Aster Apartments

Noise Impact Study

City of Hemet, CA

Prepared for:

Ali Tibbs
Highpointe Hemet I LLC
16501 Scientific Way
Irvine, CA 92618

Prepared by:

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

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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 require noise mitigation measures, if necessary, to minimize the potential noise impacts. The assessment was conducted and compared to the noise standards set-forth by the Federal, State and Local agencies. Consistent with the City's Noise Guidelines, the project must demonstrate compliance to the applicable noise criterion as outlined within the City's Public Safety 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 located at the southeast corner of W Stetson Avenue and S Elk Street (APNs: 464-270-005, 464-270-006), in the City of Hemet, California, as shown in Exhibit A. Land uses surrounding the site are residential to the north, south, east, and west. W Stetson Avenue is to the north and S Elk Street is to the west. The Hemet-Ryan Airport is approximately 1.75 miles to the west.

1.3 Proposed Project Description

The project proposes to construct eight (8) new apartment buildings consisting of 228 apartment units, a 6,724-square-foot clubhouse/leasing building, a 1,035-square-foot maintenance building, and nine (9) small car garages. The 228 apartment units range from 599 to 1,119 square feet, resulting in a total of 212,043 square feet of rentable space. The car garages consist of 77 total parking spaces and 18,671 square feet of building space. There will be an additional 375 parking spaces on the site.

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

Construction activities within the Project area will consist of site preparation, grading, building, paving, and architectural coating.

Exhibit A

Location Map

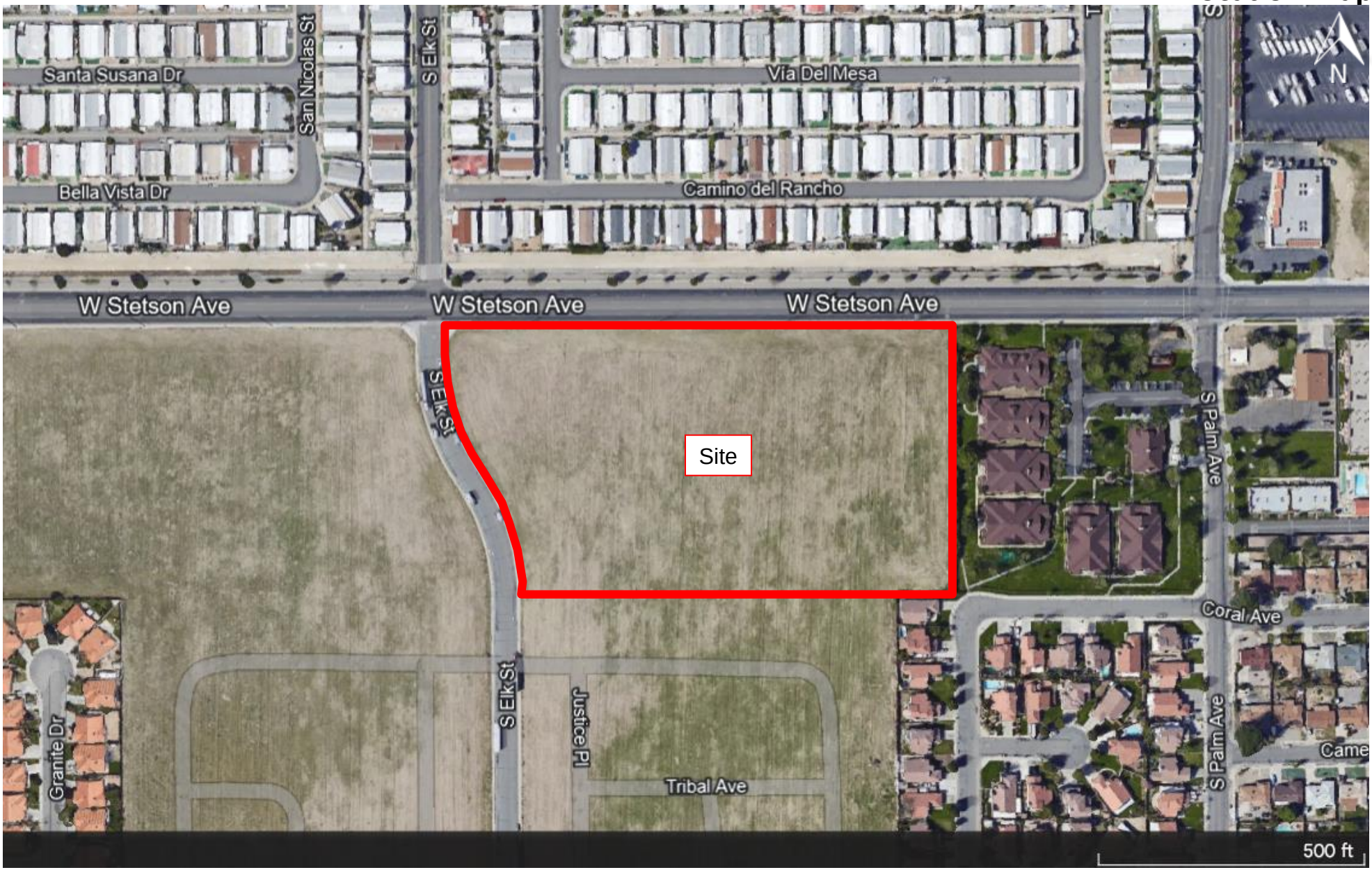
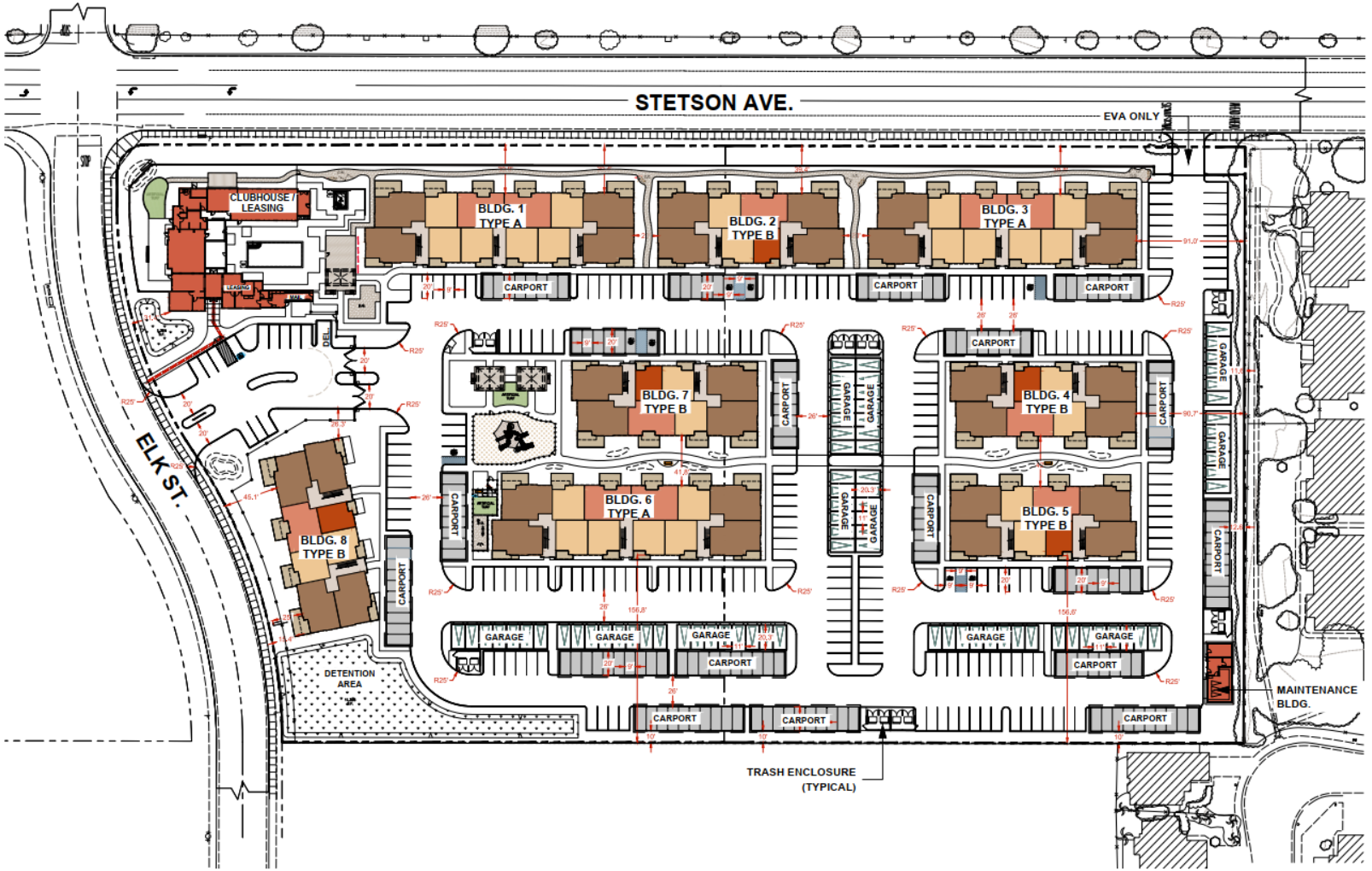


