
PPVref =	0.21	Reference PPV (in/sec) at 25 ft.	
D =	40.00	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 =	**0.125**	IN/SEC	OUTPUT IN RED

Appendix D:

SoundPLAN Inputs/Outputs

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

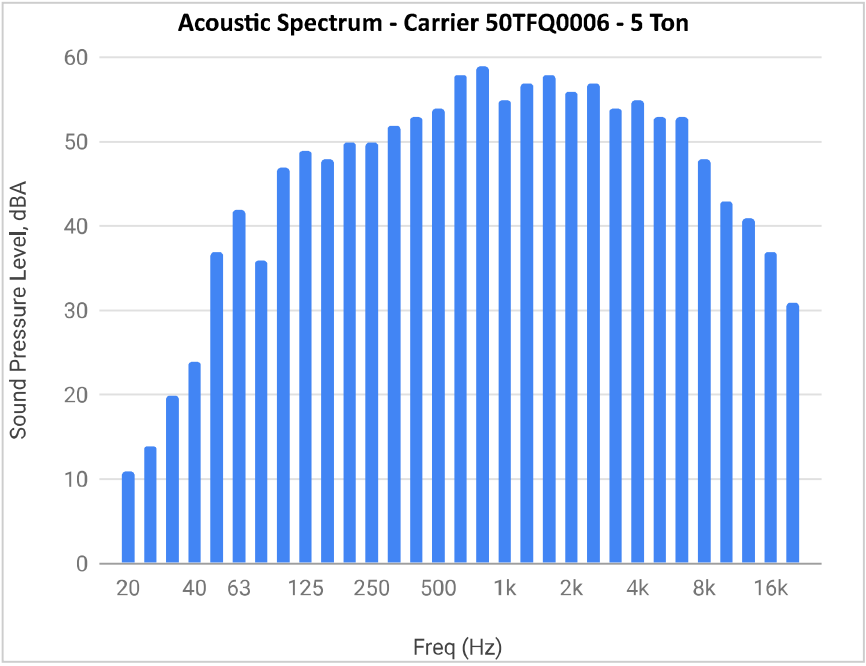
Ln 2	Ln 8	Ln 25	Ln 50	Ln 90	Ln 99
0.0	0.0	0.0	0.0	0.0	0.0

Table 1: Summary Measurement Data

Source/System	Overall Source	Overall 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
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





Project: Sound Library

Job Number: 0000-2020-02

Site Address/Location:

Date:

Field Tech/Engineer: Carrier

Source/System: Carrier WeatherMaster 50hcD14 - 12.5 Ton

General Location:

Sound Meter: **SN:**

Settings:

Meteorological Cond.:

Site Observations:

Measurements are expressed in terms of sound power. Outdoor sound data is measure in accordance with AHRI.

Leq	Lmin	Lmax
0.0	0.0	0.0

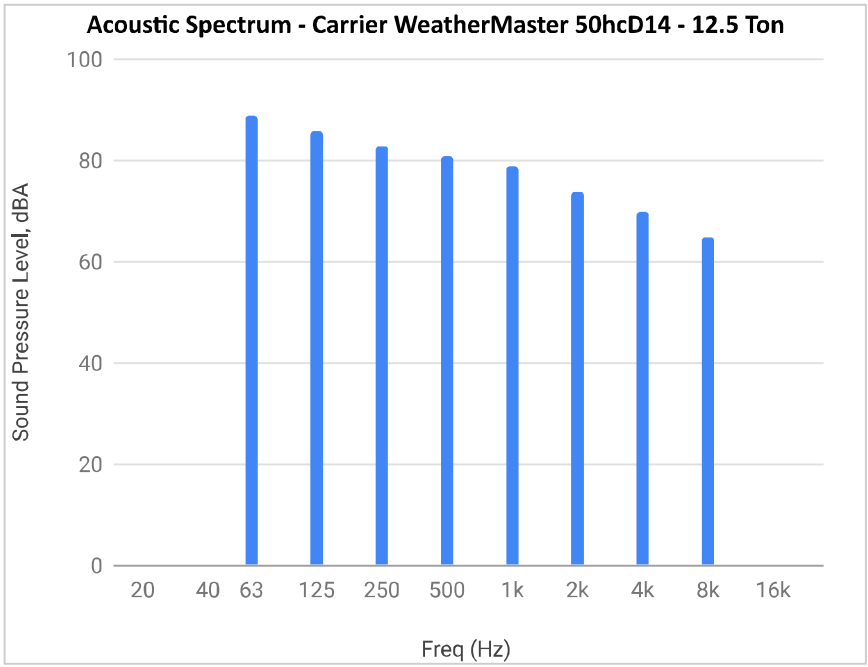
Ln 2	Ln 8	Ln 25	Ln 50	Ln 90	Ln 99
0.0	0.0	0.0	0.0	0.0	0.0

