Appendix F
Noise Study

Pilot Travel Palmdale Development Project

Noise Impact Study

City of Palmdale, CA

Prepared for:

Starla Barker
De Novo Planning Group
180 East Main Street # 108
Tustin, CA 92780

Prepared by:

MD Acoustics, LLC
Mike Dickerson, INCE & Roma Stromberg
1197 Los Angeles Ave, Ste C-256
Simi Valley, CA 93065

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www.mdacoustics.com
info@mdacoustics.com

TABLE OF CONTENTS

LIST OF APPENDICES

LIST OF EXHIBITS

LIST OF TABLES

1.0 Introduction

1.1 Purpose of Analysis and Study Objectives

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

The following is provided in this report:

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

1.2 Site Location and Study Area

The Pilot Travel Palmdale Development (Project) site is generally located north of Pear Blossom Highway and approximately 1,200 feet west of Fort Tejon Rd (Hwy 138), in the City of Palmdale, within the County of Los Angeles; refer to Exhibit A. The project site is primarily accessed from Pear Blossom Highway.

Existing land uses surrounding the Project site include:

- North: Union Pacific rail line and vacant land;
- East: Commercial land uses and State Route 138;
- South: Pear Blossom Highway, vacant property and single-family residential land uses; and
- West: Vacant land (zoned residential) and single-family residential land uses.

1.3 Proposed Project Description

The proposed project consists of the construction and operation of a Pilot Travel Center on a site approximately 9.0-acres in size. The proposed travel center would provide fueling facilities, travel amenities, restaurants, and parking facilities for passing motorists and commercial truck operators, as described below; refer to Exhibit B, Site Plan.

Fueling Facilities

The Project proposes eight diesel fueling lanes/positions and seven gas islands with 14 fueling positions. The diesel fueling lanes would be located to the north of the travel center building and include a 20-foot-tall canopy structure. The gas islands would be located south of the travel center building and north of Pearblossom Highway, and include a 20-foot-tall canopy structure. Two aboveground diesel storage

farms, a Bio-blending shed, belowground gasoline storage tanks, and a truck scale would be located within the diesel portion of the site.

Travel Center Building

The proposed travel center building would be up to 12,000 square feet and include a convenience store, three quick service restaurants, driver amenities (e.g., restrooms, showers, laundry), and support/utility areas. A refuse enclosure and storage area and transformers, screened from view by a solid wall, would be located to the west of the travel center building.

Parking Facilities

The Project would provide 123 parking spaces (56 automobile, 3 ADA, 64 truck) with passenger automobile and handicapped parking located south of and adjacent to the travel center facility and south of the gas islands, adjacent to Pearblossom Highway. Truck parking would be located north of the travel center facility and truck diesel fueling lanes.

Sound Barriers

An eight-foot-tall concrete barrier would be provided along the Project site's western property line adjacent to the auto fueling area. North of the auto fueling area the eight-foot-tall fence would transition onto a five-foot-tall berm and extend to the northern property line and storm pond.

Access

Primary access to the project site would be provided from Pearblossom Highway. A shared 36-foot-wide roadway would extend north from Pearblossom Highway along the eastern edge of the Project site, providing access to the proposed Project site and the two parcels North and East of the Project site. A driveway along the western edge of the Project site would provide auto only access from Pear Blossom Highway to the auto fueling area.

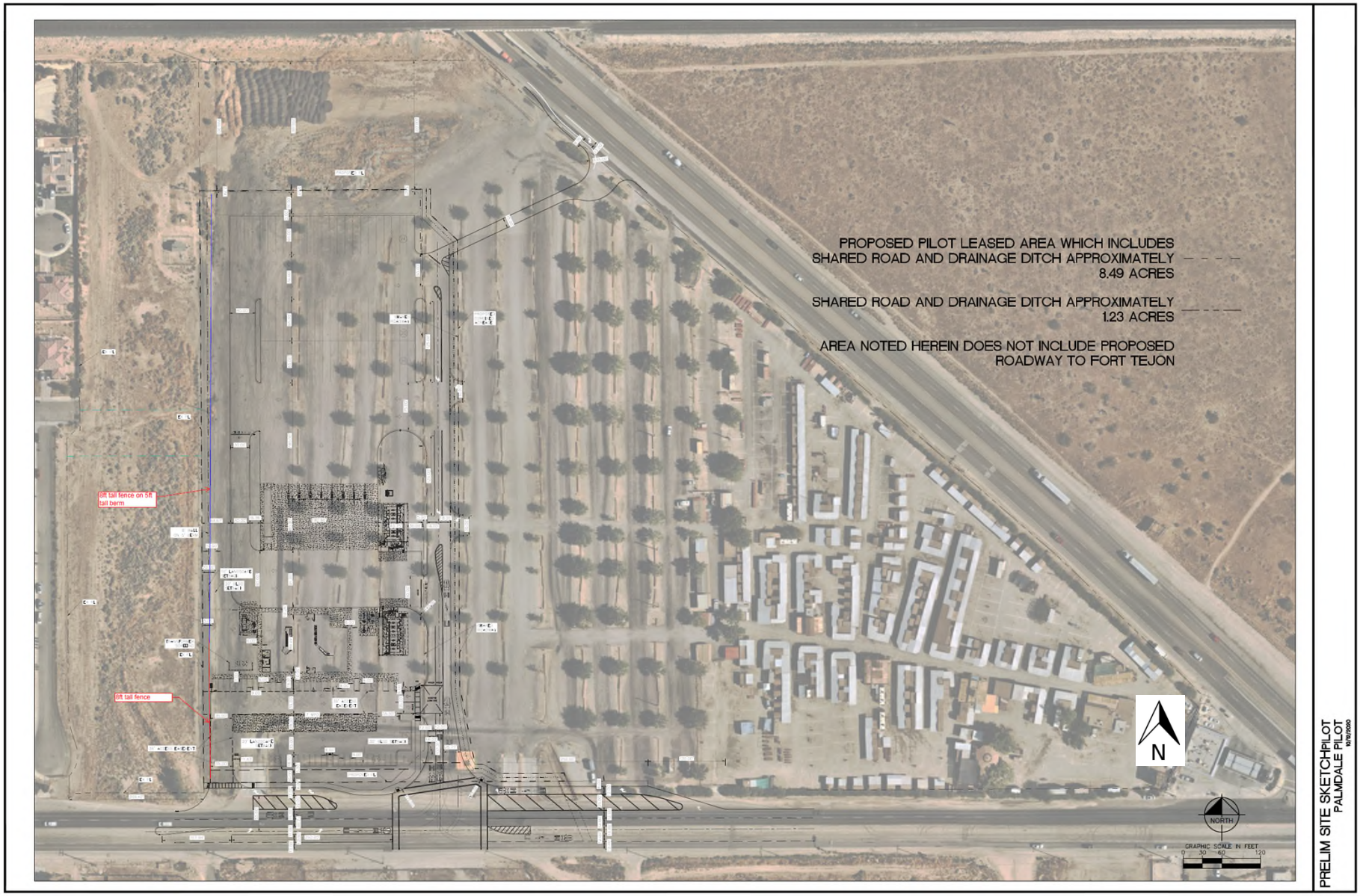
Additional access is proposed from Highway 138 via a one-way, 15-foot-wide roadway which would extend southwest from Highway 138 and connect to the shared access roadway at the northeast corner of the Project site.

Exhibit A

Location Map

Exhibit B

Site Plan



2.0 Fundamentals of Noise

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

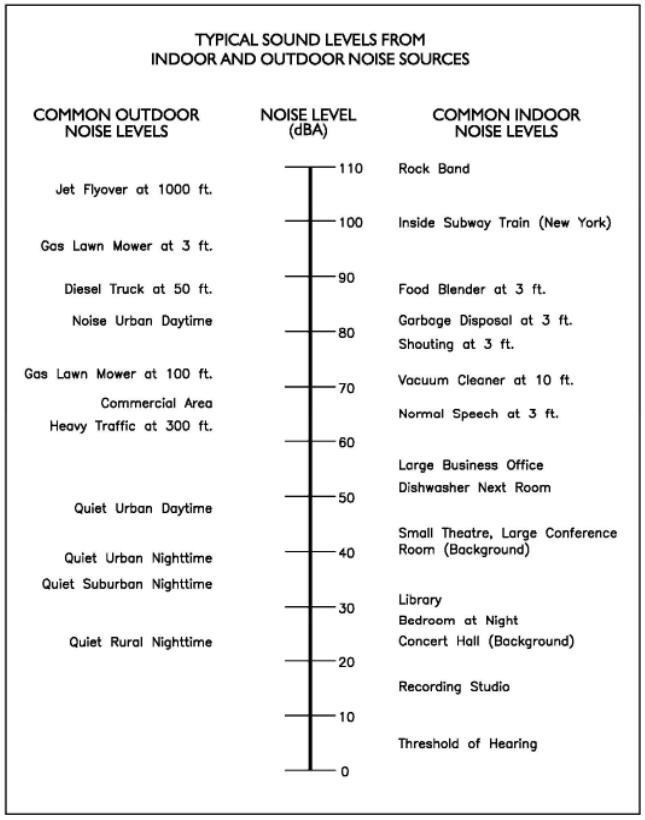
2.1 Sound, Noise and Acoustics

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

2.2 Frequency and Hertz

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

Exhibit C: Typical A-Weighted Noise Levels



2.3 Sound Pressure Levels and Decibels

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

2.4 Addition of Decibels

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

2.5 Sensitive Receptors

As defined in the City of Palmdale General Plan Noise Element (1993), "Noise-sensitive land uses" include residential (single and multi-family dwellings, mobile home parks, dormitories, and similar uses); transient lodging (including hotels, motels, and similar uses); hospitals, nursing homes, convalescent hospitals, and other facilities for long-term medical care; public or private educational facilities, libraries, churches, and places of public assembly. The proposed project is considered to be a " less-than sensitive" receptor. Some consideration of noise impact may be appropriate.

2.6 Human Response to Changes in Noise Levels

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

Table 1: Decibel Changes and Loudness

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

2.7 Noise Descriptors

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

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

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

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

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

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

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

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

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

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

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

Percent Noise Levels: See L(n).

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

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

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

2.8 Traffic Noise Prediction

Noise levels associated with traffic depends on a variety of factors: (1) volume of traffic, (2) speed of traffic, (3) auto, medium truck (2–3 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.

2.9 Sound Propagation

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

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

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

3.0 Ground-Bourne Vibration Fundamentals

3.1 Vibration Descriptors

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

Several different methods are used to quantify vibration amplitude.

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

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

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

3.2 Vibration Perception

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

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

4.0 Regulatory Setting

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

4.1 Federal Regulations

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

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

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

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

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

4.2 State Regulations

Established in 1973, the California Department of Health Services Office of Noise Control (ONC) was instrumental in developing regularity tools to control and abate noise for use by local agencies. One significant model is the “Land Use Compatibility for Community Noise Environments Matrix.” The matrix allows the local jurisdiction to clearly delineate compatibility of sensitive uses with various incremental levels of noise. The State of California has also established noise insulation standards as outlined in Title 24 and the Uniform Building Code (UBC) which in some cases requires acoustical analyses to outline exterior noise levels and to ensure interior noise levels do not exceed the interior threshold. The State mandates that the legislative body of each county and city adopt a noise element as part of its comprehensive general plan. The local noise element must recognize the land use compatibility guidelines published by the State Department of Health Services. The guidelines rank noise land use

compatibility in terms of normally acceptable, conditionally acceptable, normally unacceptable, and clearly unacceptable. The City of Palmdale has adopted their own version of the State's Land Use Compatibility Guidelines. These are presented on Table 3.

The State of California has also adopted OSHA noise standards to protect employee health and safety (CCR 1910.95, Hearing conservation program). The California State Code of Regulations has established a permissible exposure limit for noise that is an 8-hour time-weighted average (sound levels averaged over an 8 hour day) of 85 dB. exposure standard of 85 dBA (8-hour).

4.3 City of Palmdale Noise Regulations

The City of Palmdale outlines their noise regulations and standards within the Noise Element of the City's General Plan and the Noise Code located in the City's Municipal Code.

City of Palmdale General Plan

The City requires that acoustical analysis reports include an evaluation of impacts associated with noise levels at the project site as well as the impact of the project on the existing noise environment. Where appropriate, the City will require acoustical analysis reports to include acoustical design to achieve the appropriate interior and exterior noise levels through sound insulation, or other means, as indicated in Table 2. For commercial land uses, an interior noise level of 55 dBA Leq would apply to the proposed commercial building, and a "noise level which does not interfere with normal business activity" is the standard for on-site exterior noise levels. The proposed project does not propose any outdoor areas where "normal business activity" would occur.

Table 2: Maximum Acceptable Noise Levels

Land Use	Exterior	Interior	Scale
Residential			
SFR	65	45	dBA, CNEL
MFR	65	45	dBA, CNEL
MHP	65	45	dBA, CNEL
Commercial including, but not limited to:	A noise level which does not jeopardize health, safety, and welfare of visitors.		
Retail		55	Leq(h)
Services		55	Leq(h)
Office		55	Leq(h)
Institutional including, but not limited to:	A noise level which does not jeopardize health, safety, and welfare of visitors.		
School		45	Leq(h)
Hospitals		45	Leq(h)
Nursing Homes		45	Leq(h)
Industrial including but not limited to:	A noise level which does not interfere with normal business activity.		
Industrial Park		65	Leq(h)
Business Park		65	Leq(h)
Quarry	Maximum 65 Leq(h) at the interface with residentially designated land.	n/a	n/a

Source: City of Palmdale General Plan Noise Element, 1993

Table 3: State Recommended Noise Level Guidelines

Land Use	Community Noise Exposure Ldn or CNEL, dB					
	55	60	65	70	75	80
Residential-Low Density Single Family, Duplexes and Mobile Homes						
Residential Multi-Family Dwellings						
Transient Lodging: Motels, Hotels						
Schools, Libraries, Churches, Hospitals, Nursing Homes						
Auditoriums, Concert Halls, Amphitheaters						
Sports Arenas, Outdoor Spectator Sports						
Playgrounds, Neighborhood Parks						
Golf Courses, Riding Stables, Water Recreation, Cemeteries						
Office Buildings, Businesses, Commercial and Professional						
Industrial, Manufacturing, Utilities, Agriculture						

Normally Acceptable:	Conditionally Acceptable:	Normally Unacceptable:	Clearly Unacceptable:
Specified land uses is satisfactory based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation or requirements.	New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning will normally suffice. Outdoor environment will seem noisy.	New construction and development should generally be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made with needed noise insulation features included in the design. Outdoor areas must be shielded.	New construction or development should generally not be undertaken. Construction costs to make the indoor environment acceptable would be prohibitive and the outdoor environment would not be usable.

[1] Source: California Office of Noise Control. Guidelines for the Preparation and Content of Noise Elements of the General Plan. February 2017.

General Plan Noise Element Goals, objectives and policies applicable to the proposed project are presented below.

Goal N1: Minimize the exposure of residents to excessive noise to the extent possible, through the land planning and the development review process.

Objective N1.1: Utilize appropriate land use planning as the primary method of achieving noise compatibility among adjacent land uses.

Policy N1.1.1: Locate noise compatible land uses near existing and future air, rail and highway transportation noise sources.

Policy N1.1.3: When proposed stationary noise sources could exceed an exterior noise level of 65 dBA CNEL at present, or could impact future noise sensitive land uses, require preparation of an acoustical analysis and mitigation measures to reduce noise levels to no more than 65 dBA CNEL exterior and 45 dBA CNEL interior; if the noise level cannot be reduced to these thresholds through mitigation, the new noise source should not be permitted.

Policy N1.1.4: Consider the noise environment when making land use decisions with respect to the guidelines contained in Table 32, and require noise standards consistent with the criteria listed on Table 2.

Objective N1.2: Protect and maintain those areas having acceptable noise environments.

Policy N1.2.2: Restrict construction hours during the evening, early morning and Sundays.

Policy N1.2.3: Utilize any or all of the following measures in order to maintain acceptable noise environments throughout the City:

1. Control of noise at its source, including noise barriers and other muffling devices built into the noise source;
2. The provision of buffer areas and/or wide setbacks between the noise source and other development;
3. The reduction of densities, where practical, adjacent to the noise source (freeway, airport, railroad);
4. The use of sound insulation, blank walls, double paned windows and other design or architectural techniques to reduce interior noise levels; and
5. Designation of appropriate land uses adjacent to known noise sources.

City of Palmdale Municipal Code

Section 9.18.101 Noise

Section 9.18.010 of the City of Palmdale Municipal Code makes it unlawful for any person to willfully make or continue, or cause or permit to be made or continued, any loud, unnecessary, or unusual noise which unreasonably disturbs the peace and quiet of any neighborhood or which causes discomfort or annoyance to any reasonable person of normal sensitiveness residing in the area. The characteristics and conditions, which may be considered in determining whether such noise violates the provisions of this section, shall include, but not be limited to, the following:

(1) The volume of the noise;
(2) The intensity of the noise;
(3) Whether the nature of the noise is usual or unusual;
(4) Whether the origin of the noise is natural or unnatural;
(5) The volume and intensity of the background noise, if any;
(6) The proximity of the noise to sleeping facilities;
(7) The nature and zoning of the area within which the noise emanates;
(8) The density of the inhabitation of the area within which the noise emanates;
(9) The time of the day or night the noise occurs;
(10) The duration of the noise;
(11) Whether the noise is recurrent, intermittent, or constant;
(12) Whether the noise is produced by a commercial or noncommercial activity.

Section 9.18.020 Acts constituting disturbing, excessive, loud, offensive noise

Section 9.18.020 of the code identifies horns, signaling devices, etc. and radios, television sets, phonograph, amplifiers and similar devices as noise sources that among others, that can be disturbing, excessive, loud, or offensive noise. Causing or allowing such activities in a manner that is disturbing to the peace is unlawful. This section of the ordinance clarifies that these are not the only noise sources that may be found to cause disturbing, excessive, loud, or offensive noises,

Section 9.18.020 also prohibits the use of jake brakes, using compression release engine brakes, and any method of using engine compression to slow a vehicle is prohibited in the City of Palmdale and unlawful.