Exhibit B
Site Plan



UNIT LEGEND

PS-A
STUDIO
599 SF

P1-A
EXTENDED PATIOS FIRST FLOOR ONLY (See Building Plans for details)
1 BD / 1 BA
726 SF

P2-A
EXTENDED PATIOS FIRST FLOOR ONLY (See Building Plans for details)
2 BD / 2 BA
1109 SF

P2-B
EXTENDED PATIOS FIRST FLOOR ONLY (See Building Plans for details)
2 BD / 2 BA
1050 SF

NOTE: VARIANCE REQUEST FOR REDUCTION OF PRIVATE OPEN SPACE- SEE A-1.1 FOR PROVIDED PATIO / DECK AREAS

N

0 40' 80'

ASTER- RIVER OAKS
HIGHPOINTE COMMUNITIES
HEMET, CA

CONCEPTUAL SITE PLAN

22098.00 2023-08-01 A-1.0

DANIELIAN ASSOCIATES
architects + planners

2.0 Fundamentals of Noise

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

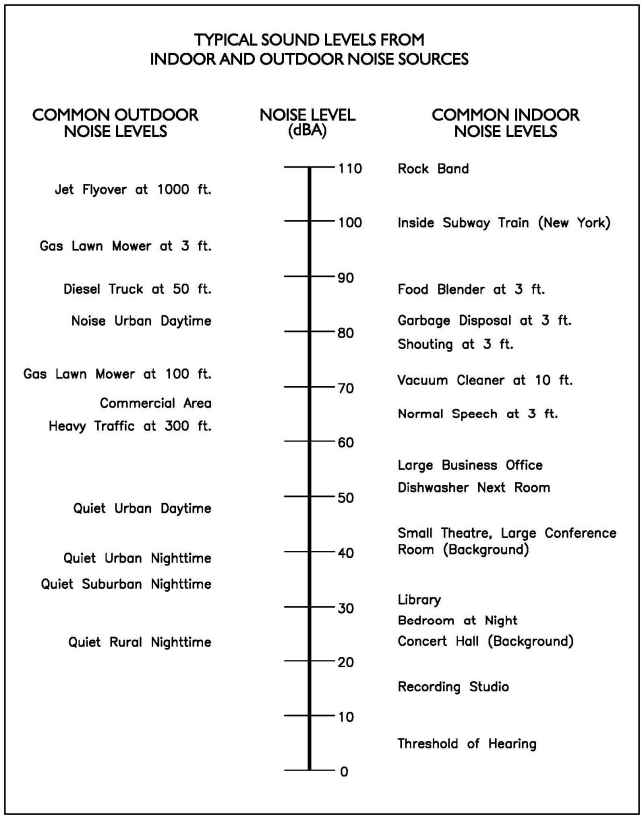
2.1 Sound, Noise and Acoustics

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

2.2 Frequency and Hertz

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

Exhibit C: Typical A-Weighted Noise Levels



2.3 Sound Pressure Levels and Decibels

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

2.4 Addition of Decibels

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

2.5 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 addition of five (5) decibels to sound levels in the evening from 7:00 to 10:00 PM and after addition of ten (10) decibels to sound levels in the night before 7:00 AM and after 10:00 PM.

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

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

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

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

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

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

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

Percent Noise Levels: See L(n).

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

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

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

2.7 Traffic Noise Prediction

Noise levels associated with traffic depends on a variety of factors: (1) volume of traffic, (2) speed of traffic, (3) auto, medium truck (2–3 axle) and heavy truck percentage (4 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 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 wave front, similar to ripples produced by throwing a rock into a pool of water. P-waves, or compression waves, are body waves that carry their energy along an expanding spherical wave front. The particle motion in these waves is longitudinal (i.e., in a "push-pull" fashion). P-waves are analogous to airborne sound waves. S-waves, or shear waves, are also body waves that carry energy along an expanding spherical wave front. However, unlike P-waves, the particle motion is transverse, or side-to-side and perpendicular to the direction of propagation.

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

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

4.0 Regulatory Setting

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

4.1 Federal Regulations

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

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

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

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

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

4.3 City of Hemet Noise Regulations

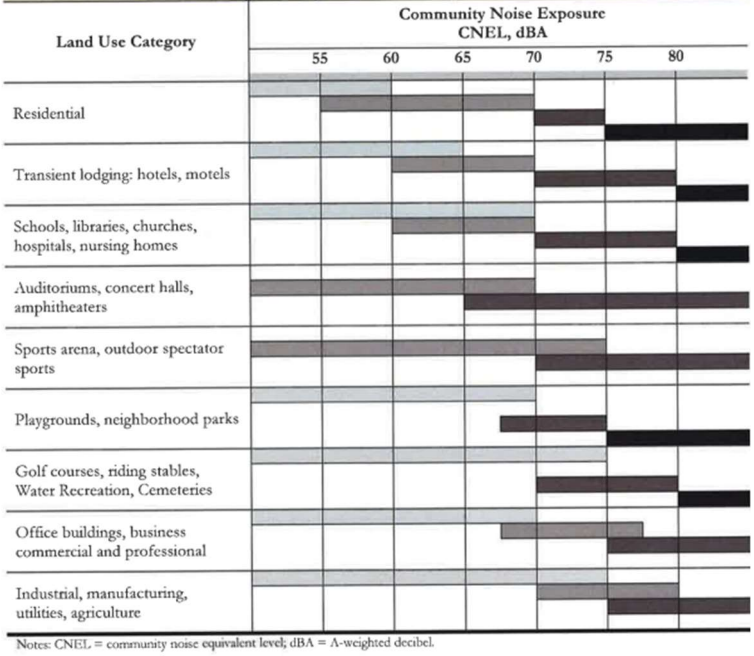
The City of Hemet outlines its noise regulations and standards within the Public Safety Element from the General Plan and the Noise Ordinance from the Municipal Code.

City of Hemet General Plan

Applicable policies and standards governing environmental noise in the City are set forth in the General Plan's Public Safety Element. Tables 6.3 and 6.4 (Exhibit D of this report) of the City's Public Safety Element provide the land use compatibility guidelines. Table 6.3 outlines the exterior noise standards for community noise environments and Table 6.4 outlines interior noise standards for community noise environments.

Exhibit D: Land Use Compatibility Guidelines

Table 6.3
Land Use Compatibility for Community Noise Environments



Notes: CNEL = community noise equivalent level; dBA = A-weighted decibel.

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

Conditionally Acceptable—New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features are included in the design.

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

Clearly Unacceptable—New construction or development clearly should not be undertaken.

Source: Adapted from the Governor's Office of Planning and Research in 2003

Table 6.4
Land Use Compatibility Standards for Exterior and Interior Noise

Land Use	Maximum Allowable Noise (CNEL)	
	Exterior (dBA)	Interior (dBA)
Residential and mixed use with residential component	65	45
School classrooms	65	45
School playgrounds	70	--
Libraries	–	50
Hospitals, convalescent homes—sleeping areas	–	40
Hospitals, convalescent homes—living areas	–	50
Passive recreation areas	65	–
Active recreation areas	70	–
Commercial and industrial areas	70	–
Office areas	–	50

Notes: CNEL = community noise equivalent level; dBA = A-weighted decibel; – = not applicable/not available.
The acceptable interior noise level for other uses depends upon the specific nature of the indoor activity.