Table 1: Summary Measurement Data

Source/System	Overall Source	Overall 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
Carrier WeatherMaster 50hcD1	HVAC	83.0	0.0	0.0	0.0	0.0	0.0	89.0	0.0	0.0	86.0	0.0	0.0	83.0	0.0	0.0	81.0	0.0	0.0	79.0	0.0	0.0	74.0	0.0	0.0	70.0	0.0	0.0	65.0	0.0	0.0	0.0	0.0

Figure 1: Commercial Air Conditioner - Carrier WeatherMaster





Crescent Gardens Riverside County Noise
Octave spectra of the sources in dB(A) - 001 - Crescent Gardens: Outdoor SP

Name	Source type	l or A	L'w	Lw	KI	KT	DO-Wall	Time histogram	Emission spectrum	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	16kHz	
		m,m²	dB(A)	dB(A)	dB	dB	dB			dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	
Auto Parking	PLot	7482.33	54.1	92.9	0.0	0.0	0	100%/24h	Typical spectrum	76.2	87.8	80.3	84.8	84.9	85.3	82.6	76.4	63.6	
2 12.5 ton HVAC units	Point		96.0	96.0	0.0	0.0	0	100%/24h	HVAC: Lw 93 dBA - Carrier WeatherMaster	92.9	89.9	86.9	84.9	82.9	77.9	73.9	68.9		
2 12.5 ton HVAC units	Point		96.0	96.0	0.0	0.0	0	100%/24h	HVAC: Lw 93 dBA - Carrier WeatherMaster	92.9	89.9	86.9	84.9	82.9	77.9	73.9	68.9		
5 ton 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	
5 ton 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	

Crescent Gardens Riverside County Noise
Contribution spectra - 001 - Crescent Gardens: Outdoor SP