Section 9.28.030 Construction noise prohibited in residential zones

Except as otherwise provided in this chapter, no person shall perform any construction or repair work on any Sunday, or any other day after 8:00 p.m. or before 6:30 a.m., in any residential zone or within 500 feet of any residence, hotel, motel or recreational vehicle park. For the purposes of this section, construction and repair work includes work of any kind upon any building or structure, earth excavating, filling, or moving, and delivery, preparation or operation of construction equipment, materials or supplies where any of the foregoing entails the use of an air compressor, jack hammer, power-driven drill, riveting machine, excavator, semi-truck, diesel power truck, tractor, cement truck, or earth moving equipment, hand hammer, or other machine, tool, device or equipment which makes loud noise which

disturbs the peace and quiet of any neighborhood or which causes discomfort or annoyance to any reasonable person of normal sensitiveness sleeping or residing in the area.

The City of Palmdale has not adopted a numerical threshold that identifies what a substantial increase would be. For purposes of this analysis, the Federal Transit Administration (FTA) Transit Noise and Vibration Impact Assessment (2006) criteria will be used to establish significance thresholds. The FTA provides reasonable criteria for assessing construction noise impacts based on the potential for adverse community reaction. For residential uses, the daytime noise threshold is 80 dBA L_{eq} averaged over an 8-hour period ($L_{eq\ (8\text{-}hr)}$; and the nighttime noise threshold is 70 dBA $L_{eq\ (8\text{-}hr)}$. For commercial uses, the daytime and nighttime noise threshold is 85 dBA $L_{eq\ (8\text{-}hr)}$. In compliance with the City's Code, it is assumed that construction would not occur during the noise-sensitive nighttime hours.

5.0 Study Method and Procedure

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

5.1 Noise Measurement Procedure and Criteria

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

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

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

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

5.2 Noise Measurement Locations

Noise monitoring locations were selected to obtain a baseline of the existing noise environment. Three short-term noise measurements were conducted at nearby noise-sensitive land uses. Appendix A includes photos, field sheet, and measured noise data. Exhibit D illustrates the location of the measurements.

5.3 SoundPLAN Noise Model (Operational Noise)

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

Measured and referenced sound level data was utilized to model the various stationary on-site noise sources associated with project operation, (i.e. idling trucks, fueling areas, parking movements, and heating and air conditioner units [HVAC]).

Noise associated with proposed truck and automobile parking areas was modeled using SoundPLAN methodology which takes into consideration the overall trip generation, number of parking spaces and estimates the number of movements per hour per parking space. The diesel fueling area was modeled by placing a point noise source representative of an idling diesel truck at each fueling station. The gasoline fueling area was modeled as an area source. A roof plan was not available at the time of this analysis so for modeling purposes it was assumed that three HVAC rooftop units would be placed on the proposed building. Modeling assumptions are summarized in Table 4. SoundPLAN noise modeling input and results are provided in Appendix B.

Table 4: SoundPLAN Modeling Assumptions

Noise Source	Source Type	Reference Level (dBA)Leq Sound Power Level
Truck Parking	Area (SP Parking Tool)	64.6
Truck Parking	Area (SP Parking Tool)	65.2
Auto Parking	Area (SP Parking Tool)	54.4
Auto Parking	Area (SP Parking Tool)	55.2
Auto Parking	Area (SP Parking Tool)	54.1
Auto Parking	Area (SP Parking Tool)	54.6
Auto Parking	Area (SP Parking Tool)	57.4
Auto Parking	Area (SP Parking Tool)	55.9
Auto Parking	Area (SP Parking Tool)	55.3
Diesel Fueling Area	Point Source	86.9
Gasoline Fueling Area	Area Source	54.3
HVAC Carrier 5-Ton	Point Source	70
Source: SoundPLAN 8.0 Manual. SoundPLAN International, LLC. May 2016.		

5.4 Traffic Noise Prediction Modeling

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

The SoundPLAN noise model was utilized to model future traffic noise levels on the project site.

Project generated vehicle traffic will result in an incremental increase in ambient noise levels. Vehicles accessing the project site will primarily utilize Pearblossom Highway/State Route 122 and Fort Tejon Road/State Route 138, to a lesser degree. To determine the project's noise impact to the surrounding

land uses, MD generated noise contours for existing ADT, and existing plus project conditions. Table 5 indicates the roadway parameters and vehicle distribution utilized for the modeling. Noise contours are used to 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 as a result of a project. The referenced traffic data and traffic noise calculation worksheets outputs are located in Appendix C.

- 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), Speeds, Percentages of autos, medium and heavy trucks
- Roadway grade and angle of view
- Site Conditions (e.g. soft vs. hard)
- Percentage of total ADT which flows each hour through-out a 24-hour period

Table 5: Roadway Parameters and Vehicle Distribution

Roadway/Type	Existing ADT[1]	Existing + Project ADT[2]	Future ADT[3]	Speed (MPH)	Site Conditions
Pearblossom Hwy 4-Lane Hwy	30,145	31,441	57,600	50	Hard
SR 138: E. Ave to S-Pearblossom Hwy 4-Lane Hwy	32,079	33,375	43,200	55	Hard
SR 138: S. of Pearblossom Hwy 4-Lane Hwy	29,072	30,368	43,200	55	Hard
Motor-Vehicle Type[4]		**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	94.3
Medium Trucks		84.8	4.9	10.3	1.1
Heavy Trucks		86.5	2.7	10.8	4.5

Notes:
[1] Existing ADT volumes for Pearblossom Highway were calculated using 2006 ADTs provided by the City (City of Palmdale Traffic Volume Map) with a 1.85% growth rate.
[2] Project trip generation provided in the traffic study prepared for the project (Kimley-Horn and Associates, Inc. 2020).
[3] City of Palmdale General Plan Circulation Element. LOS assumed to be 72% of Capacity.
[4] https://dot.ca.gov/programs/traffic-operations/census

5.6 Construction Noise Modeling

Construction noise associated with the proposed project was calculated utilizing methodology presented in the Federal Transit Administration (FTA) Transit Noise and Vibration Impact Assessment Manual (2018) together with several key construction parameters including: distance to each sensitive receiver,

equipment usage, percent usage factor, and baseline parameters for the project site. Construction activities are anticipated to include four phases site preparation, grading, building construction, and architectural coating.

Construction noise levels were calculated for each phase based on CalEEMod Air Quality Model assumptions provided by the project proponent. All equipment was assumed to be situated at the center of the project site. Construction equipment typically moves back and forth across the site; and it is an industry standard to use the acoustical center of the site to model average construction noise levels. construction worksheets are provided in Appendix D.

6.0 Existing Noise Environment

Two (2) 24-hour noise measurements were conducted near the project site in order to document the existing noise environment. The measurements include the 1-hour Leq, Lmin, Lmax and other statistical data (e.g. L2, L8). The results of the noise measurement are presented in Tables 6 and 7. Noise measurement field sheets are provided in Appendix A.

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

Date	Time	1-Hour dB(A)							
		L_{EQ}	L_{MAX}	L_{MIN}	L_2	L_8	L_{25}	L_{50}	L_{90}
4/28/2020	9AM-10AM	64.3	69.3	53.4	68.5	67.7	66.7	63.6	60.0
4/28/2020	10AM-11AM	63.0	70.1	53.9	66.8	66.1	65.5	62.5	57.8
4/28/2020	11AM-12PM	63.9	69.6	46.8	68.9	67.6	66.7	63.2	58.6
4/28/2020	12PM-1PM	63.5	70.2	49.8	69.4	67.1	66.1	62.7	56.3
4/28/2020	1PM-2PM	63.6	69.4	52.3	67.8	67.0	66.6	63.0	58.9
4/28/2020	2PM-3PM	62.4	68.7	51.2	67.6	66.3	65.2	61.3	56.7
4/28/2020	3PM-4PM	61.2	67.2	53.2	65.0	64.7	64.0	60.5	55.7
4/28/2020	4PM-5PM	60.9	65.2	49.3	64.8	64.4	64.1	60.7	54.1
4/28/2020	5PM-6PM	62.5	68.5	51.0	67.5	67.3	66.1	61.0	55.8
4/28/2020	6PM-7PM	61.1	67.0	51.4	66.1	65.2	64.5	59.8	54.2
4/28/2020	7PM-8PM	62.6	69.8	47.5	68.3	67.3	66.0	61.1	55.2
4/28/2020	8PM-9PM	61.0	67.7	50.5	65.7	65.3	64.2	59.7	52.5
4/28/2020	9PM-10PM	60.6	66.6	42.8	64.7	64.5	63.8	59.9	54.4
4/28/2020	10PM-11PM	60.6	70.2	47.1	66.6	64.8	63.9	58.3	49.9
4/28/2020	11PM-12AM	59.7	70.4	39.0	65.5	63.5	62.4	57.6	47.8
4/29/2020	12AM-1AM	57.9	65.0	41.6	64.1	63.9	62.6	54.5	42.5
4/29/2020	1AM-2AM	57.2	65.9	36.5	65.5	63.0	60.8	53.7	41.6
4/29/2020	2AM-3AM	58.1	66.3	40.3	64.5	63.7	62.2	54.5	43.5
4/29/2020	3AM-4AM	60.1	69.0	47.6	65.2	64.4	63.1	58.4	51.7
4/29/2020	4AM-5AM	64.8	73.1	54.6	68.9	68.1	67.4	63.6	59.1
4/29/2020	5AM-6AM	65.6	71.7	55.6	69.1	68.5	68.2	65.0	61.5
4/29/2020	6AM-7AM	65.8	70.6	57.9	69.5	68.3	67.9	65.5	61.1
4/29/2020	7AM-8AM	65.1	70.3	52.8	69.3	68.8	68.0	63.9	58.8
4/29/2020	8AM-9AM	64.6	72.7	48.1	68.3	67.5	66.6	63.8	61.1
CNEL		69.7							

Notes:
[1.] Long-term noise monitoring location (LT1) is illustrated in Exhibit E. The quietest hourly day/evening noise interval is highlighted in orange when project operations could occur.

Table 7: Long-Term Noise Measurement Data for (LT2) (dBA)[1]

Date	Time	1-Hour dB(A)							
		L_{EQ}	L_{MAX}	L_{MIN}	L_2	L_8	L_{25}	L_{50}	L_{90}
4/28/2020	9AM-10AM	55.3	72.7	35.9	66.2	61.9	58.2	49.0	45.7
4/28/2020	10AM-11AM	47.5	59.2	35.2	50.9	50.3	49.9	46.5	44.6
4/28/2020	11AM-12PM	48.8	64.4	35.8	53.7	52.1	51.5	48.0	45.2
4/28/2020	12PM-1PM	50.7	69.0	45.9	58.0	56.0	52.6	48.7	46.2
4/28/2020	1PM-2PM	52.7	66.7	38.2	62.1	53.6	52.6	49.8	46.6
4/28/2020	2PM-3PM	50.0	67.3	38.2	55.9	53.1	51.3	49.2	45.9
4/28/2020	3PM-4PM	50.9	66.0	36.4	56.2	54.4	53.9	49.8	46.2
4/28/2020	4PM-5PM	49.1	69.7	33.9	54.0	52.4	51.8	47.7	44.1
4/28/2020	5PM-6PM	49.6	66.1	34.0	53.7	53.3	52.5	48.1	44.9
4/28/2020	6PM-7PM	49.4	65.0	38.2	53.7	53.3	51.6	48.6	46.0
4/28/2020	7PM-8PM	51.8	68.9	39.6	57.1	55.4	54.0	50.7	47.3
4/28/2020	8PM-9PM	54.0	73.4	41.5	63.2	57.5	53.7	49.5	46.9
4/28/2020	9PM-10PM	54.7	75.4	38.5	63.1	57.8	53.6	49.2	46.8
4/28/2020	10PM-11PM	48.0	62.9	35.4	53.1	51.7	51.0	46.9	42.5
4/28/2020	11PM-12AM	54.8	76.0	35.1	65.0	52.2	51.2	47.0	42.3
4/29/2020	12AM-1AM	48.1	65.3	31.5	52.7	51.7	51.3	46.9	42.3
4/29/2020	1AM-2AM	49.7	74.2	32.0	55.7	53.7	53.0	46.6	39.4
4/29/2020	2AM-3AM	48.8	62.9	33.2	54.3	52.8	52.2	47.4	42.2
4/29/2020	3AM-4AM	53.0	72.5	39.3	61.8	60.5	54.0	49.8	47.1
4/29/2020	4AM-5AM	54.7	68.4	44.9	59.8	57.0	56.7	53.9	51.4
4/29/2020	5AM-6AM	55.5	67.1	45.3	58.8	58.6	57.2	55.1	52.3
4/29/2020	6AM-7AM	55.6	69.5	47.8	59.3	58.2	57.3	55.2	52.9
4/29/2020	7AM-8AM	55.5	73.8	43.3	63.1	59.1	56.5	51.7	49.0
4/29/2020	8AM-9AM	52.2	66.6	39.7	60.1	55.7	54.1	50.4	48.5
CNEL		60.2							

Notes:
[1.] Long-term noise monitoring location (LT1) is illustrated in Exhibit E. The quietest hourly day/evening noise interval is highlighted in orange when project operations could occur.

The data presented in Tables 6 and 7 and the field notes provided in Appendix A, indicate that ambient noise levels in the project vicinity range between 57.2 and 65.8 dBA Leq (LTM1) and between 47.5 and 55.6 dBA Leq (LTM2). The overall CNEL ranged between 60.2 to 69.7 dBA CNEL. The field data indicates that both local roadway and railroad noise are the dominant noise sources.

Exhibit D
Measurement Locations

X = Measurement location

7.0 Future Noise Environment Impacts and Mitigation

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

7.1 Off-Site Traffic Noise Impact

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

- Existing Condition: This scenario refers to the existing year traffic noise condition and is demonstrated in Table 8.

- Existing + Project Condition: This scenario refers to the existing year plus project traffic noise condition and is demonstrated in Table 8.

As shown in Table 8, the addition of project generated vehicle traffic to SR 138 and SR 122 would result in negligible increases in ambient noise levels and would not be significant.

Table 8: Change in Existing Noise Levels as a Result of Project Generated Traffic

Roadway	Segment	Modeled Noise Levels (dBA CNEL) at 50 feet from the Centerline			
		Existing	Existing Plus Project	Change in Noise Level	Increase of 3 dB or more[2]
Pearblossom Hwy	47th Street E to SR 138	75.9	76.1	0.2	No
State Route 138	E. Ave S-8 to Pearblossom Hwy	76.2	76.3	0.1	No
State Route 138	South of Pearblossom Hwy	75.5	75.7	0.2	No

Notes:
[1] FHWA roadway noise modeling worksheets provided in Appendix C.
[2] Typically, the human ear can barely perceive the change in noise level of 3 dB

7.2 On-Site Traffic Noise Impact

Future noise levels associated with Pearblossom Highway and State Route 38 were modeled using the SoundPLAN noise model in order to evaluate the project in light of the City's exterior standards presented in Table 2 of this report as they apply to future traffic noise impacts to the proposed project. The maximum acceptable exterior noise level for commercial land uses is "a noise level which does not jeopardize health, safety, and welfare of visitors"; and a maximum interior noise level for commercial

land uses is 55 dBA Leq(h). The California State Code of Regulations has established a permissible exposure limit for noise that is an 8-hour time-weighted average (sound levels averaged over an 8 hour day) of 85 dBA. As shown on Exhibit E, future noise levels at the proposed outdoor uses, i.e. parking and fueling areas are expected to reach up to 75 dBA Leq(h), and would not exceed the 8-hour time-weighted average of 85 dBA.

The expected interior noise level of the proposed commercial building is the difference between the projected exterior noise level at the structure's facade and the noise reduction provided by the structure itself. Typical commercial building construction will provide a noise level reduction of 20 dBA with a "windows closed" condition. A "windows closed" condition requires mechanical fresh air ventilation (e.g. air conditioning). Interior noise levels may reach up to 52.4 dB Leq and are not expected to exceed the City's interior noise standard for commercial buildings of 55 dBA Leq.

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

The existing single family residential land uses located approximately 185 feet west of the project site are sensitive receptors that may be affected by project operational noise. As shown in Table 2, project operational noise impacts to off-site sensitive receptors are evaluated in light of the 65 dBA CNEL exterior and 45 dBA interior noise thresholds. Worst-case operational noise was modeled using SoundPlan acoustical modeling software. One receptor representative of the project's western property line and two (2)receptors representative of existing single family homes located west of the project site were modeled using the SoundPLAN noise model to evaluate the proposed project's operational impact. A receptor is denoted by a yellow dot. All yellow dots represent either an existing building, a property line, or a sensitive receptor such as an outdoor sensitive area (courtyard, patio, backyard, etc.).

Project Operational Noise Levels

Worst-case "project only" exterior operational noise is presented on Exhibit F. Operational noise levels at the western property line are expected to reach 62.9 dBA CNEL and up to 48.3 dBA Leq at the nearest sensitive receptors (single family residences to the west). Project operational noise would not exceed the City's 65 dBA CNEL daytime exterior noise limit or the 45 dBA interior residential limit, as outlined within the City's noise Code (see Table 2). Typical newer residential construction will provide a noise level reduction of 15 dB with a "windows open" condition and a 20 dBA with a "windows closed" condition. A "windows closed" condition requires mechanical fresh air ventilation (e.g. air conditioning).

Project Plus Ambient Operational Noise Levels

As stated above, existing plus project noise level projections are anticipated to reach 48.3 dBA Leq at the nearest sensitive receptors. Measured noise levels at the noise measurement location representative of the sensitive receptors (LT1) ranged between 57.2 to 65.8 dBA Leq. When adding two noise levels that are between 4 and 9 dB in difference from each other, the resulting sum is 1 dB higher than the higher of the two values. Project generated operational noise is expected to result in a 1 dB increase in ambient noise levels. This impact would not be significant. No mitigation is required.