The City also provides stationary noise standards in Table 6.5 (Table 1 in this report). These standards apply at the property line of the noise source.

Table 1: Noise Level Standards for Stationary Noise Standards

Noise Level Descriptor	Daytime (7 AM to 10 PM)	Nighttime (10 PM to 7 AM)
Hourly average level (Leq)	60 dBA	45 dBA
Maximum equivalent levels (Lmax)	75 dBA	65 dBA

Notes:
Each of the noise levels specified above shall be lowered by 5 dB for simple tone noises, noises consisting primarily of speech or music, or for recurring impulsive noises.These noise level standards do not apply to residential units established in conjunction with industrial or commercial uses (e.g. caretaker dwellings). The noise standard is to be applied at the property lines of the affected land use.

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

Goals and Policies
Goals and policies from the Public Safety Element that would mitigate potential impacts on noise include the following.

Goal PS-11 Manage noise levels through land use planning and development review.

PS-11.1 Noise Standards. Enforce noise standards to maintain acceptable noise limits and protect existing areas with acceptable noise environments.

PS-11.2 Design to Minimize Noise. Encourage the use of siting and building design techniques as a means to minimize noise.

PS-11.3 Evaluate Noise. Evaluate potential noise conflicts for individual sites and projects, and require mitigation of all significant noise impacts (including construction and short-term noise impacts) as a condition of project approval.

PS-11.4 Protect Noise-Sensitive Uses. Protect noise-sensitive uses from new noise sources.

Goal PS-12 Minimize noise conflicts from transportation sources and airports.

PS-12.1 Traffic Noise. Minimize noise conflicts between current and proposed land uses and the circulation network by encouraging compatible land uses around critical roadway segments with higher noise potential.

PS-12.3 Airport Noise. Ensure that future development in the vicinity of Hemet-Ryan Airport is compatible with current and projected airport noise levels in accordance with the noise standards presented in Table 6.4.

Goal PS-13 Minimize noise conflicts with stationary noise generators.

PS-13.2 New Sensitive Use. Restrict the location of sensitive land uses near major noise sources to achieve the standards present in Table 6.4.

PS-13.3 Prevent Encroachment. Prevent the encroachment of noise sensitive land uses into areas designated for use by existing or future noise generators.

City of Hemet Municipal Code

The City's Municipal Code further outlines the City's exterior noise limits as it relates to stationary noise sources.

Section 30-32[1.] – Prohibited public nuisance conditions.

42. Any noise that is made, generated, produced, or continued (whether from a human, animal, or device) in such a manner that it unreasonably disturbs the peace and quiet of any neighborhood of which causes any discomfort or annoyance to any reasonable person of normal sensitivities, or that otherwise violates any provision of the Hemet Municipal Code, including the noise limits set forth in the Hemet Zoning Code, or that violates the general plan (public safety element). Factors which shall be considered in determining whether the noise is a nuisance shall include, but not be limited to the following:

    A. The volume of the noise;
    B. The intensity of the noise;
    C. Whether the nature of the noise is usual or unusual;
    D. Whether the origin of the noise is natural or unnatural;
    E. The volume and intensity of the background noise, if any;
    F. The proximity of the noise to residential sleeping facilities;

G. The nature of the zoning of the area from which the noise emanates;
H. The density of inhabitation of the area from which the noise emanates;
I. The time of day or night the noise occurs;
J. The duration of the noise;
K. Whether the noise is recurrent, intermittent, or constant;
L. Whether the noise is produced by commercial or noncommercial activity; and
M. Whether the noise is a consequence or expected result of an otherwise lawful use.

43. Construction activities that occur outside of the approved hours of construction as set forth on a permit or other city entitlement as issued the building official, planning commission, or city council, or as otherwise prohibited by the Hemet Building Code.

Section 53-4. – Noise.

No person shall willfully make or continue, or cause to be made or continued, any loud, unnecessary, and unusual noise which is greater than the level permissible for the applicable zone or which unreasonably disturbs the peace or quiet of any neighborhood or which would cause discomfort or annoyance to any reasonable person of normal sensitiveness residing in the area.

The word "unreasonably" as used herein shall include but not be limited to, consideration of the hour, place, nature, and circumstances of any loud, unnecessary, and unusual noise.

Section 67-10. – Time of grading operations.

Grading is allowed Monday through Friday between the hours of 6:00 a.m. and 6:00 p.m. from June 1 through September 30, and between the hours of 7:00 a.m. and 6:00 p.m. from October 1 through May 31. Grading is allowed on Saturdays between the hours of 7:00 a.m. and 6:00 p.m. yearround. Grading on Sundays is prohibited.

The city engineer may extend the hours allowed for grading if he or she determines that such operations are not detrimental to the health, safety or welfare of the occupants of nearby structures, or the quiet enjoyment of nearby residential property.

Section 90-1048. – Performance standards.

All uses established or placed into operation shall comply at all times with the performance standards set out in this section. The director may require submission of evidence of ability to comply with the required conditions.

1. Noise. No use, except a temporary construction operation, shall be permitted which creates noise of a maximum sound pressure level greater than the value established in the public safety element of the general plan, and adopted building codes, or as may be further determined by project specific mitigation measures. The general plan specifies land use compatibility standards to ensure that stationary noise sources (e.g., industrial uses) do not adversely affect noise-sensitive land uses and that community noise environments do not negatively affect land uses.

7. Vibration. No use, except a temporary construction operation, shall be permitted which creates vibration sufficient to cause a displacement of 0.003 inch beyond the boundaries of the site.

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

The noise monitoring locations were selected to obtain a baseline of the existing noise environment. One (1) short-term 1-hour noise measurement was conducted at the Project site, and long-term data was extrapolated based on traffic patterns. Appendix A includes photos, the field sheet, and measured noise data. Exhibit E illustrates the location of the measurements.

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 traffic volumes as prepared by TJW Engineering. 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]	Opening Year + Cumulative Project ADT[1]	Speed (MPH)	Site Conditions
W Stetson Ave	North of site	13,800	15,600	45	45	Soft
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		77.5	12.9	9.6	97.5	
Medium Trucks		84.8	4.9	10.3	1.8	
Heavy Trucks		86.5	2.7	10.8	0.7	

Notes:
[1] ADTs from TJW Engineering.
[2] Typical California Vehicle Distribution and Mix.

To determine the project's noise impact to the surrounding land uses, MD generated noise contours for projected traffic conditions. Noise contours are used to provide a characterization of 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 take into account structures, sound walls, topography, and/or other sound attenuating features which 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.

5.4 Interior Noise Modeling

The interior noise level is the difference between the projected exterior noise level at the structure's facade and the noise reduction provided by the structure itself. Typical building construction will provide a conservative 12 dBA noise level reduction with a "windows open" condition and a very conservative 20 dBA noise level reduction with "windows closed". MD estimated the interior noise level by subtracting the building shell design from the predicted exterior noise level.

For a "windows closed" condition, the project will require mechanical fresh air ventilation (e.g., air conditioning) to the habitable dwelling units.