Source	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
	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
Receiver R1 Fl G Lr,lim dB(A) Leq,d 49.7 dB(A)																													
Auto Parking	37.6					25.3			33.5			22.0			26.3			29.8			31.0			26.1			12.4		
2 12.5 ton HVAC units	41.3					39.2			33.3			30.4			28.6			28.1			24.9			19.5			5.1		
2 12.5 ton HVAC units	48.7					46.8			40.8			37.8			35.8			34.8			29.9			25.2			17.1		
5 ton HVAC	18.9	-35.2	-29.1	-25.1	-12.0	-7.0	-12.9	-4.7	-2.6	-3.4	-1.1	-0.6	1.4	3.6	4.6	8.5	11.8	7.7	9.5	10.6	8.1	8.4	4.3	3.6	-1.1	-5.3	-16.5	-30.5	-45.1
5 ton HVAC	16.4	-31.8	-25.8	-21.8	-8.9	-3.9	-10.0	-2.3	-0.4	-1.6	-0.5	-0.5	1.3	2.5	3.3	7.0	9.1	4.7	6.3	7.2	4.5	4.7	0.3	-0.5	-5.3	-9.4	-20.5	-34.3	-48.4
Receiver R2 Fl G Lr,lim dB(A) Leq,d 50.9 dB(A)																													
Auto Parking	40.0					27.0			35.8			23.9			28.9			32.2			33.4			29.2			17.0		
2 12.5 ton HVAC units	49.7					47.8			42.1			38.8			36.7			35.6			30.5			25.6			16.6		
2 12.5 ton HVAC units	42.6					40.7			34.7			31.6			29.6			28.3			23.2			17.2			4.7		
5 ton HVAC	12.0	-31.6	-25.6	-21.7	-8.9	-4.0	-10.3	-2.5	-1.0	-2.6	-1.1	-1.8	-0.5	-0.3	0.0	3.1	4.1	-0.8	0.2	0.4	-2.8	-3.1	-7.8	-8.8	-13.5	-17.1	-27.1	-38.8	-49.8
5 ton HVAC	14.8	-29.6	-23.6	-19.7	-6.7	-1.9	-8.1	-0.3	1.3	-0.2	1.3	0.8	2.1	2.4	2.7	5.9	7.0	2.1	3.2	3.5	0.4	0.1	-4.4	-5.2	-9.5	-12.5	-21.7	-32.2	-41.5
Receiver R3 Fl G Lr,lim dB(A) Leq,d 47.9 dB(A)																													
Auto Parking	36.5					24.2			32.1			21.1			25.5			28.6			30.1			25.5			13.0		
2 12.5 ton HVAC units	46.9					45.4			39.0			35.3			32.4			30.1			23.3			15.9			3.6		
2 12.5 ton HVAC units	38.3					37.3			29.7			24.8			21.1			17.6			9.5			-0.9			-22.1		
5 ton HVAC	23.9	-27.1	-21.1	-17.1	-4.1	0.9	-5.1	3.0	5.0	3.9	5.8	5.9	7.9	8.8	9.9	13.8	15.7	11.7	13.6	14.8	12.7	13.5	10.0	10.5	7.5	6.0	-1.3	-9.6	-16.2
5 ton HVAC	27.2	-24.0	-18.0	-14.0	-1.0	4.0	-2.0	6.3	8.3	7.2	9.0	9.0	11.0	12.0	13.0	17.0	19.0	14.9	16.9	18.1	16.0	16.9	13.7	14.4	11.8	10.8	4.4	-2.7	-7.7
Receiver R4 Fl G Lr,lim dB(A) Leq,d 45.6 dB(A)																													
Auto Parking	37.2					26.1			33.9			21.4			24.8			28.1			29.8			25.5			13.6		
2 12.5 ton HVAC units	43.8					42.5			35.8			31.9			28.8			26.1			18.9			10.6			-3.6		
2 12.5 ton HVAC units	37.6					35.8			29.8			26.7			24.6			23.2			17.8			10.3			-7.6		
5 ton HVAC	29.2	-22.4	-16.4	-12.4	0.6	5.6	-0.4	8.1	10.0	9.0	10.5	10.6	12.6	13.6	14.9	18.9	21.0	17.0	19.0	20.4	18.2	19.0	15.7	16.2	13.5	12.4	5.9	-1.2	-6.1
5 ton HVAC	27.1	-24.1	-18.0	-14.0	-1.0	3.9	-2.1	6.2	8.2	7.1	8.9	8.9	10.9	11.9	12.9	16.9	18.8	15.0	16.9	18.0	15.8	16.7	13.3	13.9	11.1	10.0	3.3	-4.1	-9.5

Source	Source type	Leq,d dB(A)	
Receiver R1 Fl G Lr,lim dB(A) Leq,d 49.7 dB(A)			
2 12.5 ton HVAC units	Point	48.7	
2 12.5 ton HVAC units	Point	41.3	
Auto Parking	PLot	37.6	
5 ton HVAC	Point	18.9	
5 ton HVAC	Point	16.4	
Receiver R2 Fl G Lr,lim dB(A) Leq,d 50.9 dB(A)			
2 12.5 ton HVAC units	Point	49.7	
2 12.5 ton HVAC units	Point	42.6	
Auto Parking	PLot	40.0	
5 ton HVAC	Point	14.8	
5 ton HVAC	Point	12.0	
Receiver R3 Fl G Lr,lim dB(A) Leq,d 47.9 dB(A)			
2 12.5 ton HVAC units	Point	46.9	
2 12.5 ton HVAC units	Point	38.3	
Auto Parking	PLot	36.5	
5 ton HVAC	Point	27.2	
5 ton HVAC	Point	23.9	
Receiver R4 Fl G Lr,lim dB(A) Leq,d 45.6 dB(A)			
2 12.5 ton HVAC units	Point	43.8	
2 12.5 ton HVAC units	Point	37.6	
Auto Parking	PLot	37.2	
5 ton HVAC	Point	29.2	
5 ton HVAC	Point	27.1	