Exhibit E

Future Traffic + Project Operational Noise Levels (Leq)

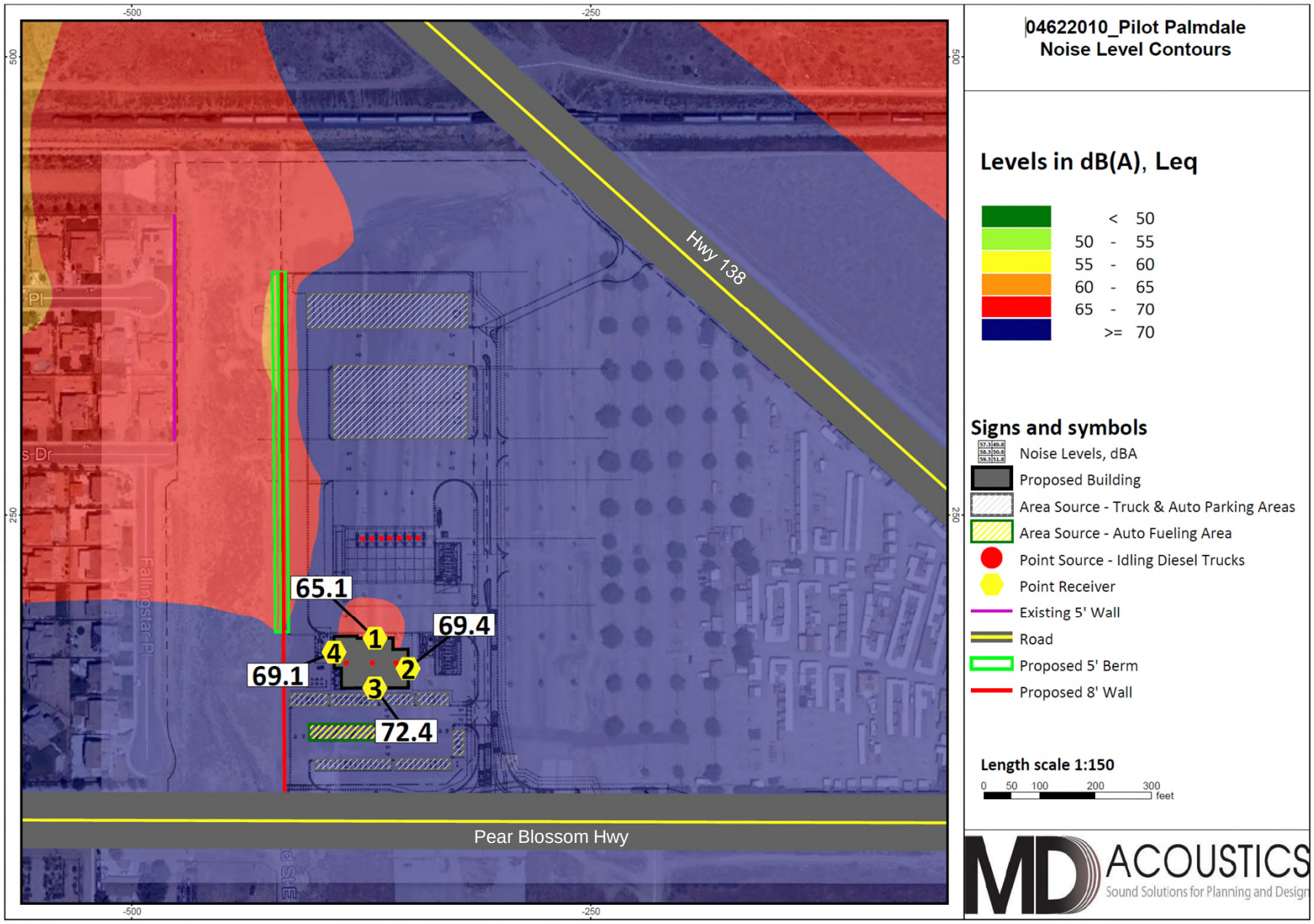
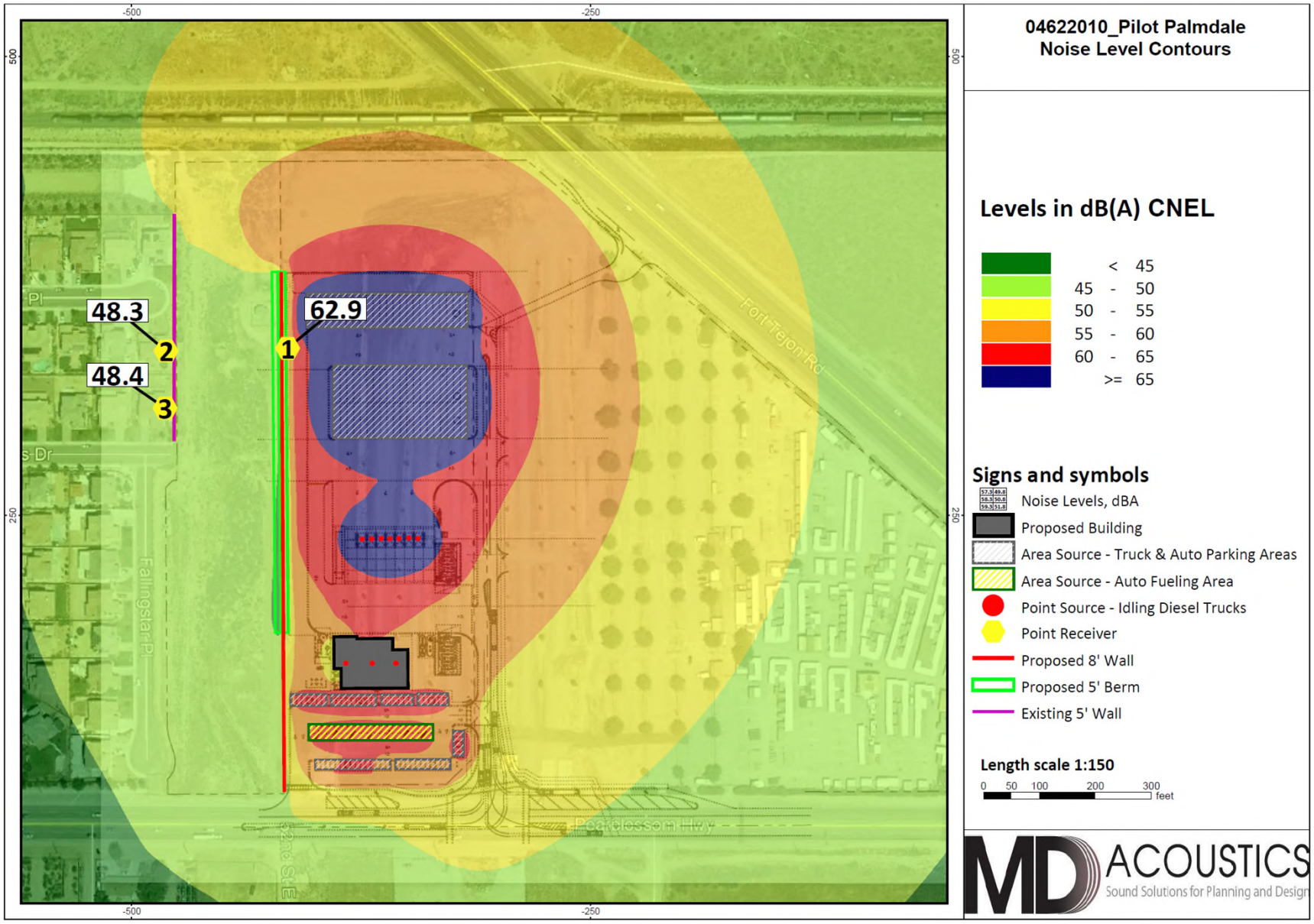


Exhibit F

Project Operational Noise Levels - CNEL



8.0 Construction Noise and Vibration Impacts

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

8.1 Construction Noise

Typical construction equipment noise levels are presented in Table 9.

Table 9: Typical Construction Equipment Noise Levels[1]

EQUIPMENT POWERED BY INTERNAL COMBUSTION ENGINES

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

IMPACT EQUIPMENT

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

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

Construction noise associated with each phase of the project was calculated at nearby sensitive receptors utilizing methodology presented in the Federal Transit Administration (FTA) Transit Noise and Vibration Impact Assessment Manual (2018) together with several key construction parameters

including: distance to each sensitive receiver, equipment usage, percent usage factor, and baseline parameters for the project site. Construction equipment typically moves back and forth across the site; and it is an industry standard to use the acoustical center of the site to model average construction noise levels.

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

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

Activity	Noise Levels at Nearest Sensitive Receptor	
	Leq	Lmax
Site Preparation	79	83
Grading	79	80
Building Construction	77	78
Architectural Coating	73	77
Note: Construction Modeling Worksheets are provided in Appendix D.		

As shown in Table 10, project construction noise will range between 73 and 79 dBA Leq dBA Lmax at nearby sensitive receptors. Measured noise levels at the noise measurement location representative of the nearest sensitive receptors (LT1) ranged between 57.2 to 65.8 dBA Leq. CEQA

The project will be required to adhere to Section 9.28.030 of the City of Palmdale Municipal Code which prohibits construction or repair work on any Sunday, or any other day after 8:00 p.m. or before 6:30 a.m., in any residential zone or within 500 feet of any residence, hotel, motel or recreational vehicle park. Project construction will be consistent with the applicable ordinance. This impact is less than significant. No mitigation is required.

As discussed previously, the City of Palmdale has not adopted a numerical threshold that identifies what a substantial increase would be. For purposes of this analysis, the Federal Transit Administration (FTA) Transit Noise and Vibration Impact Assessment (2006) criteria will be used to establish significance thresholds. The FTA provides reasonable criteria for assessing construction noise impacts based on the potential for adverse community reaction. For residential uses, the daytime noise threshold is 80 dBA L_{eq} averaged over an 8-hour period ($L_{eq\ [8\text{-}hr]}$); and the nighttime noise threshold is 70 dBA $L_{eq\ (8\text{-}hr)}$. For commercial uses, the daytime and nighttime noise threshold is 85 dBA $L_{eq\ (8\text{-}hr)}$. In compliance with the City's Code, it is assumed that construction would not occur during the noise-sensitive nighttime hours.

The $L_{eq\ (8\text{-}hr)}$ associated with project construction would range between 73 and 79 dBA depending upon the construction phase, and will not exceed the FTA criteria for impacts to residential or commercial land uses. This impact would be less than significant. No mitigation is required. Measures to minimize construction noise are provided in Section 8.3 of this report.

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 bull dozer. A large bull dozer has a vibration impact of 0.089 inches per second peak particle velocity (PPV) at 25 feet which is perceptible but below any risk to architectural damage.

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

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

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

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

Table 11: Guideline Vibration Damage Potential Threshold Criteria

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

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

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

Table 12: Vibration Source Levels for Construction Equipment

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

Source: Transit Noise and Vibration Impact Assessment, Federal Transit Administration, May 2018.

The nearest sensitive receptors are approximately 185 feet west of the project site. At this distance, a large bulldozer would yield a worst-case 0. 01 PPV (in/sec) which would not be perceptible or result in architectural damage. The impact is not significant. No mitigation is required. The ground-borne vibration worksheet is provided in Appendix E.

8.3 Construction Noise Reduction Measures

In addition to complying with Section 9.28.030 of the City of Palmdale Municipal Code which prohibits construction or repair work on any Sunday, or any other day after 8:00 p.m. or before 6:30 a.m., in any residential zone or within 500 feet of any residence, hotel, motel or recreational vehicle park, the following measures are recommended to reduce construction noise.

1. During construction, the contactor shall ensure all construction equipment is equipped with appropriate noise attenuating devices.

2. The contractor should 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.

3. Idling equipment should be turned off when not in use.

4. Equipment shall be maintained so that vehicles and their loads are secured from rattling and banging.

9.0 References

City of Palmdale
1993 General Plan
2020 Municipal Code

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

California Department of Noise Control
2017 Guidelines for the Preparation and Content of Noise Elements of the General Plan. February.

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

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

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

Kimley-Horn and Associates
Traffic Study Memorandum of Understanding, October 7, 2020

SoundPLAN International, LLC
2016 SoundPLAN Essential 4.0 Manual. May.

Appendix A:

Field Measurement Data

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

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

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

24-Hour Continuous Noise Measurement Datasheet

Project: Pilot Palmdale
Site Address/Location: N.W. corner of Pear Blossom Hwy and Fort Tejon Rd
Date: 4/28/2020 to 4/29/2020
Field Tech/Engineer: Jason Schuyler & Claire Pincock

Site Observations: Clear Sky. Measurement was performed within 5- ft of map pins. Promary noise for LT1 was vehicle traffic and construction associated with Pearblossom Hwy.

General Location:
Sound Meter: NTi Audio **SN:** A2A-07095-E0
Settings: A-weighted, slow, 1-sec, 10-minute interval
Meteorological Con.: 75 degrees F, 2 to 5 mph wind, eastern direction
Site ID: LT1

Site Topo: Flat
Ground Type: Soft site, w/ street surface hard

Noise Source(s) w/ Distance:
LT1 was taken approx. 95' N. of the Pearblosson Hwy and appoximately 1,500' S. of the rail line

Figure 1: LT Monitoring Locations

Figure 2: LT-1 Photo

Figure 3: LT-2 Photo

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

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

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

24-Hour Continuous Noise Measurement Datasheet - Cont.

Project: Pilot Palmdale **Day:** 1 of 1
Site Address/Location: N.W. corner of Pear Blossom Hwy and Fort Tejon Rd
Site ID: LT1

Date	Start	Stop	Leq	Lmax	Lmin	L2	L8	L25	L50	L90
4/28/2020	9:00 AM	10:00 AM	64.3	69.3	53.4	68.5	67.7	66.7	63.6	60.0
4/28/2020	10:00 AM	11:00 AM	63.0	70.1	53.9	66.8	66.1	65.5	62.5	57.8
4/28/2020	11:00 AM	12:00 PM	63.9	69.6	46.8	68.9	67.6	66.7	63.2	58.6
4/28/2020	12:00 PM	1:00 PM	63.5	70.2	49.8	69.4	67.1	66.1	62.7	56.3
4/28/2020	1:00 PM	2:00 PM	63.6	69.4	52.3	67.8	67.0	66.6	63.0	58.9
4/28/2020	2:00 PM	3:00 PM	62.4	68.7	51.2	67.6	66.3	65.2	61.3	56.7
4/28/2020	3:00 PM	4:00 PM	61.2	67.2	53.2	65.0	64.7	64.0	60.5	55.7
4/28/2020	4:00 PM	5:00 PM	60.9	65.2	49.3	64.8	64.4	64.1	60.7	54.1
4/28/2020	5:00 PM	6:00 PM	62.5	68.5	51.0	67.5	67.3	66.1	61.0	55.8
4/28/2020	6:00 PM	7:00 PM	61.1	67.0	51.4	66.1	65.2	64.5	59.8	54.2
4/28/2020	7:00 PM	8:00 PM	62.6	69.8	47.5	68.3	67.3	66.0	61.1	55.2
4/28/2020	8:00 PM	9:00 PM	61.0	67.7	50.5	65.7	65.3	64.2	59.7	52.5
4/28/2020	9:00 PM	10:00 PM	60.6	66.6	42.8	64.7	64.5	63.8	59.9	54.4
4/28/2020	10:00 PM	11:00 PM	60.6	70.2	47.1	66.6	64.8	63.9	58.3	49.9
4/28/2020	11:00 PM	12:00 AM	59.7	70.4	39.0	65.5	63.5	62.4	57.6	47.8
4/29/2020	12:00 AM	1:00 AM	57.9	65.0	41.6	64.1	63.9	62.6	54.5	42.5
4/29/2020	1:00 AM	2:00 AM	57.2	65.9	36.5	65.5	63.0	60.8	53.7	41.6
4/29/2020	2:00 AM	3:00 AM	58.1	66.3	40.3	64.5	63.7	62.2	54.5	43.5
4/29/2020	3:00 AM	4:00 AM	60.1	69.0	47.6	65.2	64.4	63.1	58.4	51.7
4/29/2020	4:00 AM	5:00 AM	64.8	73.1	54.6	68.9	68.1	67.4	63.6	59.1
4/29/2020	5:00 AM	6:00 AM	65.6	71.7	55.6	69.1	68.5	68.2	65.0	61.5
4/29/2020	6:00 AM	7:00 AM	65.8	70.6	57.9	69.5	68.3	67.9	65.5	61.1
4/29/2020	7:00 AM	8:00 AM	65.1	70.3	52.8	69.3	68.8	68.0	63.9	58.8
4/29/2020	8:00 AM	9:00 AM	64.6	72.7	48.1	68.3	67.5	66.6	63.8	61.1

CNEL: 69.7

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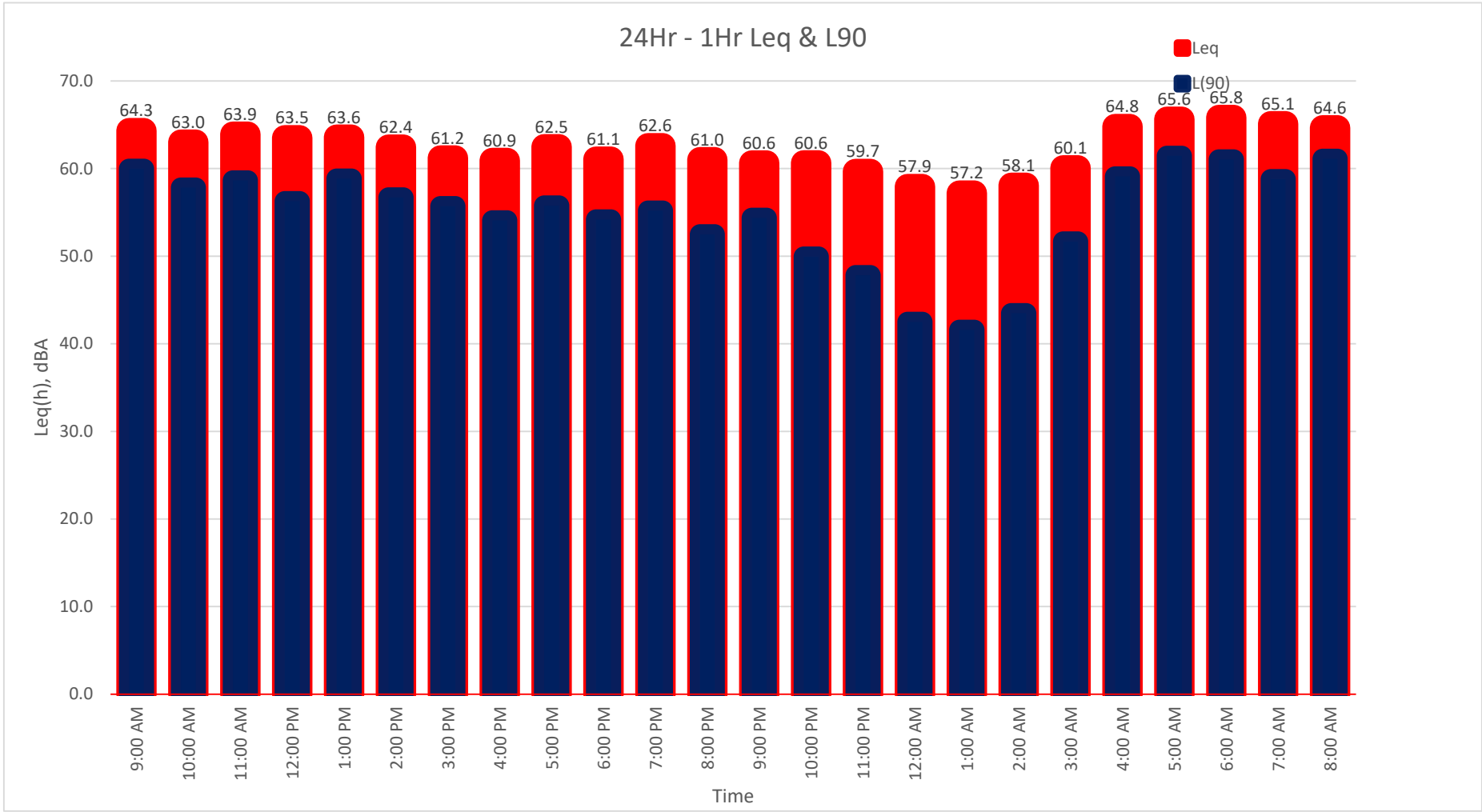
24-Hour Continuous Noise Measurement Datasheet - Cont.