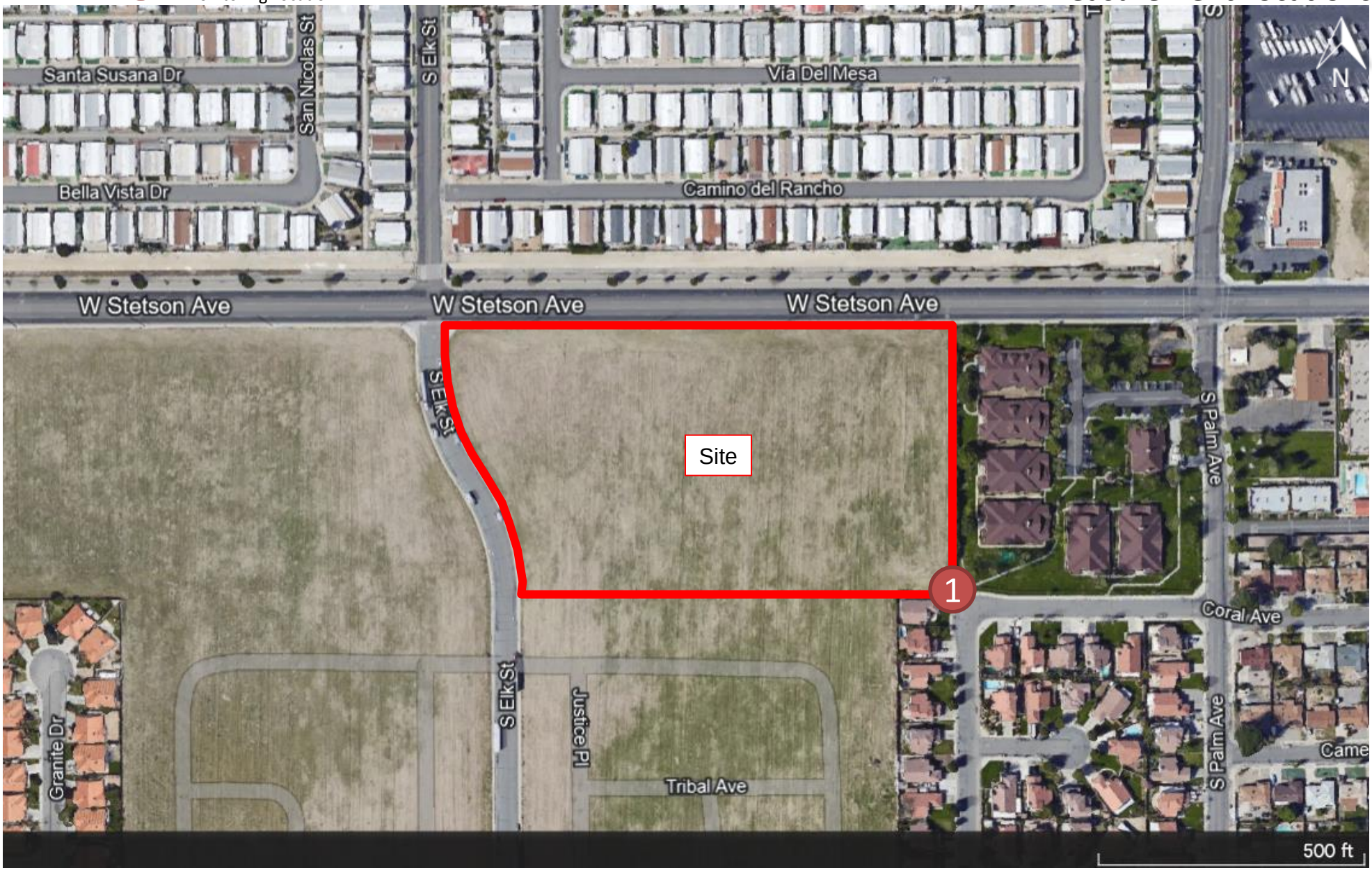
5.5 FHWA Roadway Construction Noise Model

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.

Exhibit E

Measurement Locations



6.0 Existing Noise Environment

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

6.1 Short-Term Noise Measurement Results

The results of the short-term noise data are presented in Table 3.

Table 3: Short-Term Noise Measurement Data[1]

Location	Start Time	Stop Time	L_{EQ}	L_{MAX}	L_{MIN}	L_2	L_8	L_{25}	L_{50}	L_{90}	Estimated CNEL[2]
NM1	10:08 AM	11:08 AM	46.6	62.7	39.2	53.1	48.4	46.7	44.8	41.8	50.3

Notes:
[1] Short-term noise monitoring locations are illustrated in Exhibit E.
[2] CNEL estimated based off typical traffic patterns. See Appendix A.

Noise data indicates that the ambient noise level is 46.6 dBA Leq at and near the project site. The exterior ambient noise level is approximately 50 dBA CNEL and falls within the normally acceptable level from the Noise Compatibility Matrix for multiple family residential uses. The project must ensure that the levels fall below 45 dBA CNEL inside the residences. Additional field notes and photographs are provided 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 City's Noise Standards. The analysis details the estimated exterior noise levels associated with traffic from adjacent roadway sources.

7.1 Future Off-site Exterior Noise Impact

The exterior noise level off-site of the project will be impacted by transportation-related sources and stationary sources from the site. The following outlines the impacts associated with exterior noise levels.

7.1.1 Future 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 60 feet. The distance to the 55, 60, 65, and 70 dBA CNEL noise contours are also provided for reference. The noise level at 60 feet is representative of approximate distances to existing residential uses close to the subject roadway impacted by the project. The noise contours were calculated for the following scenarios and conditions:

- Existing Condition: This scenario refers to the existing traffic noise condition and is demonstrated in Table 4.
- Existing + Project Condition: This scenario refers to the existing plus project traffic noise condition and is demonstrated in Table 4.

<Table 4, next page>

Table 4: Existing/Existing + Project Scenario – Noise Levels Along Roadways (dBA CNEL)

Existing Exterior Noise Levels

Roadway	Segment	CNEL at 60 ft (dBA)	Distance to Contour (ft)			
			70 dBA CNEL	65 dBA CNEL	60 dBA CNEL	55 dBA CNEL
W Stetson Ave	North of site	67.8	43	92	198	426

Existing + Project Exterior Noise Levels

Roadway	Segment	CNEL at 60 ft (dBA)	Distance to Contour (ft)			
			70 dBA CNEL	65 dBA CNEL	60 dBA CNEL	55 dBA CNEL
W Stetson Ave	North of site	67.8	43	93	200	431

Change in Noise Levels as a Result of Projects

Roadway[1]	Segment	CNEL at 50 Feet dBA[2]			
		Existing Without Project	Existing With Project	Change in Noise Level	Potential Significant Impact
W Stetson Ave	North of site	67.8	67.8	0.0	No

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

Table 4 provides the Existing and Existing + Project noise conditions and shows the change in noise level because of the proposed project. As shown in Table 4, there will be a 0.0 dBA increase in traffic noise of at 60 feet from the centerline of the subject roadway as a result of the project. There is no noise increase due to the project and therefore the impact is less than significant, and no mitigation is required.

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

The nearest sensitive receptors that may be affected by project operational noise include adjacent residential uses to the east.

On-site operational noise includes transformers and HVAC units. HVAC equipment will be located on the rooftops. Each Type A building will have 36 rooftop units and each Type B building will have 24 rooftop units (228 units total). Parapet walls line the perimeter of each rooftop. Equipment will be at least 150 feet away from the nearest residential uses to the east. The maximum sound power level from a single unit is 72 dBA. At 150 feet away, the sound pressure level is estimated to be 28 dBA. Assuming all units are running simultaneously on each building and that the parapets provide a conservative 10 dB reduction, the sound level is 37 dBA Leq at the nearest residential receptors and complies with the stationary noise standards provided in Table 6.5 of the City's General Plan Public Safety Element (Table

1 of this report). The noise due to the HVAC units operating simultaneously will thus meet the City's noise level limit for residential properties.

Per ANSI and NEPA requirements for transformer noise, transformers will be no louder than 65 dBA at 6 feet. To ensure that the stationary noise standards are met, the following Mitigation Measure is required:

1. In order to meet the nighttime stationary noise standard of 45 dBA Leq, the Permittee/Owner shall ensure that the construction drawings show that all transformers are located at least 57 feet away from adjacent off-site residences or are shielded to stay below the 45 dBA Leq nighttime noise level limit. The Building Department will check for the inclusion of these requirements on the construction drawings through the Plan Check process.

Operational noise complies with the stationary noise standards set in Table 6.5 of the City of Hemet's General Plan Public Safety Element. The impact is, therefore, less than significant.

7.2 Future On-Site Exterior Noise Levels

The exterior noise level at the project site will be impacted by transportation-related sources. The following outlines the impacts associated with exterior noise levels.

7.2.1 Noise Impacts to On-Site Receptors Due to Traffic

Traffic noise from W Stetson Way was evaluated and compared to the City's guidelines. The traffic noise level was calculated for the opening year plus cumulative project condition. Per the *project's* Landscape Plan, there will be a 6-foot CMU block wall along the northern property line. Using opening year plus cumulative project traffic and accounting for the property line wall, the edge of the Project site will be up to 62 dBA CNEL. According to the Public Safety Element of the General Plan, residential uses are acceptable up to 65 dBA CNEL. Thus, the project meets the 65 dBA CNEL limit for residential uses and falls within the conditionally acceptable level from the Noise Compatibility Matrix.

7.2.2 Noise Impacts to On-Site Receptors Due to Aircrafts

The project site is located approximately 1.75 miles away from Hemet-Ryan Airport. The site is within the Proposed Airport Influence Area boundary line in Compatibility Zone E, according to the Ryan-Hemet Airport Compatibility Criteria. Residential uses are permitted within Zone E. Additionally, the project site is outside of the 55 dBA CNEL noise contour. Therefore, the impact due to aircraft noise is less than significant.

7.3 Interior Noise Levels

The future interior noise level was calculated for the sensitive receptor locations using a typical "windows open" and "windows closed" condition. A "windows open" condition assumes 12 dBA of noise attenuation from the exterior noise level. A "windows closed" condition" assumes 20 dBA of noise attenuation from the exterior noise level. Table 5 indicates the first and second-floor interior noise levels for the project site.

Table 5: Future Interior Noise Levels (dBA CNEL)

Location	Roadway Noise Source	Exterior Facade Study Location	Noise Level at Building Facade[1]	Interior Noise Reduction Required to Meet Interior Noise Standard of 45 dBA CNEL	STC Rating for Windows Facing Subject Roadway[2]	Interior Noise Level w/ Residential Windows	
						Window Open[3]	Windows Closed[4]
1st Row Units Along Northern Property Line	W Stetson Ave	1st Floor	62	17	25	50	42
1st Row Units Along Northern Property Line	W Stetson Ave	2nd Floor	66	21	26	54	45
1st Row Units Along Northern Property Line	W Stetson Ave	3rd Floor	66	21	26	54	45

Notes:
1. Noise level from Section 7.2 and from worksheets Appendix B.
2. Indicates the required STC rating to meet the interior noise standard.
3. A minimum of 12 dBA noise reduction is assumed with a "windows open" condition.
4.. A minimum of 20 dBA noise reduction is assumed with a "windows closed" condition.

As shown in Table 5, the interior noise level will be 50 dBA CNEL with the windows open and 42 dBA CNEL with the windows closed at the 1st floor northern units and 55 dBA CNEL with the windows open and 45 dBA CNEL with the windows closed at the 2nd and 3rd floor northern units. To meet the City's interior 45 dBA CNEL standard a "windows closed" condition is required. The windows and sliding glass doors do not require more than standard glass. A "windows closed" condition simply means that in order to achieve a 45 dBA CNEL interior noise level, the windows must be closed and does not mean the windows must be fixed.

The following Mitigation Measure is required:

2. In order to achieve an interior noise level of 45 dBA CNEL, the Permittee/Owner shall ensure that the construction drawings show that any unshielded residential glass facades within 90 feet of the centerline of West Stetson Avenue directly facing the subject roadway must have an STC rating of 26 or more. This includes all floors (the 1st, 2nd and 3rd floors) of Buildings 1, 2, and 3. The Building Department will check for the inclusion of these requirements on the construction drawings through the Plan Check process.

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. Noise levels associated with the construction will vary with the different phases of construction. The construction noise and vibration level projections are provided in the sections below.

8.1 Construction Noise

The Environmental Protection Agency (EPA) has compiled data regarding the noise generated 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 is considered a short-term impact and would be considered significant if construction activities are taken outside the allowable times as described in the City's Municipal Code (Section 30-32 [.1] (43)). During the grading phase, construction activities must occur during the allowable times described in Section 67-10 of the Municipal Code. Construction is anticipated to occur during the permissible hours according to the City's Municipal Code. Construction noise will temporarily or

periodically increase in the ambient noise level above the existing noise level within the project vicinity. Construction noise level projections are provided below.

Typical operating cycles for these types of construction equipment may involve one or two minutes of full power operation followed by three to four minutes at lower power settings. Noise levels at the nearest sensitive land uses to the south are in Table 7. A likely worst-case construction noise scenario assumes equipment operating as close as 15 feet and an average of 250 feet from the nearest sensitive receptor. The Lmax levels represent maximum levels when construction occurs adjacent to the residential receptors. Leq levels represent the average construction noise level during each phase.

Table 7: Construction Noise Levels East Property Line

Phase	dBA Lmax	dBA Leq
Site Prep	97.9	67.7
Grading	98.9	69.8
Build	97.9	67.6
Paving	93.5	68.3
Arch Coating	88.5	60.0
Notes: Const Equip from CalEEMod		

Construction noise will range from 60 to 70 dBA Leq at the nearest sensitive receptors and will have a temporary increase in ambient noise level. Construction will occur within the allowable times as described in Section 30-32 [.1] (43) of the Municipal Code; thus, the impact is considered less than significant.

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 8 (below) provides general thresholds and guidelines as to the vibration damage potential from vibratory impacts.

Table 8: 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 9 gives approximate vibration levels for particular construction activities. This data provides a reasonable estimate for a wide range of soil conditions.

Table 9: 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 20 feet, a vibratory roller would yield a worst-case 0.268 PPV (in/sec), which will be perceptible but sustainably 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.

9.0 Mitigation Measures

The Project complies with the City's noise regulations with the implementation of the following mitigation measures:

1. In order to meet the nighttime stationary noise standard of 45 dBA Leq, the Permittee/Owner shall ensure that the construction drawings show that all transformers are located at least 57 feet away from adjacent residences or are shielded to stay below the 45 dBA Leq nighttime noise level limit. The Building Department will check for the inclusion of these requirements on the construction drawings through the Plan Check process.
2. In order to achieve an interior noise level of 45 dBA CNEL, the Permittee/Owner shall ensure that the construction drawings show that any unshielded residential glass facades within 90 feet of the centerline of West Stetson Avenue directly facing the subject roadway must have an STC rating of 26 or more. This includes all floors (the 1st, 2nd, and 3rd floors) of Buildings 1, 2, and 3. The Building Department will check for the inclusion of these requirements on the construction drawings through the Plan Check process.

10.0 References

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

City of Hemet: General Plan Public Safety Element.

City of Hemet: Municipal Code.

Caltrans Noise Technical Manual. 2013

Konan Vibration Criteria

TJW Engineering: Transportation Impact Study, February 2024.

Federal Highway Administration. Noise Barrier Design Handbook. June 2017.

Federal Transit Administration. Transit Noise and Vibration Impact Assessment Manual. September 2018

Appendix A:

Photographs and Field Measurement Data

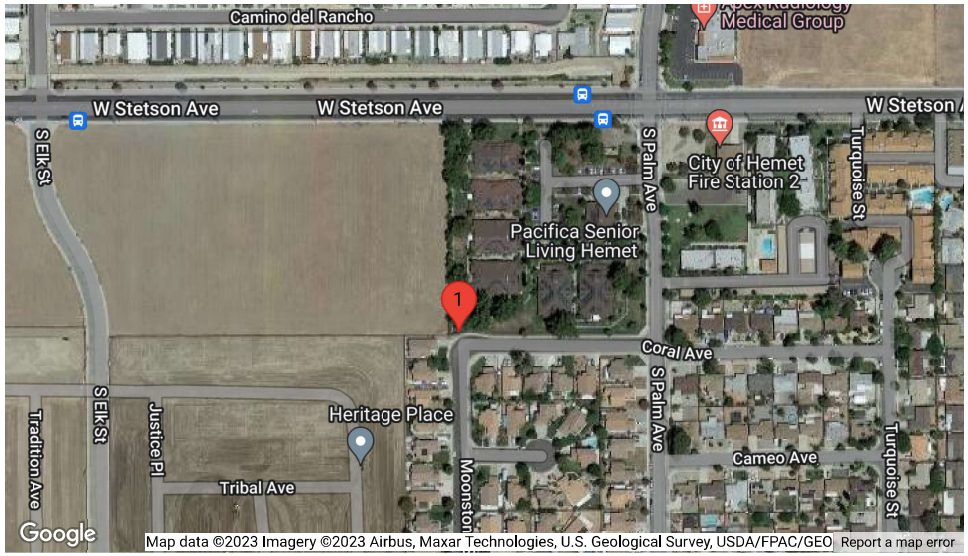
1-Hour Noise Measurement Datasheet

Project Name:	Aster Apts Noise
Project: #/Name:	0144-2023-003
Site Address/Location:	W Stetson Ave & S Elk St
Date:	08/24/2023
Field Tech/Engineer:	Jason Schuyler/ Claire Pincock

Site Observations:

Almost no wind on the site, The primary noise source was 2 gardeners running equipment to trim a tree and run a small chipper around the corner in a nearby culdesac. Overall the site was quiet.