Project: Pilot Palmdale **Day:** 1 of 1
Site Address/Location: N.W. corner of Pear Blossom Hwy and Fort Tejon Rd
Site ID: LT1



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24-Hour Continuous Noise Measurement Datasheet - Cont.

Project: Pilot Palmdale **Day:** 1 of 1
Site Address/Location: N.W. corner of Pear Blossom Hwy and Fort Tejon Rd
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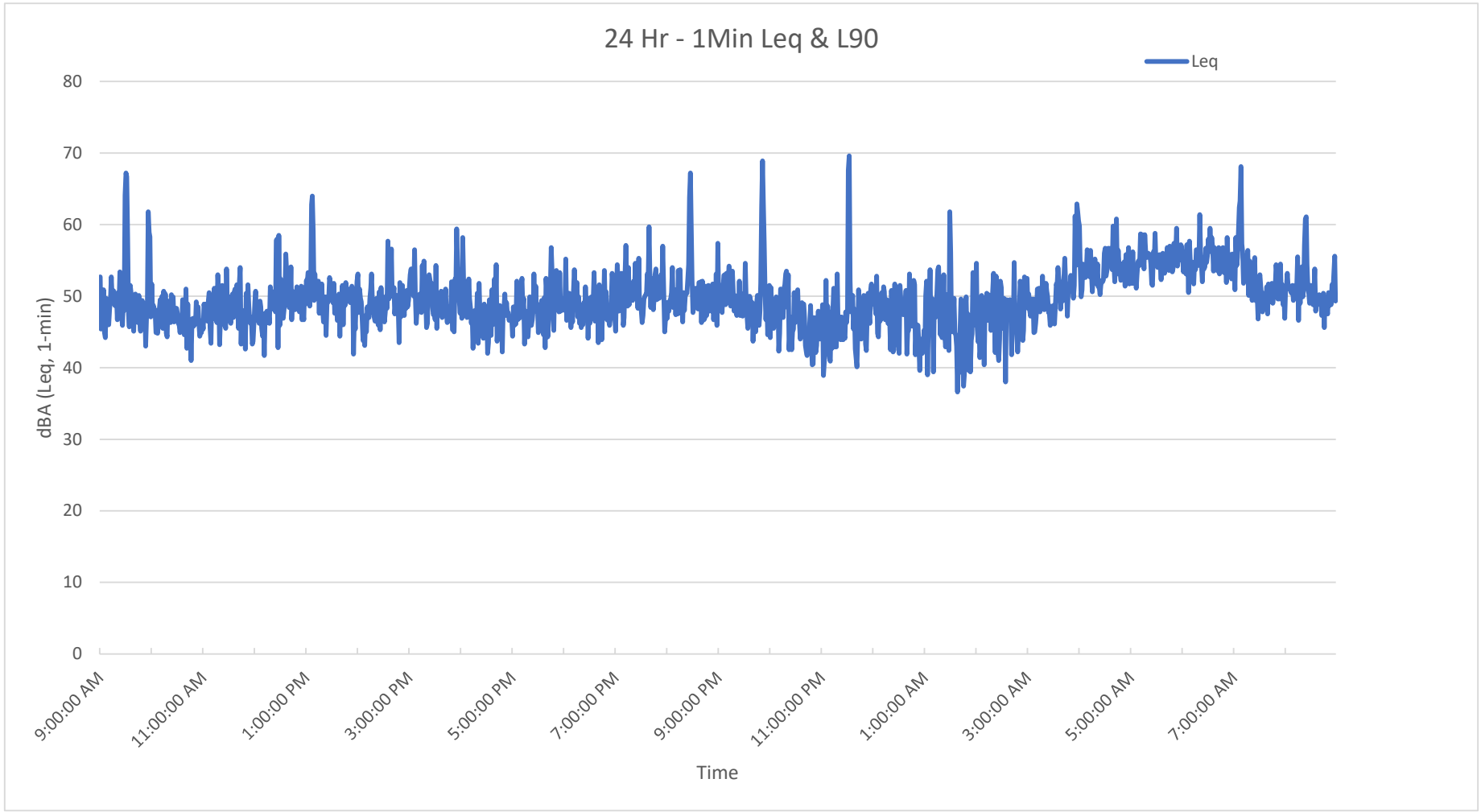

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24-Hour Continuous Noise Measurement Datasheet

Project: Pilot Palmdale
Site Address/Location: N.W. corner of Pear Blossom Hwy and Fort Tejon Rd
Date: 4/28/2020 to 4/29/2020
Field Tech/Engineer: Jason Schuyler & Claire Pincock

Site Observations: Primary noise for LT2: vehicle noise associated with State Route 138 and train pass-by. A strong wind moved through the area on the final day of testing 10-15MPH.

General Location:
Sound Meter: NTi Audio **SN:** A2A-07095-E0
Settings: A-weighted, slow, 1-sec, 10-minute interval
Meteorological Con.: 75 degrees F, 2 to 5 mph wind, eastern direction
Site ID: LT2

Site Topo: Flat
Ground Type: Soft site, w/ street surface hard

Noise Source(s) w/ Distance:
LT2- was taken approx. 250' W. of SR-138 and approximately 485' S. of the rail line

Figure 1: LT Monitoring Locations

Figure 2: LT-1 Photo

Figure 3: LT-2 Photo

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24-Hour Continuous Noise Measurement Datasheet - Cont.

Project: Pilot Palmdale **Day:** 1 of 1
Site Address/Location: N.W. corner of Pear Blossom Hwy and Fort Tejon Rd
Site ID: LT2

Date	Start	Stop	Leq	Lmax	Lmin	L2	L8	L25	L50	L90
4/28/2020	9:00 AM	10:00 AM	55.3	72.7	35.9	66.2	61.9	58.2	49.0	45.7
4/28/2020	10:00 AM	11:00 AM	47.5	59.2	35.2	50.9	50.3	49.9	46.5	44.6
4/28/2020	11:00 AM	12:00 PM	48.8	64.4	35.8	53.7	52.1	51.5	48.0	45.2
4/28/2020	12:00 PM	1:00 PM	50.7	69.0	45.9	58.0	56.0	52.6	48.7	46.2
4/28/2020	1:00 PM	2:00 PM	52.7	66.7	38.2	62.1	53.6	52.6	49.8	46.6
4/28/2020	2:00 PM	3:00 PM	50.0	67.3	38.2	55.9	53.1	51.3	49.2	45.9
4/28/2020	3:00 PM	4:00 PM	50.9	66.0	36.4	56.2	54.4	53.9	49.8	46.2
4/28/2020	4:00 PM	5:00 PM	49.1	69.7	33.9	54.0	52.4	51.8	47.7	44.1
4/28/2020	5:00 PM	6:00 PM	49.6	66.1	34.0	53.7	53.3	52.5	48.1	44.9
4/28/2020	6:00 PM	7:00 PM	49.4	65.0	38.2	53.7	53.3	51.6	48.6	46.0
4/28/2020	7:00 PM	8:00 PM	51.8	68.9	39.6	57.1	55.4	54.0	50.7	47.3
4/28/2020	8:00 PM	9:00 PM	54.0	73.4	41.5	63.2	57.5	53.7	49.5	46.9
4/28/2020	9:00 PM	10:00 PM	54.7	75.4	38.5	63.1	57.8	53.6	49.2	46.8
4/28/2020	10:00 PM	11:00 PM	48.0	62.9	35.4	53.1	51.7	51.0	46.9	42.5
4/28/2020	11:00 PM	12:00 AM	54.8	76.0	35.1	65.0	52.2	51.2	47.0	42.3
4/29/2020	12:00 AM	1:00 AM	48.1	65.3	31.5	52.7	51.7	51.3	46.9	42.3
4/29/2020	1:00 AM	2:00 AM	49.7	74.2	32.0	55.7	53.7	53.0	46.6	39.4
4/29/2020	2:00 AM	3:00 AM	48.8	62.9	33.2	54.3	52.8	52.2	47.4	42.2
4/29/2020	3:00 AM	4:00 AM	53.0	72.5	39.3	61.8	60.5	54.0	49.8	47.1
4/29/2020	4:00 AM	5:00 AM	54.7	68.4	44.9	59.8	57.0	56.7	53.9	51.4
4/29/2020	5:00 AM	6:00 AM	55.5	67.1	45.3	58.8	58.6	57.2	55.1	52.3
4/29/2020	6:00 AM	7:00 AM	55.6	69.5	47.8	59.3	58.2	57.3	55.2	52.9
4/29/2020	7:00 AM	8:00 AM	55.5	73.8	43.3	63.1	59.1	56.5	51.7	49.0
4/29/2020	8:00 AM	9:00 AM	52.2	66.6	39.7	60.1	55.7	54.1	50.4	48.5

CNEL: 60.2

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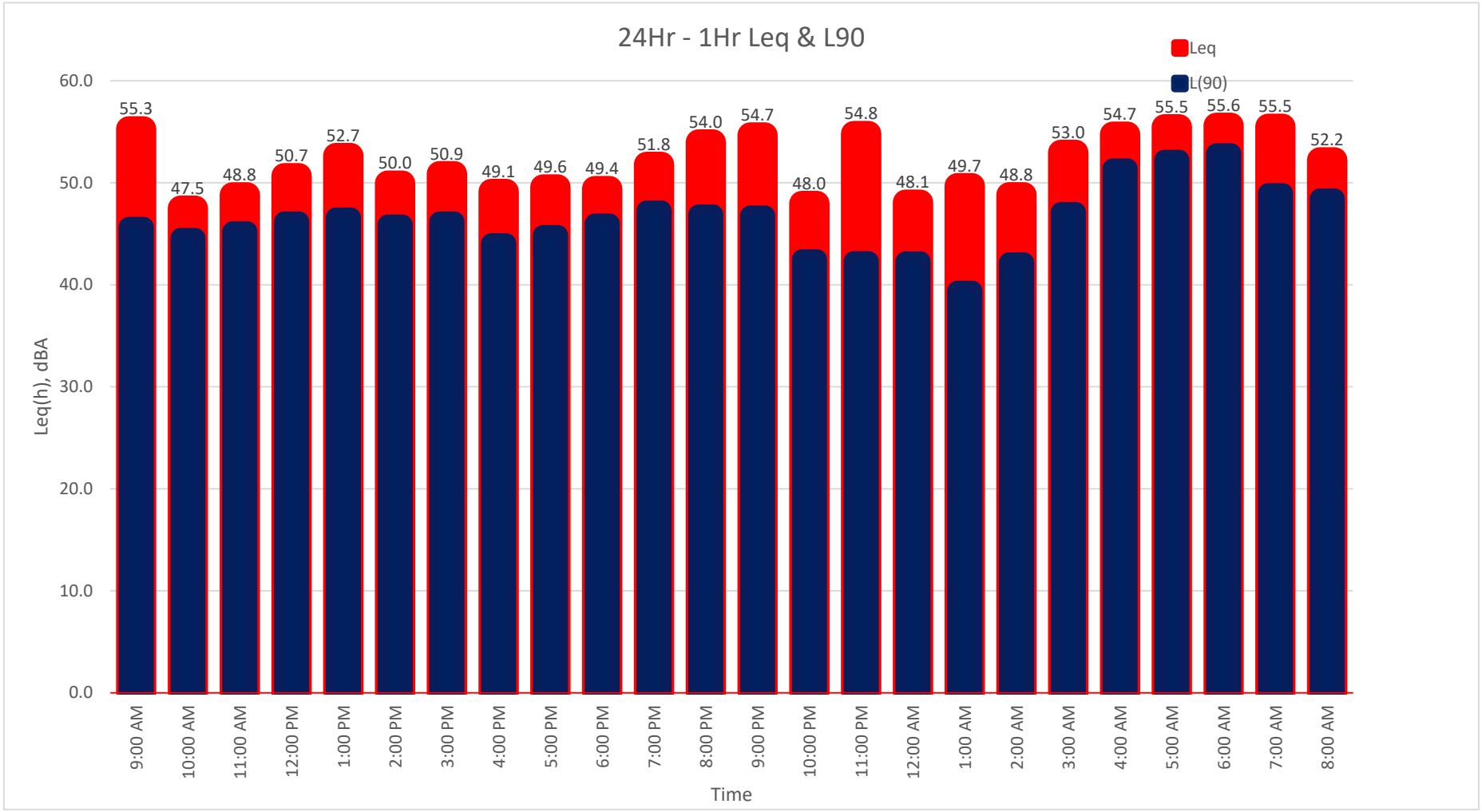
24-Hour Continuous Noise Measurement Datasheet - Cont.

Project: Pilot Palmdale **Day:** 1 of 1
Site Address/Location: N.W. corner of Pear Blossom Hwy and Fort Tejon Rd
Site ID: LT2



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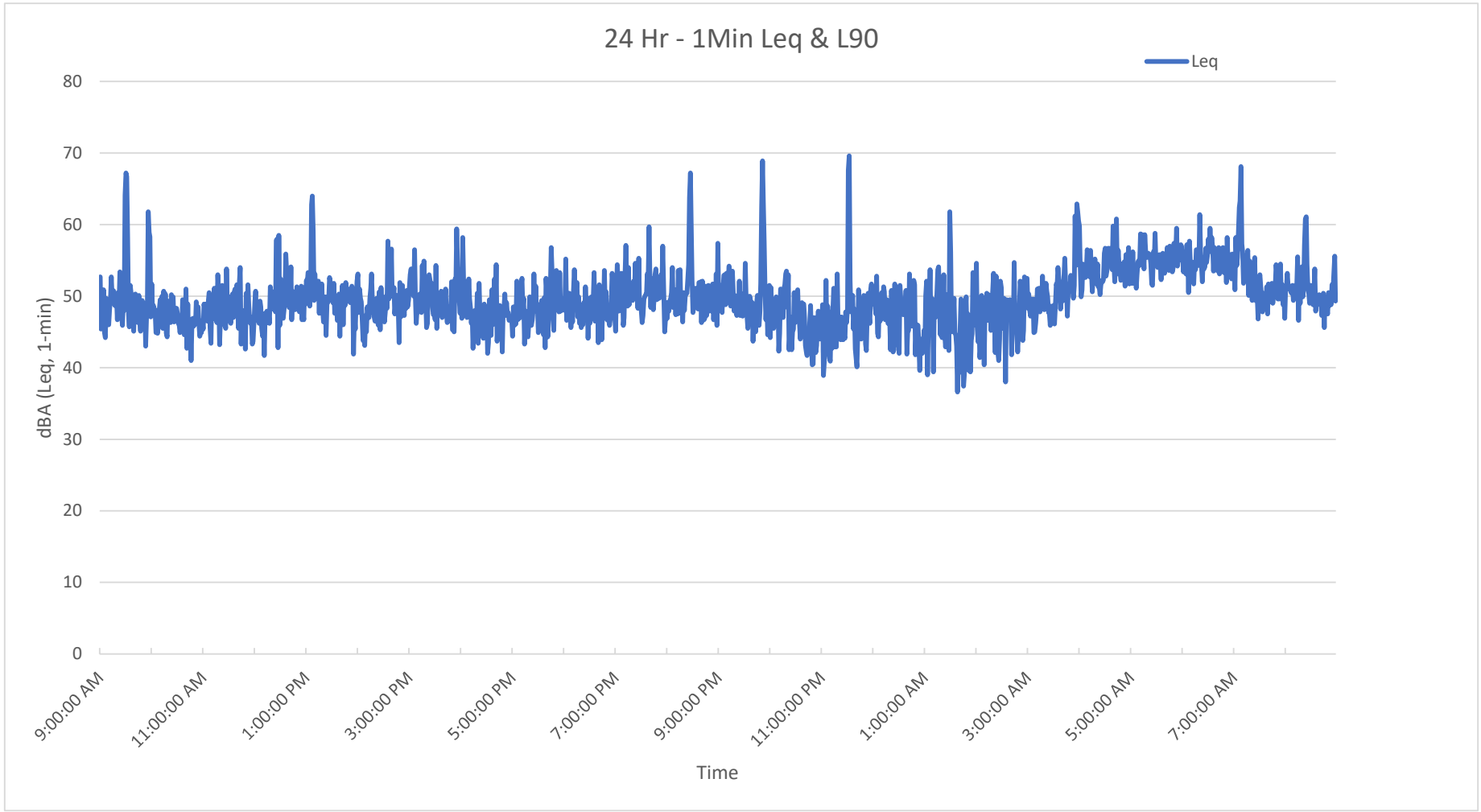
24-Hour Continuous Noise Measurement Datasheet - Cont.