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



MD ACOUSTICS

1-Hour Noise Measurement Datasheet - Cont.

Project Name: Aster Apts Noise

Site Address/Location: W Stetson Ave & S Elk St

Site Id: NM1

Figure 1: NM1

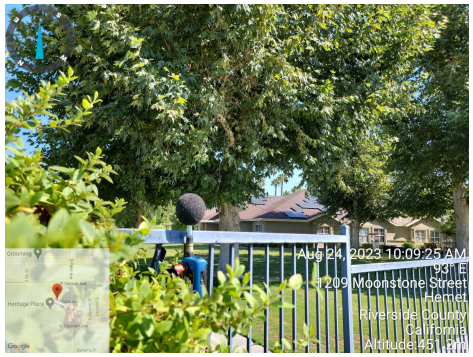


Figure 2: NM1

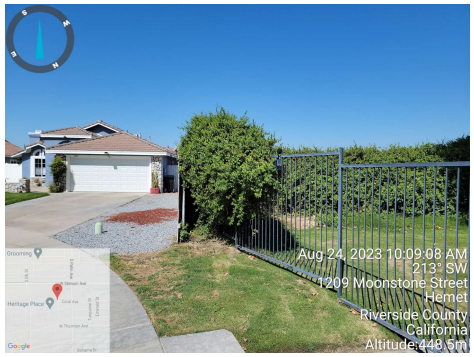
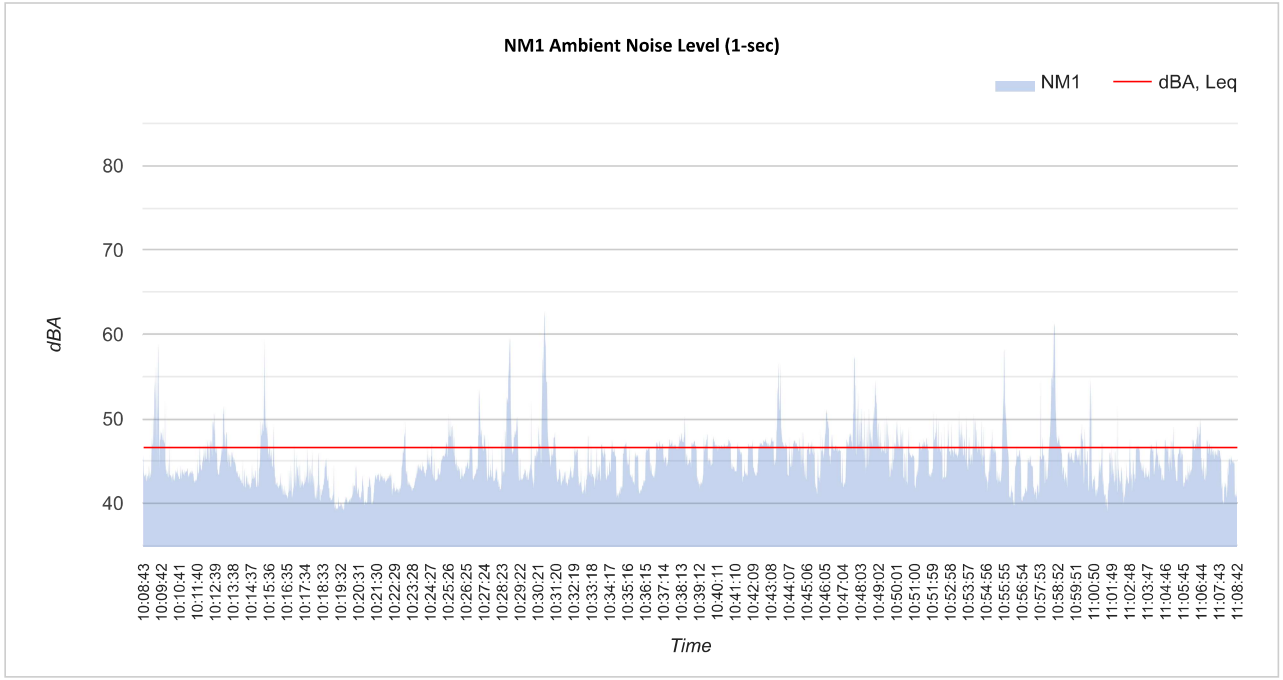


Table 1: Baseline Noise Measurement Summary

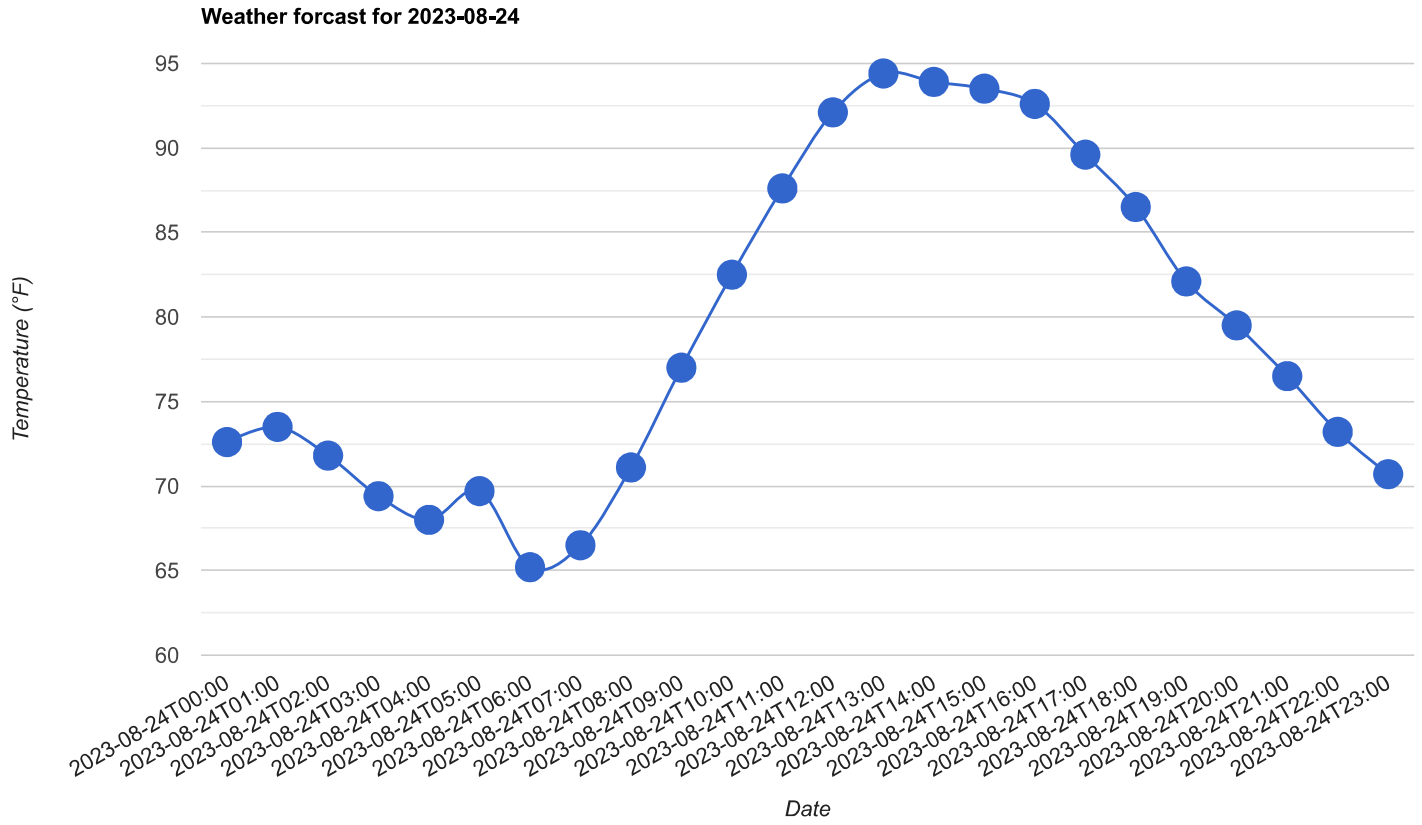
Location	Start	Stop	Leq	Lmax	Lmin	L2	L8	L25	L50	L90
NM1	10:08 AM	11:08 AM	46.6	62.7	39.2	53.1	48.4	46.7	44.8	41.8

1-Hour Noise Measurement Datasheet - Cont.