Project: Pilot Palmdale **Day:** 1 of 1
Site Address/Location: N.W. corner of Pear Blossom Hwy and Fort Tejon Rd
Site ID: LT2



Noise emissions of road traffic

Statio km	ADT Veh/24	Vehicles type	Vehicle name	Traffic values day Veh/h	evening Veh/h	night Veh/h	Speed km/h	Contr devic	Cons Spee km/h	Affec veh. %	Road surface	Gradie Min / M %
I-15 NBound			Traffic direction: In entry direction									
0+00	52450	Total	-	3117	2220	771	-	none	-	-	Average (of DGAC a	1.3
		Automobiles	-	2954	2193	544	105					
		Medium trucks	-	61	10	85	105					
		Heavy trucks	-	102	17	142	105					
		Buses	-	-	-	-	-					
		Motorcycles	-	-	-	-	-					
		Auxiliary vehicle	-	-	-	-	-					
I-15 SBound			Traffic direction: In entry direction									
0+00	52450	Total	-	3117	2220	771	-	none	-	-	Average (of DGAC a	1.2
		Automobiles	-	2954	2193	544	105					
		Medium trucks	-	61	10	85	105					
		Heavy trucks	-	102	17	142	105					
		Buses	-	-	-	-	-					
		Motorcycles	-	-	-	-	-					
		Auxiliary vehicle	-	-	-	-	-					
Nisqualli Road			Traffic direction: In entry direction									
0+00	37742	Total	-	2243	1598	555	-	none	-	-	Average (of DGAC a	-3.4
		Automobiles	-	2126	1578	392	72					
		Medium trucks	-	44	7	61	72					
		Heavy trucks	-	73	12	102	72					
		Buses	-	-	-	-	-					
		Motorcycles	-	-	-	-	-					
		Auxiliary vehicle	-	-	-	-	-					
0+25	37742	Total	-	2243	1598	555	-	none	-	-	Average (of DGAC a	-1.9 / -
		Automobiles	-	2126	1578	392	72					
		Medium trucks	-	44	7	61	72					
		Heavy trucks	-	73	12	102	72					
		Buses	-	-	-	-	-					
		Motorcycles	-	-	-	-	-					
		Auxiliary vehicle	-	-	-	-	-					
1+26	37742	Total	-	2243	1598	555	-	none	-	-	Average (of DGAC a	-0.6
		Automobiles	-	2126	1578	392	72					
		Medium trucks	-	44	7	61	72					
		Heavy trucks	-	73	12	102	72					
		Buses	-	-	-	-	-					
		Motorcycles	-	-	-	-	-					
		Auxiliary vehicle	-	-	-	-	-					

Receiver list

No.	Receiver name	Building side	Floor	Limit Lden dB(A)	Level Lden dB(A)	Conflict Lden dB
1	1	-	GF	-	58.7	-
2	2	-	GF	-	60.7	-
3	3	-	GF	-	62.9	-
4	4	-	GF	-	65.2	-
5	5	-	GF	-	64.9	-
6	6	-	GF	-	62.5	-
7	7	-	GF	-	59.9	-
8	8	-	GF	-	57.4	-
9	9	-	GF	-	60.2	-

04622010_Pilot Palmdale
Emission calculation road - Situation 4: Outdoor SP

Road	Section name	KM km	ADT Veh/24h	Gradient %	
Pearblossom Hwy		0.000	57600	0.0	
SR 138 E. Ave S to Pearblossom		0.000	43200	0.0	

04622010_Pilot Palmdale
Octave spectra of the sources in dB(A) - Situation 4: Outdoor SP

Name	Source type	l or A	Li	R'w	L'w	Lw	KI	KT	LwMax	DO-Wall	Time histogram	Emission spectrum	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	16kHz
		m,m²	dB(A)	dB	dB(A)	dB(A)	dB	dB	dB(A)	dB			dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
Car Gas Pad - Area Source	Area	573.69			54.3	81.9	0.0	0.0		0	100%/24h					81.9					
HVAC 1	Point				70.0	70.0	0.0	0.0		0	100%/24h	RTU - 3'	46.4	55.3	54.4	62.8	64.5	64.3	61.3	56.9	45.2
HVAC 2	Point				70.0	70.0	0.0	0.0		0	100%/24h	RTU - 3'	46.4	55.3	54.5	62.8	64.5	64.3	61.3	57.0	45.2
HVAC 3	Point				70.0	70.0	0.0	0.0		0	100%/24h	RTU - 3'	46.4	55.3	54.5	62.8	64.5	64.3	61.3	57.0	45.2
Trucking Gas Pad- Point Source 1	Point				86.9	86.9	0.0	0.0		0	100%/24h	Idiling Heavy Diesel Truck	56.1	73.8	72.6	79.0	83.5	80.2	75.2	67.2	55.1
Trucking Gas Pad- Point Source 2	Point				86.9	86.9	0.0	0.0		0	100%/24h	Idiling Heavy Diesel Truck	56.1	73.8	72.6	79.0	83.5	80.2	75.2	67.2	55.1
Trucking Gas Pad- Point Source 3	Point				86.9	86.9	0.0	0.0		0	100%/24h	Idiling Heavy Diesel Truck	56.1	73.8	72.6	79.0	83.5	80.2	75.2	67.2	55.1
Trucking Gas Pad- Point Source 4	Point				86.9	86.9	0.0	0.0		0	100%/24h	Idiling Heavy Diesel Truck	56.1	73.8	72.6	79.0	83.5	80.2	75.2	67.2	55.1
Trucking Gas Pad- Point Source 5	Point				86.9	86.9	0.0	0.0		0	100%/24h	Idiling Heavy Diesel Truck	56.1	73.8	72.6	79.0	83.5	80.2	75.2	67.2	55.1
Trucking Gas Pad- Point Source 6	Point				86.9	86.9	0.0	0.0		0	100%/24h	Idiling Heavy Diesel Truck	56.1	73.8	72.6	79.0	83.5	80.2	75.2	67.2	55.1
Trucking Gas Pad- Point Source 7	Point				86.9	86.9	0.0	0.0		0	100%/24h	Idiling Heavy Diesel Truck	56.1	73.8	72.6	79.0	83.5	80.2	75.2	67.2	55.1
Car Parking 1	PLot	128.42			54.4	75.5	0.0	0.0		0	Car Parking	Typical spectrum	58.8	70.4	62.9	67.4	67.5	67.9	65.2	59.0	46.2
Car Parking 2	PLot	152.50			55.2	77.0	0.0	0.0		0	Car Parking	Typical spectrum	60.3	71.9	64.4	68.9	69.0	69.4	66.7	60.5	47.7
Car Parking 3	PLot	97.92			54.1	74.0	0.0	0.0		0	Car Parking	Typical spectrum	57.3	68.9	61.4	65.9	66.0	66.4	63.7	57.5	44.7
Car Parking 4	PLot	104.98			54.6	74.8	0.0	0.0		0	Car Parking	Typical spectrum	58.1	69.7	62.2	66.7	66.8	67.2	64.5	58.3	45.5
Car Parking 5	PLot	213.67			57.4	80.7	0.0	0.0		0	Car Parking	Typical spectrum	64.1	75.7	68.2	72.7	72.8	73.2	70.5	64.3	51.5
Car Parking 6	PLot	166.60			55.9	78.2	0.0	0.0		0	Car Parking	Typical spectrum	61.5	73.1	65.6	70.1	70.2	70.6	67.9	61.7	48.9
Car Parking 7	PLot	73.89			55.3	74.0	0.0	0.0		0	Car Parking	Typical spectrum	57.3	68.9	61.4	65.9	66.0	66.4	63.7	57.5	44.7
Truck Parking 1	PLot	2863.48			65.2	99.7	0.0	0.0		0	Truck Parking	Idiling Heavy Diesel Truck	68.9	86.6	85.4	91.8	96.4	93.1	88.1	80.1	68.0
Truck Parking 2	PLot	1647.48			64.6	96.7	0.0	0.0		0	Truck Parking	Idiling Heavy Diesel Truck	65.9	83.6	82.4	88.8	93.4	90.0	85.1	77.1	64.9

04622010_Pilot Palmdale
Contribution level - Situation 4: Outdoor SP

Source	Source group	Source ty	Tr. lane	Leq dB(A)	A dB	
Receiver Receiver 4 Fl G dB(A) Leq 65.1 dB(A)						
Car Gas Pad - Area Source	Default industrial noise	Area		27.9	0.0	
Car Parking 1	Default parking lot noise	PLot		23.0	0.0	
Car Parking 2	Default parking lot noise	PLot		25.3	0.0	
Car Parking 3	Default parking lot noise	PLot		22.5	0.0	
Car Parking 4	Default parking lot noise	PLot		23.3	0.0	
Car Parking 5	Default parking lot noise	PLot		25.1	0.0	
Car Parking 6	Default parking lot noise	PLot		22.4	0.0	
Car Parking 7	Default parking lot noise	PLot		18.7	0.0	
HVAC 1	Default industrial noise	Point		29.8	0.0	
HVAC 2	Default industrial noise	Point		27.5	0.0	
HVAC 3	Default industrial noise	Point		25.7	0.0	
Pearblossom Hwy		Road		51.8	0.0	
SR 138 E. Ave S to Pearblossom		Road		63.9	0.0	
Truck Parking 1	Default parking lot noise	PLot		52.7	0.0	
Truck Parking 2	Default parking lot noise	PLot		46.6	0.0	
Trucking Gas Pad- Point Source 1	Default industrial noise	Point		46.7	0.0	
Trucking Gas Pad- Point Source 2	Default industrial noise	Point		47.0	0.0	
Trucking Gas Pad- Point Source 3	Default industrial noise	Point		47.3	0.0	
Trucking Gas Pad- Point Source 4	Default industrial noise	Point		47.4	0.0	
Trucking Gas Pad- Point Source 5	Default industrial noise	Point		47.5	0.0	
Trucking Gas Pad- Point Source 6	Default industrial noise	Point		47.6	0.0	
Trucking Gas Pad- Point Source 7	Default industrial noise	Point		47.5	0.0	
Receiver Receiver 5 Fl G dB(A) Leq 69.4 dB(A)						
Car Gas Pad - Area Source	Default industrial noise	Area		42.3	0.0	
Car Parking 1	Default parking lot noise	PLot		21.8	0.0	
Car Parking 2	Default parking lot noise	PLot		28.5	0.0	
Car Parking 3	Default parking lot noise	PLot		38.8	0.0	
Car Parking 4	Default parking lot noise	PLot		44.0	0.0	
Car Parking 5	Default parking lot noise	PLot		30.1	0.0	
Car Parking 6	Default parking lot noise	PLot		38.0	0.0	
Car Parking 7	Default parking lot noise	PLot		35.5	0.0	
HVAC 1	Default industrial noise	Point		26.4	0.0	
HVAC 2	Default industrial noise	Point		35.5	0.0	
HVAC 3	Default industrial noise	Point		21.4	0.0	
Pearblossom Hwy		Road		68.3	0.0	

Source	Source group	Source ty	Tr. lane	Leq dB(A)	A dB	
SR 138 E. Ave S to Pearblossom		Road		62.5	0.0	
Truck Parking 1	Default parking lot noise	PLot		48.9	0.0	
Truck Parking 2	Default parking lot noise	PLot		42.7	0.0	
Trucking Gas Pad- Point Source 1	Default industrial noise	Point		45.0	0.0	
Trucking Gas Pad- Point Source 2	Default industrial noise	Point		45.0	0.0	
Trucking Gas Pad- Point Source 3	Default industrial noise	Point		38.7	0.0	
Trucking Gas Pad- Point Source 4	Default industrial noise	Point		36.0	0.0	
Trucking Gas Pad- Point Source 5	Default industrial noise	Point		34.0	0.0	
Trucking Gas Pad- Point Source 6	Default industrial noise	Point		32.5	0.0	
Trucking Gas Pad- Point Source 7	Default industrial noise	Point		31.3	0.0	
Receiver Receiver 6 Fl G dB(A) Leq 72.4 dB(A)						
Car Gas Pad - Area Source	Default industrial noise	Area		50.9	0.0	
Car Parking 1	Default parking lot noise	PLot		40.3	0.0	
Car Parking 2	Default parking lot noise	PLot		52.6	0.0	
Car Parking 3	Default parking lot noise	PLot		48.3	0.0	
Car Parking 4	Default parking lot noise	PLot		40.4	0.0	
Car Parking 5	Default parking lot noise	PLot		43.2	0.0	
Car Parking 6	Default parking lot noise	PLot		39.6	0.0	
Car Parking 7	Default parking lot noise	PLot		34.4	0.0	
HVAC 1	Default industrial noise	Point		29.5	0.0	
HVAC 2	Default industrial noise	Point		27.1	0.0	
HVAC 3	Default industrial noise	Point		25.9	0.0	
Pearblossom Hwy		Road		72.3	0.0	
SR 138 E. Ave S to Pearblossom		Road		52.0	0.0	
Truck Parking 1	Default parking lot noise	PLot		33.6	0.0	
Truck Parking 2	Default parking lot noise	PLot		28.2	0.0	
Trucking Gas Pad- Point Source 1	Default industrial noise	Point		25.8	0.0	
Trucking Gas Pad- Point Source 2	Default industrial noise	Point		25.8	0.0	
Trucking Gas Pad- Point Source 3	Default industrial noise	Point		25.8	0.0	
Trucking Gas Pad- Point Source 4	Default industrial noise	Point		25.8	0.0	
Trucking Gas Pad- Point Source 5	Default industrial noise	Point		25.9	0.0	

Source	Source group	Source ty	Tr. lane	Leq dB(A)	A dB	
Trucking Gas Pad- Point Source 6	Default industrial noise	Point		25.9	0.0	
Trucking Gas Pad- Point Source 7	Default industrial noise	Point		25.9	0.0	
Receiver Receiver 7 Fl G dB(A) Leq 69.1 dB(A)						
Car Gas Pad - Area Source	Default industrial noise	Area		39.7	0.0	
Car Parking 1	Default parking lot noise	PLot		42.1	0.0	
Car Parking 2	Default parking lot noise	PLot		36.2	0.0	
Car Parking 3	Default parking lot noise	PLot		21.8	0.0	
Car Parking 4	Default parking lot noise	PLot		19.8	0.0	
Car Parking 5	Default parking lot noise	PLot		35.9	0.0	
Car Parking 6	Default parking lot noise	PLot		23.0	0.0	
Car Parking 7	Default parking lot noise	PLot		17.2	0.0	
HVAC 1	Default industrial noise	Point		25.3	0.0	
HVAC 2	Default industrial noise	Point		21.1	0.0	
HVAC 3	Default industrial noise	Point		33.8	0.0	
Pearblossom Hwy		Road		68.6	0.0	
SR 138 E. Ave S to Pearblossom		Road		58.5	0.0	
Truck Parking 1	Default parking lot noise	PLot		42.9	0.0	
Truck Parking 2	Default parking lot noise	PLot		40.8	0.0	
Trucking Gas Pad- Point Source 1	Default industrial noise	Point		30.9	0.0	
Trucking Gas Pad- Point Source 2	Default industrial noise	Point		31.4	0.0	
Trucking Gas Pad- Point Source 3	Default industrial noise	Point		32.1	0.0	
Trucking Gas Pad- Point Source 4	Default industrial noise	Point		32.7	0.0	
Trucking Gas Pad- Point Source 5	Default industrial noise	Point		33.5	0.0	
Trucking Gas Pad- Point Source 6	Default industrial noise	Point		34.4	0.0	
Trucking Gas Pad- Point Source 7	Default industrial noise	Point		35.7	0.0	

04622010_Pilot Palmdale
Contribution spectra - Situation 4: Outdoor SP

Source	Time slice	Sum	25Hz	31.5Hz	40Hz	50Hz	63Hz	80Hz	100Hz	125Hz	160Hz	200Hz	250Hz	315Hz	400Hz	500Hz	630Hz	800Hz	1kHz	1.25kHz	1.6kHz	2kHz	2.5kHz	3.15kHz	4kHz	5kHz	6.3kHz	8kHz	10kHz
		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 Receiver 4 Fl G dB(A) Leq 65.1 dB(A)																													
Car Gas Pad - Area Source	Leq	27.9														27.9													
HVAC 1	Leq	29.8	-12.0	-6.4	-2.8	9.8	14.4	7.9	15.7	17.2	15.5	-12.7	-13.5	17.8	18.4	18.5	21.7	21.8	16.9	17.9	18.0	15.0	15.0	10.9	11.5	9.2	8.8	3.2	-2.6
HVAC 2	Leq	27.5	-13.9	-8.3	-4.8	7.8	12.3	5.8	13.5	14.8	13.2	-15.0	-15.7	15.5	16.2	16.3	19.5	19.6	14.6	15.7	15.7	12.7	12.7	8.6	9.2	6.8	6.2	0.5	-5.6
HVAC 3	Leq	25.7	-16.0	-10.3	-6.7	5.9	10.4	3.9	11.5	12.9	11.3	-16.8	-17.6	13.7	14.4	14.6	17.7	17.8	12.9	13.9	14.0	10.9	10.9	6.8	7.4	5.1	4.5	-1.3	-7.5
Trucking Gas Pad- Point Source 1	Leq	46.7	-3.0	1.7	5.9	7.5	12.5	17.8	18.3	33.3	23.5	23.1	23.8	26.8	30.2	31.6	32.3	37.2	41.3	36.6	37.1	36.7	34.4	32.0	29.9	27.2	22.2	15.7	8.6
Trucking Gas Pad- Point Source 2	Leq	47.0	-2.8	2.0	6.2	7.8	12.7	18.0	18.6	33.5	23.8	23.4	24.1	27.1	30.5	31.9	32.6	37.4	41.6	36.9	37.4	37.0	34.6	32.3	30.2	27.6	22.6	16.2	9.1
Trucking Gas Pad- Point Source 3	Leq	47.3	-2.5	2.2	6.4	8.0	13.0	18.3	18.9	33.8	24.0	23.7	24.5	27.4	30.8	32.2	32.9	37.7	41.8	37.2	37.6	37.2	34.9	32.6	30.6	27.9	23.0	16.6	9.7
Trucking Gas Pad- Point Source 4	Leq	47.4	-2.3	2.4	6.6	8.2	13.1	18.4	19.0	34.0	24.2	23.9	24.7	27.6	31.0	32.5	33.1	37.9	42.0	37.3	37.8	37.4	35.1	32.8	30.8	28.1	23.2	16.9	10.0
Trucking Gas Pad- Point Source 5	Leq	47.5	-2.3	2.5	6.6	8.2	13.2	18.5	19.1	34.1	24.3	24.0	24.8	27.7	31.1	32.5	33.2	37.9	42.1	37.4	37.9	37.5	35.2	32.8	30.9	28.3	23.4	17.0	10.1
Trucking Gas Pad- Point Source 6	Leq	47.6	-2.2	2.5	6.7	8.3	13.3	18.6	19.2	34.1	24.3	24.1	24.8	27.8	31.2	32.6	33.2	38.0	42.1	37.5	37.9	37.5	35.2	32.9	31.0	28.4	23.5	17.2	10.3
Trucking Gas Pad- Point Source 7	Leq	47.5	-2.3	2.5	6.7	8.3	13.2	18.5	19.1	34.1	24.3	24.0	24.8	27.7	31.1	32.5	33.2	38.0	42.1	37.4	37.9	37.5	35.2	33.5	31.0	28.4	23.5	17.1	10.2
Pearblossom Hwy	Leq	51.8				24.4	32.3	36.7	38.9	40.1	41.3	42.1	41.5	41.8	40.9	42.3	41.8	40.1	38.6	36.3	32.6	29.0	25.8	21.4	15.8	10.0	11.6	8.5	4.0
SR 138 E. Ave S to Pearblossom	Leq	63.9				28.4	36.5	41.0	43.4	45.0	46.8	49.0	52.4	52.9	53.0	55.2	56.1	54.8	54.5	52.3	49.7	47.5	45.1	42.6	35.0	27.5	30.9	27.8	23.5
Car Parking 1	Leq	23.0					15.6			21.0			9.7			11.1			9.5			7.3			2.2			-8.3	
Car Parking 2	Leq	25.3					18.1			23.3			11.9			13.3			11.3			9.7			6.1			-3.2	
Car Parking 3	Leq	22.5					15.3			20.4			9.0			10.4			8.4			6.8			3.2			-6.1	
Car Parking 4	Leq	23.3					16.0			21.3			9.8			11.2			9.1			6.6			1.7			-8.5	
Car Parking 5	Leq	25.1					17.6			23.1			12.1			13.6			11.5			8.8			2.8			-9.4	
Car Parking 6	Leq	22.4					15.0			20.4			9.3			10.7			8.6			6.0			-0.1			-12.6	
Car Parking 7	Leq	18.7					11.4			16.8			5.4			6.9			4.8			2.2			-4.0			-16.5	
Truck Parking 1	Leq	52.7	3.1	7.8	12.0	13.6	18.6	23.9	23.7	38.6	28.9	28.2	28.9	31.9	37.1	38.5	39.1	43.6	47.6	42.9	42.7	42.1	39.5	36.6	33.5	30.5	23.7	14.4	3.2
Truck Parking 2	Leq	46.6	-2.4	2.3	6.5	8.1	13.0	18.3	17.7	32.6	22.9	22.1	22.9	25.8	31.1	32.5	33.1	37.7	41.7	36.9	36.7	35.9	33.0	29.8	26.0	21.6	14.5	3.0	-11.4
Receiver Receiver 5 Fl G dB(A) Leq 69.4 dB(A)																													
Car Gas Pad - Area Source	Leq	42.3														42.3													
HVAC 1	Leq	26.4	-15.3	-9.6	-6.0	6.5	11.1	4.6	12.2	13.6	11.9	-16.2	-16.9	14.3	15.0	15.2	18.3	18.4	13.5	14.5	14.6	11.6	11.5	7.4	8.0	5.6	5.1	-0.7	-6.9
HVAC 2	Leq	35.5	-6.7	-1.1	2.6	15.2	19.8	13.3	21.6	23.0	21.4	-7.0	-7.7	23.6	24.0	24.2	27.3	27.5	22.6	23.6	23.7	20.7	20.7	16.7	17.0	14.9	14.6	9.3	3.8
HVAC 3	Leq	21.4	-20.0	-14.4	-10.8	1.8	6.3	-0.2	7.2	8.6	6.9	-21.3	-22.1	9.1	10.1	10.3	13.4	13.5	8.6	9.6	9.6	6.5	6.4	2.2	2.8	0.2	-0.7	-7.1	-14.1

04622010_Pilot Palmdale
Contribution spectra - Situation 4: Outdoor SP

Source	Time slice	Sum	25Hz	31.5Hz	40Hz	50Hz	63Hz	80Hz	100Hz	125Hz	160Hz	200Hz	250Hz	315Hz	400Hz	500Hz	630Hz	800Hz	1kHz	1.25kHz	1.6kHz	2kHz	2.5kHz	3.15kHz	4kHz	5kHz	6.3kHz	8kHz	10kHz
		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)
Trucking Gas Pad- Point Source 1	Leq	45.0	-4.6	0.2	4.4	6.0	10.9	16.2	16.6	31.6	21.8	21.1	21.9	24.8	28.3	29.7	30.3	35.5	39.6	34.9	35.5	35.0	32.6	30.2	27.6	24.8	19.6	12.7	4.9
Trucking Gas Pad- Point Source 2	Leq	45.0	-4.6	0.2	4.4	6.0	10.9	16.2	16.6	31.6	21.8	21.1	21.9	24.8	28.3	29.7	30.3	35.5	39.6	34.9	35.5	35.0	32.6	30.2	27.6	24.8	19.6	12.7	4.9
Trucking Gas Pad- Point Source 3	Leq	38.7	-6.7	-2.1	2.0	3.4	8.2	13.3	13.5	28.2	18.1	18.0	18.3	20.8	23.8	24.8	25.1	29.6	33.4	28.3	28.4	27.5	24.6	21.5	18.3	14.9	8.9	1.3	-7.2
Trucking Gas Pad- Point Source 4	Leq	36.0	-6.8	-2.3	1.7	3.1	7.8	12.8	13.0	27.5	17.3	17.1	17.2	19.5	22.2	22.9	22.9	26.9	30.3	24.9	24.7	23.5	20.2	16.9	13.5	9.9	3.8	-3.9	-12.5
Trucking Gas Pad- Point Source 5	Leq	34.0	-7.2	-2.6	1.4	2.7	7.3	12.3	12.3	26.7	16.3	16.2	16.1	18.2	20.7	21.2	21.0	24.6	27.9	22.3	22.0	20.7	17.3	14.0	10.6	7.0	0.9	-6.8	-15.3
Trucking Gas Pad- Point Source 6	Leq	32.5	-7.5	-3.0	0.9	2.2	6.8	11.6	11.6	25.9	15.4	15.3	15.1	17.1	19.4	19.8	19.5	22.7	25.9	20.3	19.9	18.5	15.2	11.7	8.5	4.9	-1.1	-8.7	-17.2
Trucking Gas Pad- Point Source 7	Leq	31.3	-7.8	-3.4	0.5	1.7	6.2	11.0	10.9	25.1	14.5	14.6	14.3	16.1	18.4	18.7	18.4	21.3	24.5	18.8	18.4	17.0	13.6	10.1	7.1	3.5	-2.4	-10.0	-18.5
Pearblossom Hwy	Leq	68.3				32.5	40.6	45.0	47.4	48.9	50.7	52.7	55.6	55.9	56.3	58.3	59.2	59.0	59.5	58.3	56.3	55.5	52.9	51.3	47.7	43.6	43.3	40.3	36.1
SR 138 E. Ave S to Pearblossom	Leq	62.5				26.9	35.0	39.5	41.9	43.4	45.3	47.4	50.8	51.4	51.5	53.7	54.7	53.3	53.1	50.9	48.3	46.2	44.0	41.3	33.4	26.9	29.3	26.3	22.1
Car Parking 1	Leq	21.8					14.3			19.7			8.6			10.3			8.8			6.6			1.1			-10.2	
Car Parking 2	Leq	28.5					20.8			26.7			15.1			16.5			14.6			12.1			7.7			-1.6	
Car Parking 3	Leq	38.8					26.5			34.8			25.4			29.9			30.4			30.5			27.3			19.5	
Car Parking 4	Leq	44.0					29.8			38.9			30.2			35.4			36.5			36.9			33.7			25.8	
Car Parking 5	Leq	30.1					21.8			28.2			16.8			18.8			17.3			14.8			8.3			-4.3	
Car Parking 6	Leq	38.0					24.7			33.1			23.2			28.9			30.7			31.1			27.1			16.4	
Car Parking 7	Leq	35.5					21.8			30.4			20.6			26.5			28.3			28.7			24.9			14.6	
Truck Parking 1	Leq	48.9	1.0	5.7	9.8	11.3	16.2	21.4	21.1	35.9	26.0	25.5	26.0	28.8	33.7	35.0	35.5	39.9	43.9	39.1	38.8	38.1	35.3	32.3	28.8	24.7	17.5	7.8	-4.1
Truck Parking 2	Leq	42.7	-4.2	0.5	4.6	6.1	10.9	16.1	15.3	30.0	20.1	19.7	20.1	22.8	27.7	29.0	29.4	33.9	37.8	32.9	32.6	31.7	28.6	25.2	21.2	16.1	7.5	-4.3	-19.4
Receiver Receiver 6 Fl G dB(A) Leq 72.4 dB(A)																													
Car Gas Pad - Area Source	Leq	50.9														50.9													
HVAC 1	Leq	29.5	-12.6	-7.0	-3.3	9.3	13.9	7.5	15.4	16.8	15.2	-13.0	-13.8	17.5	18.1	18.3	21.4	21.5	16.6	17.7	17.7	14.7	14.7	10.6	11.3	9.0	8.6	3.1	-2.8
HVAC 2	Leq	27.1	-14.8	-9.1	-5.5	7.1	11.7	5.2	12.9	14.3	12.7	-15.4	-16.2	15.1	15.8	15.9	19.1	19.2	14.3	15.3	15.4	12.4	12.3	8.2	8.9	6.5	6.0	0.3	-5.8
HVAC 3	Leq	25.9	-15.9	-10.3	-6.6	6.0	10.5	4.0	11.6	13.0	11.4	-16.7	-17.4	13.8	14.6	14.7	17.9	18.0	13.1	14.1	14.1	11.1	11.1	6.9	7.6	5.2	4.6	-1.3	-7.5
Trucking Gas Pad- Point Source 1	Leq	25.8	-11.1	-6.8	-3.2	-2.2	1.9	6.3	5.9	19.8	8.9	10.0	9.7	11.6	13.8	14.2	13.8	15.1	18.2	12.5	12.1	10.7	7.2	3.9	1.1	-1.6	-7.4	-15.0	-23.7
Trucking Gas Pad- Point Source 2	Leq	25.8	-11.1	-6.8	-3.1	-2.2	2.0	6.4	6.0	19.9	9.0	10.1	9.8	11.7	13.9	14.3	13.9	15.2	18.3	12.6	12.2	10.8	7.3	4.0	1.8	-1.4	-7.2	-14.8	-23.4
Trucking Gas Pad- Point Source 3	Leq	25.8	-11.0	-6.7	-3.1	-2.1	2.0	6.4	6.0	19.8	8.9	10.2	9.8	11.7	13.9	14.3	13.9	15.0	18.1	12.4	12.0	10.6	7.1	3.9	1.9	-1.3	-7.1	-14.6	-23.2

04622010_Pilot Palmdale
Contribution spectra - Situation 4: Outdoor SP

Source	Time slice	Sum	25Hz	31.5Hz	40Hz	50Hz	63Hz	80Hz	100Hz	125Hz	160Hz	200Hz	250Hz	315Hz	400Hz	500Hz	630Hz	800Hz	1kHz	1.25kHz	1.6kHz	2kHz	2.5kHz	3.15kHz	4kHz	5kHz	6.3kHz	8kHz	10kHz
		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)
Trucking Gas Pad- Point Source 4	Leq	25.8	-10.9	-6.7	-3.0	-2.1	2.1	6.5	6.1	19.9	9.0	10.2	9.9	11.8	14.0	14.3	14.0	15.1	18.2	12.5	12.1	10.7	7.2	4.0	2.0	-1.2	-6.9	-14.4	-22.9
Trucking Gas Pad- Point Source 5	Leq	25.9	-10.9	-6.6	-3.0	-2.0	2.1	6.5	6.1	19.9	9.0	10.3	9.9	11.8	14.0	14.4	14.0	15.1	18.2	12.5	12.1	10.7	7.2	4.0	2.1	-1.1	-6.8	-14.3	-22.8
Trucking Gas Pad- Point Source 6	Leq	25.9	-10.9	-6.6	-3.0	-2.0	2.2	6.6	6.1	19.9	9.0	10.3	9.9	11.9	14.0	14.4	14.0	15.1	18.2	12.6	12.2	10.7	7.3	4.0	2.2	-1.0	-6.7	-14.2	-22.7
Trucking Gas Pad- Point Source 7	Leq	25.9	-10.9	-6.6	-3.0	-2.0	2.2	6.5	6.1	19.9	9.0	10.3	9.9	11.8	14.0	14.4	14.0	15.1	18.2	12.5	12.2	10.7	7.3	4.0	2.3	-0.9	-6.6	-14.1	-22.7
Pearblossom Hwy	Leq	72.3				36.3	44.3	48.8	51.2	52.7	54.5	56.6	59.6	59.9	60.2	62.1	63.2	63.2	63.5	62.0	60.6	59.5	57.4	54.8	51.3	47.4	47.3	44.4	40.2
SR 138 E. Ave S to Pearblossom	Leq	52.0				19.1	27.1	31.6	33.9	35.3	36.9	38.6	41.2	41.9	41.7	43.6	44.1	42.5	41.7	39.1	35.6	32.1	28.4	26.0	19.8	9.5	15.7	12.4	7.6
Car Parking 1	Leq	40.3					26.0			34.8			25.5			31.1			32.9			33.9			30.3			20.9	
Car Parking 2	Leq	52.6					38.0			47.5			39.4			44.3			44.8			45.2			42.3			35.3	
Car Parking 3	Leq	48.3					33.8			43.2			35.0			39.9			40.5			41.0			38.0			30.8	
Car Parking 4	Leq	40.4					26.4			35.2			26.1			31.6			32.9			33.4			29.9			21.2	
Car Parking 5	Leq	43.2					29.4			38.0			28.4			34.2			35.8			36.4			32.8			22.8	
Car Parking 6	Leq	39.6					25.9			34.5			24.7			30.6			32.4			32.8			29.0			18.7	
Car Parking 7	Leq	34.4					20.8			29.3			19.4			25.3			27.2			27.6			23.6			12.9	
Truck Parking 1	Leq	33.6	-3.5	0.8	4.5	5.5	9.7	14.1	13.6	27.4	16.6	17.8	17.5	19.4	21.6	22.0	21.6	23.3	26.4	20.6	19.4	17.8	14.0	9.9	6.2	2.2	-4.6	-15.0	-27.8
Truck Parking 2	Leq	28.2	-8.3	-4.0	-0.3	0.7	4.9	9.3	8.2	22.1	11.2	12.4	12.1	14.0	16.2	16.5	16.1	18.1	21.1	15.3	14.0	12.2	8.1	3.7	-0.7	-5.8	-14.2	-25.9	-41.9
Receiver Receiver 7 Fl G dB(A) Leq 69.1 dB(A)																													
Car Gas Pad - Area Source	Leq	39.7														39.7													
HVAC 1	Leq	25.3	-16.3	-10.7	-7.0	5.5	10.1	3.6	11.1	12.5	10.8	-17.3	-18.0	13.2	14.0	14.2	17.3	17.4	12.5	13.5	13.6	10.5	10.5	6.4	7.0	4.6	4.0	-1.9	-8.2
HVAC 2	Leq	21.1	-20.5	-14.8	-11.2	1.3	5.9	-0.6	6.8	8.2	6.6	-21.7	-22.4	8.8	9.8	10.0	13.1	13.2	8.3	9.3	9.3	6.3	6.1	2.0	2.6	-0.1	-1.0	-7.4	-14.4
HVAC 3	Leq	33.8	-3.9	-2.4	1.2	13.7	18.3	11.8	19.9	21.3	19.7	-8.7	-9.4	21.9	22.3	22.5	25.7	25.8	20.9	21.9	22.0	19.0	19.0	15.0	15.4	13.2	12.9	7.5	1.9
Trucking Gas Pad- Point Source 1	Leq	30.9	-8.8	-4.5	-0.7	0.4	4.8	9.5	9.3	23.4	12.7	13.2	12.8	14.5	16.6	16.8	16.4	18.5	21.6	15.9	15.5	14.0	10.6	23.9	20.8	17.1	10.6	1.9	-8.5
Trucking Gas Pad- Point Source 2	Leq	31.4	-8.4	-4.0	-0.2	0.9	5.3	10.0	9.8	23.9	13.2	13.7	13.3	15.1	17.2	17.4	16.9	19.2	22.3	16.6	16.1	14.7	11.3	24.3	21.2	17.6	11.3	2.7	-7.5
Trucking Gas Pad- Point Source 3	Leq	32.1	-7.9	-3.5	0.3	1.5	5.9	10.6	10.5	24.6	13.9	14.4	14.0	15.7	17.8	18.1	17.6	20.0	23.1	17.4	17.0	15.6	12.2	24.7	21.7	18.2	12.0	3.6	-6.3
Trucking Gas Pad- Point Source 4	Leq	32.7	-7.3	-2.9	0.9	2.0	6.5	11.2	11.1	25.3	14.6	15.0	14.6	16.4	18.5	18.8	18.4	20.9	24.0	18.4	17.9	16.5	13.1	25.2	22.2	18.8	12.6	4.4	-5.3
Trucking Gas Pad- Point Source 5	Leq	33.5	-6.9	-2.5	1.3	2.5	7.0	11.8	11.7	25.9	15.3	15.6	15.2	17.1	19.3	19.6	19.2	21.9	25.1	19.4	19.0	17.6	14.2	25.6	22.6	19.3	13.2	5.2	-4.3
Trucking Gas Pad- Point Source 6	Leq	34.4	-6.5	-2.0	1.9	3.1	7.7	12.5	12.4	26.7	16.2	16.3	16.1	18.0	20.3	20.6	20.3	23.3	26.5	20.8	20.4	19.0	15.7	26.1	23.2	19.9	13.9	6.0	-3.2