Project Name:	Aster Apts Noise	**Site Topo:**	Buildings 1-2 stories tall site	**Noise Source(s) w/ Distance:**
Site Address/Location:	W Stetson Ave & S Elk St	**Meteorological Cond.:**	87F Sunny winds 0-1MPH	road noise and residential noise
Site Id:	NM1	**Ground Type:**	buildings, asphalt, treesopen lawn and a large commercial lot	



MD ACOUSTICS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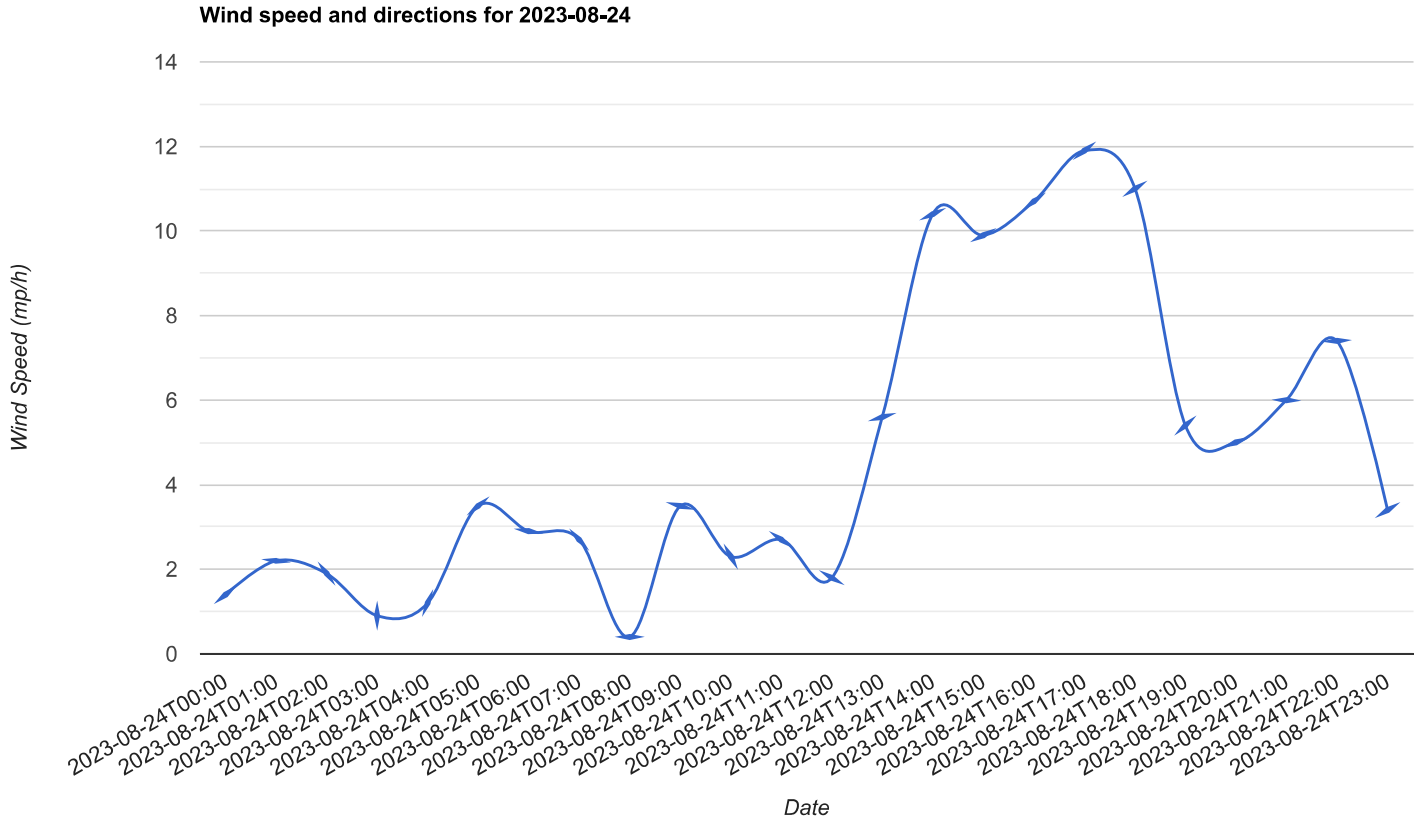
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12
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6
4
2
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2023-08-24T23:00
Date

Appendix B:

Traffic Noise Modeling Output

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

PROJECT: ASTER APARTMENTS
ROADWAY: W STETSON AVE
LOCATION: 60 FT FROM C/L

JOB #: 0144-2023-003
DATE: ########
ENGINEER: R. Edelman

NOISE INPUT DATA - EXISTING

ROADWAY CONDITIONS

ADT =	14,500	
SPEED =	45	
PK HR % =	10	
NEAR LANE/FAR LANE DI	55	
ROAD ELEVATION =	0.0	
GRADE =	1.0	%
PK HR VOL =	1,450	

RECEIVER INPUT DATA

RECEIVER DISTANCE =		60
DIST C/L TO WALL =		60
RECEIVER HEIGHT =		5.0
WALL DISTANCE FROM RECEIVER		0
PAD ELEVATION =		0.5
ROADWAY VIEW:	LF ANGLE=	-90
	RT ANGLE=	90
	DF ANGLE=	180

SITE CONDITIONS

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

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	0.775	0.129	0.096	0.9742
MEDIUM TRUCK	0.848	0.049	0.103	0.0184
HEAVY TRUCKS	0.865	0.027	0.108	0.0074

MISC. VEHICLE INFO

VEHICLE TYPE	HEIGHT	SLE DISTANCE	GRADE ADJUSTMENT
AUTOMOBILES	2.0	53.44	- -
MEDIUM TRUCKS	4.0	53.35	- -
HEAVY TRUCKS	8.0	53.39	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	67.3	65.4	63.6	57.6	66.2	66.8
MEDIUM TRUCKS	58.3	56.8	50.5	48.9	57.4	57.6
HEAVY TRUCKS	58.9	57.5	48.4	49.7	58.0	58.2
NOISE LEVELS (dBA)	68.3	66.5	63.9	58.7	67.3	67.8

NOISE IMPACTS (WITH TOPO AND BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	67.3	65.4	63.6	57.6	66.2	66.8
MEDIUM TRUCKS	58.3	56.8	50.5	48.9	57.4	57.6
HEAVY TRUCKS	58.9	57.5	48.4	49.7	58.0	58.2
NOISE LEVELS (dBA)	68.3	66.5	63.9	58.7	67.3	67.8

NOISE CONTOUR (FT)				
NOISE LEVELS	70 dBA	65 dBA	60 dBA	55 dBA
CNEL	43	92	198	426
LDN	39	85	183	394

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

PROJECT: ASTER APARTMENTS
ROADWAY: W STETSON AVE
LOCATION: 60 FT FROM C/L

JOB #: 0144-2023-003
DATE: ########
ENGINEER: R. Edelman

NOISE INPUT DATA - EXISTING + PROJECT

ROADWAY CONDITIONS

ADT =	14,709	
SPEED =	45	
PK HR % =	10	
NEAR LANE/FAR LANE DI	55	
ROAD ELEVATION =	0.0	
GRADE =	1.0	%
PK HR VOL =	1,471	

RECEIVER INPUT DATA

RECEIVER DISTANCE =		60
DIST C/L TO WALL =		60
RECEIVER HEIGHT =		5.0
WALL DISTANCE FROM RECEIVER		0
PAD ELEVATION =		0.5
ROADWAY VIEW:	LF ANGLE=	-90
	RT ANGLE=	90
	DF ANGLE=	180

SITE CONDITIONS

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

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	0.775	0.129	0.096	0.9742
MEDIUM TRUCK	0.848	0.049	0.103	0.0184
HEAVY TRUCKS	0.865	0.027	0.108	0.0074

MISC. VEHICLE INFO

VEHICLE TYPE	HEIGHT	SLE DISTANCE	GRADE ADJUSTMENT
AUTOMOBILES	2.0	53.44	- -
MEDIUM TRUCKS	4.0	53.35	- -
HEAVY TRUCKS	8.0	53.39	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	67.3	65.4	63.7	57.6	66.2	66.8
MEDIUM TRUCKS	58.4	56.9	50.5	49.0	57.4	57.7
HEAVY TRUCKS	58.9	57.5	48.5	49.7	58.1	58.2
NOISE LEVELS (dBA)	68.4	66.6	64.0	58.8	67.3	67.8