04622010_Pilot Palmdale
Contribution spectra - Situation 4: Outdoor SP

Source	Time slice	Sum	25Hz	31.5Hz	40Hz	50Hz	63Hz	80Hz	100Hz	125Hz	160Hz	200Hz	250Hz	315Hz	400Hz	500Hz	630Hz	800Hz	1kHz	1.25kHz	1.6kHz	2kHz	2.5kHz	3.15kHz	4kHz	5kHz	6.3kHz	8kHz	10kHz
		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)
Trucking Gas Pad- Point Source 7	Leq	35.7	-6.1	-1.6	2.4	3.7	8.3	13.2	13.2	27.6	17.2	17.3	17.1	19.1	21.5	22.0	21.7	25.1	28.3	22.7	22.3	21.0	17.6	26.6	23.7	20.5	14.7	6.9	-2.1
Pearblossom Hwy	Leq	68.6				33.6	41.6	46.1	48.4	50.0	51.7	53.7	56.8	56.9	56.8	58.8	59.7	58.9	59.3	58.3	56.4	55.3	53.2	51.0	46.6	42.0	42.7	39.7	35.5
SR 138 E. Ave S to Pearblossom	Leq	58.5				24.2	32.3	36.7	39.1	40.6	42.3	44.2	47.2	47.6	47.7	49.9	50.7	49.3	48.9	46.6	43.8	41.3	38.7	36.6	29.4	18.6	25.2	22.1	17.6
Car Parking 1	Leq	42.1					27.7			36.7			27.6			33.0			34.8			35.7			32.2			23.4	
Car Parking 2	Leq	36.2					25.0			32.6			22.5			26.9			27.4			27.3			23.6			14.9	
Car Parking 3	Leq	21.8					14.6			19.8			8.4			9.8			7.8			5.5			1.5			-8.4	
Car Parking 4	Leq	19.8					12.5			17.7			6.7			8.2			6.2			3.6			-1.2			-12.5	
Car Parking 5	Leq	35.9					24.0			31.7			21.2			26.5			28.1			28.2			23.8			12.3	
Car Parking 6	Leq	23.0					15.7			21.1			9.5			10.9			8.9			6.2			-0.3			-13.3	
Car Parking 7	Leq	17.2					9.8			15.2			4.0			5.5			3.5			0.8			-5.7			-19.1	
Truck Parking 1	Leq	42.9	-0.1	4.5	8.4	9.7	14.4	19.3	19.1	33.5	23.2	23.3	23.3	25.4	29.2	30.0	30.0	33.6	37.2	31.9	31.2	30.1	26.9	23.4	28.0	25.4	17.8	7.5	-5.1
Truck Parking 2	Leq	40.8	-4.6	0.0	4.1	5.5	10.3	15.3	14.6	29.3	19.2	19.0	19.2	21.7	26.2	27.3	27.6	31.9	35.7	30.7	30.3	29.3	26.2	22.8	18.8	17.0	10.8	-1.2	-16.3

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

PROJECT:	Pilot Palmdale	JOB #:	04622010
ROADWAY:	Pearblossom Highway - Existing	DATE:	5-Jan-21
LOCATION:	SR 138 to 47th St E	ENGINEER:	R. Stromberg

NOISE INPUT DATA

ROADWAY CONDITIONS

ADT =	30,145	
SPEED =	50	
PK HR % =	10	
NEAR LANE/FAR LANE DIS	50	
ROAD ELEVATION =	0.0	
GRADE =	0.0	%
PK HR VOL =	2,360	

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	0.775	0.129	0.096	0.9430
MEDIUM TRUCK	0.848	0.049	0.103	0.0110
HEAVY TRUCKS	0.865	0.027	0.108	0.0450

MISC. VEHICLE INFO

VEHICLE TYPE	HEIGHT	SLE DISTANCE	GRADE ADJUSTMENT
AUTOMOBILES	2.0	43.41	- -
MEDIUM TRUCKS	4.0	43.31	- -
HEAVY TRUCKS	8.0	43.41	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	72.8	72.0	70.2	64.2	72.8	73.4
MEDIUM TRUCKS	61.2	60.8	54.4	52.8	61.3	61.5
HEAVY TRUCKS	71.5	71.2	62.1	63.4	71.7	71.9
NOISE LEVELS (dBA)	75.4	74.8	71.0	67.0	75.5	75.9

NOISE IMPACTS (WITH TOPO AND BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	72.8	72.0	70.2	64.2	72.8	73.4
MEDIUM TRUCKS	61.2	60.8	54.4	52.8	61.3	61.5
HEAVY TRUCKS	71.5	71.2	62.1	63.4	71.7	71.9
NOISE LEVELS (dBA)	75.4	74.8	71.0	67.0	75.5	75.9

NOISE CONTOUR (FT)				
NOISE LEVELS	70 dBA	65 dBA	60 dBA	55 dBA
CNEL	194	613	1938	6128
LDN	177	559	1769	5595

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

PROJECT:	Pilot Palmdale	JOB #:	04622010
ROADWAY:	Pearblossom Highway - Existing Plus Project	DATE:	5-Jan-21
LOCATION:	SR 138 to 47th St E	ENGINEER:	R. Stromberg

NOISE INPUT DATA

ROADWAY CONDITIONS

ADT =	31,441	
SPEED =	50	
PK HR % =	10	
NEAR LANE/FAR LANE DIS	50	
ROAD ELEVATION =	0.0	
GRADE =	0.0	%
PK HR VOL =	2,360	

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	0.775	0.129	0.096	0.9430
MEDIUM TRUCK	0.848	0.049	0.103	0.0110
HEAVY TRUCKS	0.865	0.027	0.108	0.0450

MISC. VEHICLE INFO

VEHICLE TYPE	HEIGHT	SLE DISTANCE	GRADE ADJUSTMENT
AUTOMOBILES	2.0	43.41	- -
MEDIUM TRUCKS	4.0	43.31	- -
HEAVY TRUCKS	8.0	43.41	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	72.8	72.2	70.4	64.4	73.0	73.6
MEDIUM TRUCKS	61.2	60.9	54.6	53.0	61.5	61.7
HEAVY TRUCKS	71.5	71.4	62.3	63.6	71.9	72.1
NOISE LEVELS (dBA)	75.4	75.0	71.1	67.2	75.7	76.1

NOISE IMPACTS (WITH TOPO AND BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	72.8	72.2	70.4	64.4	73.0	73.6
MEDIUM TRUCKS	61.2	60.9	54.6	53.0	61.5	61.7
HEAVY TRUCKS	71.5	71.4	62.3	63.6	71.9	72.1
NOISE LEVELS (dBA)	75.4	75.0	71.1	67.2	75.7	76.1

NOISE CONTOUR (FT)				
NOISE LEVELS	70 dBA	65 dBA	60 dBA	55 dBA
CNEL	202	639	2021	6392
LDN	185	584	1845	5835

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

PROJECT:	Pilot Palmdale	JOB #:	04622010
ROADWAY:	State Route 138 - Existing	DATE:	5-Jan-21
LOCATION:	E. Ave S-8 to Pearblossom Hwy	ENGINEER:	R. Stromberg

NOISE INPUT DATA

ROADWAY CONDITIONS

ADT =	32,079	
SPEED =	50	
PK HR % =	10	
NEAR LANE/FAR LANE DIS	50	
ROAD ELEVATION =	0.0	
GRADE =	0.0	%
PK HR VOL =	2,360	

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	0.775	0.129	0.096	0.9430
MEDIUM TRUCK	0.848	0.049	0.103	0.0110
HEAVY TRUCKS	0.865	0.027	0.108	0.0450

MISC. VEHICLE INFO

VEHICLE TYPE	HEIGHT	SLE DISTANCE	GRADE ADJUSTMENT
AUTOMOBILES	2.0	43.41	- -
MEDIUM TRUCKS	4.0	43.31	- -
HEAVY TRUCKS	8.0	43.41	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	72.8	72.3	70.5	64.5	73.1	73.7
MEDIUM TRUCKS	61.2	61.0	54.7	53.1	61.6	61.8
HEAVY TRUCKS	71.5	71.4	62.4	63.7	72.0	72.1
NOISE LEVELS (dBA)	75.4	75.1	71.2	67.3	75.8	76.2

NOISE IMPACTS (WITH TOPO AND BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	72.8	72.3	70.5	64.5	73.1	73.7
MEDIUM TRUCKS	61.2	61.0	54.7	53.1	61.6	61.8
HEAVY TRUCKS	71.5	71.4	62.4	63.7	72.0	72.1
NOISE LEVELS (dBA)	75.4	75.1	71.2	67.3	75.8	76.2

NOISE CONTOUR (FT)				
NOISE LEVELS	70 dBA	65 dBA	60 dBA	55 dBA
CNEL	206	652	2062	6521
LDN	188	595	1883	5953

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

PROJECT:	Pilot Palmdale	JOB #:	04622010
ROADWAY:	State Route 138 - Existing	DATE:	5-Jan-21
LOCATION:	Site	ENGINEER:	R. Stromberg

NOISE INPUT DATA

ROADWAY CONDITIONS

ADT =	33,375	
SPEED =	50	
PK HR % =	10	
NEAR LANE/FAR LANE DIS	50	
ROAD ELEVATION =	0.0	
GRADE =	0.0	%
PK HR VOL =	2,360	

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	0.775	0.129	0.096	0.9430
MEDIUM TRUCK	0.848	0.049	0.103	0.0110
HEAVY TRUCKS	0.865	0.027	0.108	0.0450

MISC. VEHICLE INFO

VEHICLE TYPE	HEIGHT	SLE DISTANCE	GRADE ADJUSTMENT
AUTOMOBILES	2.0	43.41	- -
MEDIUM TRUCKS	4.0	43.31	- -
HEAVY TRUCKS	8.0	43.41	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	72.8	72.5	70.7	64.6	73.3	73.9
MEDIUM TRUCKS	61.2	61.2	54.8	53.3	61.7	62.0
HEAVY TRUCKS	71.5	71.6	62.6	63.8	72.2	72.3
NOISE LEVELS (dBA)	75.4	75.2	71.4	67.4	75.9	76.3

NOISE IMPACTS (WITH TOPO AND BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	72.8	72.5	70.7	64.6	73.3	73.9
MEDIUM TRUCKS	61.2	61.2	54.8	53.3	61.7	62.0
HEAVY TRUCKS	71.5	71.6	62.6	63.8	72.2	72.3
NOISE LEVELS (dBA)	75.4	75.2	71.4	67.4	75.9	76.3

NOISE CONTOUR (FT)				
NOISE LEVELS	70 dBA	65 dBA	60 dBA	55 dBA
CNEL	215	678	2145	6785
LDN	196	619	1959	6194

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

PROJECT: Pilot Palmdale
ROADWAY: State Route 138 - Existing
LOCATION: S. of Pearblossom Hwy

JOB #: 04622010
DATE: 5-Jan-21
ENGINEER: R. Stromberg

NOISE INPUT DATA

ROADWAY CONDITIONS

ADT =	27,776
SPEED =	50
PK HR % =	10
NEAR LANE/FAR LANE DIS	50
ROAD ELEVATION =	0.0
GRADE =	0.0 %
PK HR VOL =	2,360

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	0.775	0.129	0.096	0.9430
MEDIUM TRUCK	0.848	0.049	0.103	0.0110
HEAVY TRUCKS	0.865	0.027	0.108	0.0450

MISC. VEHICLE INFO

VEHICLE TYPE	HEIGHT	SLE DISTANCE	GRADE ADJUSTMENT
AUTOMOBILES	2.0	43.41	- -
MEDIUM TRUCKS	4.0	43.31	- -
HEAVY TRUCKS	8.0	43.41	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	72.8	71.7	69.9	63.8	72.5	73.1
MEDIUM TRUCKS	61.2	60.4	54.0	52.5	61.0	61.2
HEAVY TRUCKS	71.5	70.8	61.8	63.0	71.4	71.5
NOISE LEVELS (dBA)	75.4	74.4	70.6	66.6	75.1	75.5

NOISE IMPACTS (WITH TOPO AND BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	72.8	71.7	69.9	63.8	72.5	73.1
MEDIUM TRUCKS	61.2	60.4	54.0	52.5	61.0	61.2
HEAVY TRUCKS	71.5	70.8	61.8	63.0	71.4	71.5
NOISE LEVELS (dBA)	75.4	74.4	70.6	66.6	75.1	75.5

NOISE CONTOUR (FT)				
NOISE LEVELS	70 dBA	65 dBA	60 dBA	55 dBA
CNEL	179	565	1786	5646
LDN	163	515	1630	5155

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

PROJECT:	Pilot Palmdale	JOB #:	04622010
ROADWAY:	State Route 138 - Existing	DATE:	5-Jan-21
LOCATION:	S. of Pearblossom Hwy	ENGINEER:	R. Stromberg

NOISE INPUT DATA

ROADWAY CONDITIONS

ADT =	29,072	
SPEED =	50	
PK HR % =	10	
NEAR LANE/FAR LANE DIS	50	
ROAD ELEVATION =	0.0	
GRADE =	0.0	%
PK HR VOL =	2,360	

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	0.775	0.129	0.096	0.9430
MEDIUM TRUCK	0.848	0.049	0.103	0.0110
HEAVY TRUCKS	0.865	0.027	0.108	0.0450

MISC. VEHICLE INFO

VEHICLE TYPE	HEIGHT	SLE DISTANCE	GRADE ADJUSTMENT
AUTOMOBILES	2.0	43.41	- -
MEDIUM TRUCKS	4.0	43.31	- -
HEAVY TRUCKS	8.0	43.41	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	72.8	71.9	70.1	64.0	72.7	73.3
MEDIUM TRUCKS	61.2	60.6	54.2	52.7	61.1	61.4
HEAVY TRUCKS	71.5	71.0	62.0	63.2	71.6	71.7
NOISE LEVELS (dBA)	75.4	74.6	70.8	66.8	75.3	75.7

NOISE IMPACTS (WITH TOPO AND BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	72.8	71.9	70.1	64.0	72.7	73.3
MEDIUM TRUCKS	61.2	60.6	54.2	52.7	61.1	61.4
HEAVY TRUCKS	71.5	71.0	62.0	63.2	71.6	71.7
NOISE LEVELS (dBA)	75.4	74.6	70.8	66.8	75.3	75.7

NOISE CONTOUR (FT)				
NOISE LEVELS	70 dBA	65 dBA	60 dBA	55 dBA
CNEL	187	591	1869	5910
LDN	171	540	1706	5395

Construction Noise Levels at Senstiive Receptors by Phase

Activity	Leq at SFR to the West	Lmax at SRF to the West
Site Preparation	79	83
Grading	79	80
Building Construction	77	78
Architectural Coating	73	77

#	Equipment Summary	Reference (dBA) 50 ft Lmax
1	Rock Drills	96
2	Jack Hammers	82
3	Pneumatic Tools	85
4	Pavers	80
5	Dozers	85
6	Scrappers	87
7	Haul Trucks	88
8	Cranes	82
9	Portable Generators	80
10	Rollers	80
11	Tractors	80
12	Front-End Loaders	86
13	Hydraulic Excavators	86
14	Graders	86
15	Air Compressors	86
16	Trucks	86

Site Preparation

Noise Level Calculation Prior to Implementation of Noise Attenuation Requirements

No.	Equipment Description	Reference (dBA) 50 ft Lmax	Quantity	Usage Factor[1]	Distance to Receptor (ft)	Ground Effect	Shielding (dBA)	Calculated (dBA) Lmax	Leq	Energy
5	Dozer	85	2	40	480	0.5	0	63.5	59.5	885955.49
11	Tractor/Backhoe	80	1	40	480	0.5	0	55.4	51.5	140081.86
							Lmax*	**64**	**Leq**	**60**
							Lw	**95**	**Lw**	**92**

Source: MD Acoustics, January, 2020.
1- Percentage of time that a piece of equipment is operating at full power.
dBA – A-weighted Decibels
Lmax- Maximum Level
Leq- Equivalent Level

Feet	Meters	Ground Effect	No Shielding Leq dBA	1 dBA Shielding Leq dBA	2 dBA Shielding Leq dBA	3 dBA Shielding Leq dBA	4 dBA Shielding Leq dBA	5 dBA Shielding Leq dBA	6 dBA Shielding Leq dBA	7 dBA Shielding Leq dBA	8 dBA Shielding Leq dBA	9 dBA Shielding Leq dBA	10 dBA Shielding Leq dBA	11 dBA Shielding LeqdBA	12 dBA Shielding Leq dBA	13 dBA Shielding Leq dBA	14 dBA Shielding Leq dBA	15 dBA Shielding Leq dBA
50	15.2	0.5	60	59	58	57	56	55	54	53	52	51	50	49	48	47	46	45
60	18.3	0.5	58	57	56	55	54	53	52	51	50	49	48	47	46	45	44	43
70	21.3	0.5	56	55	54	53	52	51	50	49	48	47	46	45	44	43	42	41
80	24.4	0.5	55	54	53	52	51	50	49	48	47	46	45	44	43	42	41	40
90	27.4	0.5	54	53	52	51	50	49	48	47	46	45	44	43	42	41	40	39
100	30.5	0.5	53	52	51	50	49	48	47	46	45	44	43	42	41	40	39	38
110	33.5	0.5	52	51	50	49	48	47	46	45	44	43	42	41	40	39	38	37
120	36.6	0.5	51	50	49	48	47	46	45	44	43	42	41	40	39	38	37	36
130	39.6	0.5	50	49	48	47	46	45	44	43	42	41	40	39	38	37	36	35
140	42.7	0.5	49	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34
150	45.7	0.5	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33
160	48.8	0.5	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32
170	51.8	0.5	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32
180	54.9	0.5	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32	31
190	57.9	0.5	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32	31
200	61.0	0.5	45	44	43	42	41	40	39	38	37	36	35	34	33	32	31	30
210	64.0	0.5	45	44	43	42	41	40	39	38	37	36	35	34	33	32	31	30
220	67.1	0.5	44	43	42	41	40	39	38	37	36	35	34	33	32	31	30	29
230	70.1	0.5	44	43	42	41	40	39	38	37	36	35	34	33	32	31	30	29
240	73.1	0.5	43	42	41	40	39	38	37	36	35	34	33	32	31	30	29	28
250	76.2	0.5	43	42	41	40	39	38	37	36	35	34	33	32	31	30	29	28
260	79.2	0.5	42	41	40	39	38	37	36	35	34	33	32	31	30	29	28	27
270	82.3	0.5	42	41	40	39	38	37	36	35	34	33	32	31	30	29	28	27
280	85.3	0.5	41	40	39	38	37	36	35	34	33	32	31	30	29	28	27	26
290	88.4	0.5	41	40	39	38	37	36	35	34	33	32	31	30	29	28	27	26
300	91.4	0.5	41	40	39	38	37	36	35	34	33	32	31	30	29	28	27	26
310	94.5	0.5	40	39	38	37	36	35	34	33	32	31	30	29	28	27	26	25
320	97.5	0.5	40	39	38	37	36	35	34	33	32	31	30	29	28	27	26	25
330	100.6	0.5	40	39	38	37	36	35	34	33	32	31	30	29	28	27	26	25
340	103.6	0.5	39	38	37	36	35	34	33	32	31	30	29	28	27	26	25	24
350	106.7	0.5	39	38	37	36	35	34	33	32	31	30	29	28	27	26	25	24
360	109.7	0.5	39	38	37	36	35	34	33	32	31	30	29	28	27	26	25	24
370	112.8	0.5	38	37	36	35	34	33	32	31	30	29	28	27	26	25	24	23