NOISE IMPACTS (WITH TOPO AND BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	67.3	65.4	63.7	57.6	66.2	66.8
MEDIUM TRUCKS	58.4	56.9	50.5	49.0	57.4	57.7
HEAVY TRUCKS	58.9	57.5	48.5	49.7	58.1	58.2
NOISE LEVELS (dBA)	68.4	66.6	64.0	58.8	67.3	67.8

NOISE CONTOUR (FT)				
NOISE LEVELS	70 dBA	65 dBA	60 dBA	55 dBA
CNEL	43	93	200	431
LDN	40	86	185	398

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

PROJECT: ASTER APARTMENTS
ROADWAY: W STETSON AVE
LOCATION: NORTHERN FAÇADE

JOB #: 0144-2023-003
DATE: ########
ENGINEER: R. Edelman

NOISE INPUT DATA - OYCP On-site

ROADWAY CONDITIONS

ADT =	15,600	
SPEED =	45	
PK HR % =	10	
NEAR LANE/FAR LANE DI	55	
ROAD ELEVATION =	0.0	
GRADE =	1.0	%
PK HR VOL =	1,560	

RECEIVER INPUT DATA

RECEIVER DISTANCE =	70	
DIST C/L TO WALL =	40	
RECEIVER HEIGHT =	5.0	
WALL DISTANCE FROM RECEIVER	30	
PAD ELEVATION =	0.5	
ROADWAY VIEW: LF ANGLE=	-90	
RT ANGLE=	90	
DF ANGLE=	180	

SITE CONDITIONS

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

WALL INFORMATION

HTH WALL	6.0	
AMBIENT=	0.0	
BARRIER =	0	(0 = WALL, 1 = BERM)

VEHICLE MIX DATA

VEHICLE TYPE	DAY	EVENING	NIGHT	DAILY
AUTOMOBILES	0.775	0.129	0.096	0.9742
MEDIUM TRUCK	0.848	0.049	0.103	0.0184
HEAVY TRUCKS	0.865	0.027	0.108	0.0074

MISC. VEHICLE INFO

VEHICLE TYPE	HEIGHT	SLE DISTANCE	GRADE ADJUSTMENT
AUTOMOBILES	2.0	59.41	- -
MEDIUM TRUCKS	4.0	59.17	- -
HEAVY TRUCKS	8.0	64.42	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	66.9	65.0	63.2	57.2	65.8	66.4
MEDIUM TRUCKS	58.0	56.5	50.1	48.5	57.0	57.2
HEAVY TRUCKS	58.0	56.6	47.5	48.8	57.1	57.2
NOISE LEVELS (dBA)	67.9	66.1	63.5	58.3	66.8	67.3

NOISE IMPACTS (WITH TOPO AND BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	60.3	58.4	56.6	50.6	59.2	59.8
MEDIUM TRUCKS	52.3	50.7	44.4	42.8	51.3	51.5
HEAVY TRUCKS	58.0	56.6	47.5	48.8	57.1	57.2
NOISE LEVELS (dBA)	62.7	60.9	58.3	53.0	61.6	62.1

NOISE CONTOUR (FT)				
NOISE LEVELS	70 dBA	65 dBA	60 dBA	55 dBA
CNEL	47	100	216	466
LDN	43	93	200	430

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

PROJECT: ASTER APARTMENTS
ROADWAY: W STETSON AVE
LOCATION: NORTHERN FAÇADE, 2ND & 3RD FLOOR

JOB #: 0144-2023-003
DATE: ########
ENGINEER: R. Edelman

NOISE INPUT DATA - OYCP On-Site 2nd & 3rd Floor

ROADWAY CONDITIONS

ADT =	16,700	
SPEED =	45	
PK HR % =	10	
NEAR LANE/FAR LANE DI	55	
ROAD ELEVATION =	0.0	
GRADE =	1.0	%
PK HR VOL =	1,670	

RECEIVER INPUT DATA

RECEIVER DISTANCE =		70
DIST C/L TO WALL =		40
RECEIVER HEIGHT =		29.0
WALL DISTANCE FROM RECEIVER		30
PAD ELEVATION =		0.5
ROADWAY VIEW:	LF ANGLE=	-90
	RT ANGLE=	90
	DF ANGLE=	180

SITE CONDITIONS

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

WALL INFORMATION

HTH WALL	6.0	
AMBIENT=	0.0	
BARRIER =	0	(0 = WALL, 1 = BERM)

VEHICLE MIX DATA

VEHICLE TYPE	DAY	EVENING	NIGHT	DAILY
AUTOMOBILES	0.775	0.129	0.096	0.9742
MEDIUM TRUCK	0.848	0.049	0.103	0.0184
HEAVY TRUCKS	0.865	0.027	0.108	0.0074

MISC. VEHICLE INFO

VEHICLE TYPE	HEIGHT	SLE DISTANCE	GRADE ADJUSTMENT
AUTOMOBILES	2.0	70.00	- -
MEDIUM TRUCKS	4.0	69.24	- -
HEAVY TRUCKS	8.0	67.87	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	66.1	64.2	62.5	56.4	65.0	65.6
MEDIUM TRUCKS	57.2	55.7	49.4	47.8	56.3	56.5
HEAVY TRUCKS	57.9	56.5	47.5	48.7	57.1	57.2
NOISE LEVELS (dBA)	67.2	65.4	62.8	57.6	66.1	66.7

NOISE IMPACTS (WITH TOPO AND BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	66.1	64.2	62.5	56.4	65.0	65.6
MEDIUM TRUCKS	57.2	55.7	49.4	47.8	56.3	56.5
HEAVY TRUCKS	57.9	56.5	47.5	48.7	57.1	57.2
NOISE LEVELS (dBA)	67.2	65.4	62.8	57.6	66.1	66.7

NOISE CONTOUR (FT)				
NOISE LEVELS	70 dBA	65 dBA	60 dBA	55 dBA
CNEL	42	90	195	419
LDN	39	83	180	387

Appendix C:

Construction Noise Modeling Output

Receptor - Residences to the South

Construction Phase Equipment Item	# of Items	Item Lmax at 50 feet, dBA[1]	Edge of Site to Receptor, feet	Center of Site to Receptor, feet	Item Usage Percent[1]	Ground Factor[2]	Usage Factor	Receptor Item Lmax, dBA	Recptor. Item Leq, dBA
SITE PREP									
Dozer	2	82	20	250	40	0.66	0.40	92.6	59.4
Tractor	3	84	20	250	40	0.66	0.40	94.6	61.4
							Log Sum	94.6	67.7
GRADE									
Grader	1	85	20	250	40	0.66	0.40	95.6	62.4
Excavator	2	81	20	250	40	0.66	0.40	91.6	58.4
Tractor	2	84	20	250	40	0.66	0.40	94.6	61.4
Scraper	2	84	20	250	40	0.66	0.40	94.6	61.4
Dozer	1	82	20	250	40	0.66	0.40	92.6	59.4
								95.6	69.8
BUILD									
Man lift	3	75	20	250	20	0.66	0.20	85.6	49.4
Generator	1	81	20	250	50	0.66	0.50	91.6	59.4
Crane	1	81	20	250	16	0.66	0.16	91.6	54.4
Welder/Torch	1	74	20	250	40	0.66	0.40	84.6	51.4
Tractor	3	84	20	250	40	0.66	0.40	94.6	61.4
								94.6	67.6
PAVE									
Paver	2	77	20	250	50	0	0.50	85.0	60.0
Compactor (ground)	2	83	20	250	20	0	0.20	91.0	62.0
Roller	2	80	20	250	20	0	0.20	88.0	59.0
								91.0	68.3
ARCH COAT									
Compressor (air)	1	78	20	250	40	0	0.40	86.0	60.0
								86.0	60.0

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

VIBRATION LEVEL IMPACT

Project:	Aster Apartments	Date: 3/8/24
Source:	Roller	
Scenario:	Unmitigated	
Location:	Southern Residences	
Address:	Hemet	

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 =	20.00	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 =	**0.268**	IN/SEC	OUTPUT IN RED