Grading

Noise Level Calculation Prior to Implementation of Noise Attenuation Requirements

No.	Equipment Description	Reference (dBA) 50 ft Lmax	Quantity	Usage Factor[1]	Distance to Receptor (ft)	Ground Effect	Shielding (dBA)	Calculated (dBA) Lmax	Calculated (dBA) Leq	Energy
13	Excavator	86	2	40	480	0.5	0	64.5	60.5	1115351.9
14	Grader	86	2	40	480	0.5	0	64.5	60.5	1115351.9
5	Dozer	85	2	40	480	0.5	0	63.5	59.5	885955.49
12	Tractor/Loader/Backhoe	86	3	40	480	0.5	0	66.2	62.2	1673027.8
16	Water Truck	86	3	40	480	0.5	0	66.2	62.2	1673027.8
Source: MD Acoustics, January, 2020.							**Lmax***	**72**	**Leq**	**68**
1- Percentage of time that a piece of equipment is operating at full power.							**Lw**	**100**	**Lw**	**100**

dBA – A-weighted Decibels

Lmax- Maximum Level

Leq- Equivalent Level

Feet	Meters	Ground Effect	No Shielding Leq dBA	1 dBA Shielding Leq dBA	2 dBA Shielding Leq dBA	3 dBA Shielding Leq dBA	4 dBA Shielding Leq dBA	5 dBA Shielding Leq dBA	6 dBA Shielding Leq dBA	7 dBA Shielding Leq dBA	8 dBA Shielding Leq dBA	9 dBA Shielding Leq dBA	10 dBA Shielding Leq dBA	11 dBA Shielding LeqdBA	12 dBA Shielding Leq dBA	13 dBA Shielding Leq dBA	14 dBA Shielding Leq dBA	15 dBA Shielding Leq dBA
50	15.2	0.5	68	67	66	65	64	63	62	61	60	59	58	57	56	55	54	53
60	18.3	0.5	66	65	64	63	62	61	60	59	58	57	56	55	54	53	52	51
70	21.3	0.5	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49
80	24.4	0.5	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49	48
90	27.4	0.5	62	61	60	59	58	57	56	55	54	53	52	51	50	49	48	47
100	30.5	0.5	61	60	59	58	57	56	55	54	53	52	51	50	49	48	47	46
110	33.5	0.5	60	59	58	57	56	55	54	53	52	51	50	49	48	47	46	45
120	36.6	0.5	59	58	57	56	55	54	53	52	51	50	49	48	47	46	45	44
130	39.6	0.5	58	57	56	55	54	53	52	51	50	49	48	47	46	45	44	43
140	42.7	0.5	57	56	55	54	53	52	51	50	49	48	47	46	45	44	43	42
150	45.7	0.5	56	55	54	53	52	51	50	49	48	47	46	45	44	43	42	41
160	48.8	0.5	55	54	53	52	51	50	49	48	47	46	45	44	43	42	41	40
170	51.8	0.5	55	54	53	52	51	50	49	48	47	46	45	44	43	42	41	40
180	54.9	0.5	54	53	52	51	50	49	48	47	46	45	44	43	42	41	40	39
190	57.9	0.5	54	53	52	51	50	49	48	47	46	45	44	43	42	41	40	39
200	61.0	0.5	53	52	51	50	49	48	47	46	45	44	43	42	41	40	39	38
210	64.0	0.5	53	52	51	50	49	48	47	46	45	44	43	42	41	40	39	38
220	67.1	0.5	52	51	50	49	48	47	46	45	44	43	42	41	40	39	38	37
230	70.1	0.5	52	51	50	49	48	47	46	45	44	43	42	41	40	39	38	37
240	73.1	0.5	51	50	49	48	47	46	45	44	43	42	41	40	39	38	37	36
250	76.2	0.5	51	50	49	48	47	46	45	44	43	42	41	40	39	38	37	36
260	79.2	0.5	50	49	48	47	46	45	44	43	42	41	40	39	38	37	36	35
270	82.3	0.5	50	49	48	47	46	45	44	43	42	41	40	39	38	37	36	35
280	85.3	0.5	49	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34
290	88.4	0.5	49	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34
300	91.4	0.5	49	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34
310	94.5	0.5	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33
320	97.5	0.5	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33
330	100.6	0.5	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33
340	103.6	0.5	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32
350	106.7	0.5	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32
360	109.7	0.5	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32
370	112.8	0.5	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32	31

Building Construction

Noise Level Calculation Prior to Implementation of Noise Attenuation Requirements

No.	Equipment Description	Reference (dBA) 50 ft Lmax	Quantity	Usage Factor[1]	Distance to Receptor (ft)	Ground Effect	Shielding (dBA)	Calculated (dBA) Lmax	Calculated (dBA) Leq	Energy
8	Cranes	82	1	40	480	0.5	0	57.4	53.5	222014.79
11	Forklift/Tractor	80	1	40	480	0.5	0	55.4	51.5	140081.86
Source: MD Acoustics, January, 2020.							**Lmax***	**60**	**Leq**	**56**
1- Percentage of time that a piece of equipment is operating at full power.							**Lw**	**91**	**Lw**	**87**

dBA – A-weighted Decibels

Lmax- Maximum Level

Leq- Equivalent Level

Feet	Meters	Ground Effect	No Shielding Leq dBA	1 dBA Shielding Leq dBA	2 dBA Shielding Leq dBA	3 dBA Shielding Leq dBA	4 dBA Shielding Leq dBA	5 dBA Shielding Leq dBA	6 dBA Shielding Leq dBA	7 dBA Shielding Leq dBA	8 dBA Shielding Leq dBA	9 dBA Shielding Leq dBA	10 dBA Shielding Leq dBA	11 dBA Shielding LeqdBA	12 dBA Shielding Leq dBA	13 dBA Shielding Leq dBA	14 dBA Shielding Leq dBA	15 dBA Shielding Leq dBA
50	**15.2**	**0.5**	**56**	**55**	**54**	**53**	**52**	**51**	**50**	**49**	**48**	**47**	**46**	**45**	**44**	**43**	**42**	**41**
60	18.3	0.5	54	53	52	51	50	49	48	47	46	45	44	43	42	41	40	39
70	21.3	0.5	52	51	50	49	48	47	46	45	44	43	42	41	40	39	38	37
80	24.4	0.5	50	49	48	47	46	45	44	43	42	41	40	39	38	37	36	35
90	27.4	0.5	49	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34
100	30.5	0.5	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33
110	33.5	0.5	47	46	45	44	43	42	41	40	39	38	37	36	35	34	**33**	32
120	36.6	0.5	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32	31
130	39.6	0.5	45	44	43	42	41	40	39	38	37	36	35	34	33	32	31	30
140	42.7	0.5	44	43	42	41	40	39	38	37	36	35	34	33	32	31	30	29
150	45.7	0.5	44	43	42	41	40	39	38	37	36	35	34	33	32	31	30	29
160	48.8	0.5	43	42	41	40	39	38	37	36	35	34	33	32	31	30	29	28
170	51.8	0.5	42	41	40	39	38	37	36	35	34	33	32	31	30	29	28	27
180	54.9	0.5	42	41	40	39	38	37	36	35	34	33	32	31	30	29	28	27
190	57.9	0.5	41	40	39	38	37	36	35	34	33	32	31	30	29	28	27	26
200	61.0	0.5	41	40	39	38	37	36	35	34	33	32	31	30	29	28	27	26
210	64.0	0.5	40	39	38	37	36	35	34	33	32	31	30	29	28	27	26	25
220	67.1	0.5	40	39	38	37	36	35	34	33	32	31	30	29	28	27	26	25
230	70.1	0.5	39	38	37	36	35	34	33	32	31	30	29	28	27	26	25	24
240	73.1	0.5	39	38	37	36	35	34	33	32	31	30	29	28	27	26	25	24
250	76.2	0.5	38	37	36	35	34	33	32	31	30	29	28	27	26	25	24	23
260	79.2	0.5	38	37	36	35	34	33	32	31	30	29	28	27	26	25	24	23
270	82.3	0.5	37	36	35	34	33	32	31	30	29	28	27	26	25	24	23	22
280	85.3	0.5	37	36	35	34	33	32	31	30	29	28	27	26	25	24	23	22
290	88.4	0.5	37	36	35	34	33	32	31	30	29	28	27	26	25	24	23	22
300	91.4	0.5	36	35	34	33	32	31	30	29	28	27	26	25	24	23	22	21
310	94.5	0.5	36	35	34	33	32	31	30	29	28	27	26	25	24	23	22	21
320	97.5	0.5	35	34	33	32	31	30	29	28	27	26	25	24	23	22	21	20
330	100.6	0.5	35	34	33	32	31	30	29	28	27	26	25	24	23	22	21	20
340	103.6	0.5	35	34	33	32	31	30	29	28	27	26	25	24	23	22	21	20
350	106.7	0.5	34	33	32	31	30	29	28	27	26	25	24	23	22	21	20	19
360	109.7	0.5	34	33	32	31	30	29	28	27	26	25	24	23	22	21	20	19
370	112.8	0.5	34	33	32	31	30	29	28	27	26	25	24	23	22	21	20	19

Site Preparation

Noise Level Calculation Prior to Implementation of Noise Attenuation Requirements

No.	Equipment Description	Reference (dBA) 50 ft Lmax	Quantity	Usage Factor[1]	Distance to Receptor (ft)	Ground Effect	Shielding (dBA)	Calculated (dBA) Lmax	Calculated (dBA) Leq	Energy
4	Paver	80	1	40	480	0.5	0	55.4	51.5	140081.86
12	Front End Loader	86	1	40	480	0.5	0	61.4	57.5	557675.94
10	Roller	80	2	40	480	0.5	0	58.5	54.5	280163.73
16	Lot Sweeper	86	1	40	480	0.5	0	61.4	57.5	557675.94
Source: MD Acoustics, January, 2020.							**Lmax***	**66**	**Leq**	**62**
1- Percentage of time that a piece of equipment is operating at full power.							**Lw**	**87**	**Lw**	**94**

dBA – A-weighted Decibels

Lmax- Maximum Level

Leq- Equivalent Level

Feet	Meters	Ground Effect	No Shielding Leq dBA	1 dBA Shielding Leq dBA	2 dBA Shielding Leq dBA	3 dBA Shielding Leq dBA	4 dBA Shielding Leq dBA	5 dBA Shielding Leq dBA	6 dBA Shielding Leq dBA	7 dBA Shielding Leq dBA	8 dBA Shielding Leq dBA	9 dBA Shielding Leq dBA	10 dBA Shielding Leq dBA	11 dBA Shielding LeqdBA	12 dBA Shielding Leq dBA	13 dBA Shielding Leq dBA	14 dBA Shielding Leq dBA	15 dBA Shielding Leq dBA
50	15.2	0.5	62	61	60	59	58	57	56	55	54	53	52	51	50	49	48	47
60	18.3	0.5	60	59	58	57	56	55	54	53	52	51	50	49	48	47	46	45
70	21.3	0.5	58	57	56	55	54	53	52	51	50	49	48	47	46	45	44	43
80	24.4	0.5	57	56	55	54	53	52	51	50	49	48	47	46	45	44	43	42
90	27.4	0.5	55	54	53	52	51	50	49	48	47	46	45	44	43	42	41	40
100	30.5	0.5	54	53	52	51	50	49	48	47	46	45	44	43	42	41	40	39
110	33.5	0.5	53	52	51	50	49	48	47	46	45	44	43	42	41	40	39	38
120	36.6	0.5	52	51	50	49	48	47	46	45	44	43	42	41	40	39	38	37
130	39.6	0.5	51	50	49	48	47	46	45	44	43	42	41	40	39	38	37	36
140	42.7	0.5	51	50	49	48	47	46	45	44	43	42	41	40	39	38	37	36
150	45.7	0.5	50	49	48	47	46	45	44	43	42	41	40	39	38	37	36	35
160	48.8	0.5	49	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34
170	51.8	0.5	49	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34
180	54.9	0.5	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33
190	57.9	0.5	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32
200	61.0	0.5	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32
210	64.0	0.5	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32	31
220	67.1	0.5	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32	31
230	70.1	0.5	45	44	43	42	41	40	39	38	37	36	35	34	33	32	31	30
240	73.1	0.5	45	44	43	42	41	40	39	38	37	36	35	34	33	32	31	30
250	76.2	0.5	44	43	42	41	40	39	38	37	36	35	34	33	32	31	30	29
260	79.2	0.5	44	43	42	41	40	39	38	37	36	35	34	33	32	31	30	29
270	82.3	0.5	44	43	42	41	40	39	38	37	36	35	34	33	32	31	30	29
280	85.3	0.5	43	42	41	40	39	38	37	36	35	34	33	32	31	30	29	28
290	88.4	0.5	43	42	41	40	39	38	37	36	35	34	33	32	31	30	29	28
300	91.4	0.5	42	41	40	39	38	37	36	35	34	33	32	31	30	29	28	27
310	94.5	0.5	42	41	40	39	38	37	36	35	34	33	32	31	30	29	28	27
320	97.5	0.5	42	41	40	39	38	37	36	35	34	33	32	31	30	29	28	27
330	100.6	0.5	41	40	39	38	37	36	35	34	33	32	31	30	29	28	27	26
340	103.6	0.5	41	40	39	38	37	36	35	34	33	32	31	30	29	28	27	26
350	106.7	0.5	41	40	39	38	37	36	35	34	33	32	31	30	29	28	27	26
360	109.7	0.5	40	39	38	37	36	35	34	33	32	31	30	29	28	27	26	25
370	112.8	0.5	40	39	38	37	36	35	34	33	32	31	30	29	28	27	26	25

Architectural Coating

Noise Level Calculation Prior to Implementation of Noise Attenuation Requirements										
No.	Equipment Description	Reference (dBA) 50 ft Lmax	Quantity	Usage Factor[1]	Distance to Receptor (ft)	Ground Effect	Shielding (dBA)	Calculated (dBA) Lmax	Calculated (dBA) Leq	Energy
15	Air Compressor	86	2	40	480	0.5	0	64.5	60.5	1115351.9
Source: MD Acoustics, January, 2020.							Lmax*	64	Leq	60
1- Percentage of time that a piece of equipment is operating at full power.							Lw	96	Lw	92

dBA – A-weighted Decibels
Lmax- Maximum Level
Leq- Equivalent Level

Feet	Meters	Ground Effect	No Shielding Leq dBA	1 dBA Shielding Leq dBA	2 dBA Shielding Leq dBA	3 dBA Shielding Leq dBA	4 dBA Shielding Leq dBA	5 dBA Shielding Leq dBA	6 dBA Shielding Leq dBA	7 dBA Shielding Leq dBA	8 dBA Shielding Leq dBA	9 dBA Shielding Leq dBA	10 dBA Shielding Leq dBA	11 dBA Shielding LeqdBA	12 dBA Shielding Leq dBA	13 dBA Shielding Leq dBA	14 dBA Shielding Leq dBA	15 dBA Shielding Leq dBA
50	**15.2**	**0.5**	**60**	**59**	**58**	**57**	**56**	**55**	**54**	**53**	**52**	**51**	**50**	**49**	**48**	**47**	**46**	**45**
60	18.3	0.5	58	57	56	55	54	53	52	51	50	49	48	47	46	45	44	43
70	21.3	0.5	57	56	55	54	53	52	51	50	49	48	47	46	45	44	43	42
80	24.4	0.5	55	54	53	52	51	50	49	48	47	46	45	44	43	42	41	40
90	27.4	0.5	54	53	52	51	50	49	48	47	46	45	44	43	42	41	40	39
100	30.5	0.5	53	52	51	50	49	48	47	46	45	44	43	42	41	40	39	38
110	33.5	0.5	52	51	50	49	48	47	46	45	44	43	42	41	40	39	**38**	37
120	36.6	0.5	51	50	49	48	47	46	45	44	43	42	41	40	39	38	37	36
130	39.6	0.5	50	49	48	47	46	45	44	43	42	41	40	39	38	37	36	35
140	42.7	0.5	49	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34
150	45.7	0.5	49	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34
160	48.8	0.5	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33
170	51.8	0.5	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32
180	54.9	0.5	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32
190	57.9	0.5	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32	31
200	61.0	0.5	45	44	43	42	41	40	39	38	37	36	35	34	33	32	31	30
210	64.0	0.5	45	44	43	42	41	40	39	38	37	36	35	34	33	32	31	30
220	67.1	0.5	44	43	42	41	40	39	38	37	36	35	34	33	32	31	30	29
230	70.1	0.5	44	43	42	41	40	39	38	37	36	35	34	33	32	31	30	29
240	73.1	0.5	43	42	41	40	39	38	37	36	35	34	33	32	31	30	29	28
250	76.2	0.5	43	42	41	40	39	38	37	36	35	34	33	32	31	30	29	28
260	79.2	0.5	43	42	41	40	39	38	37	36	35	34	33	32	31	30	29	28
270	82.3	0.5	42	41	40	39	38	37	36	35	34	33	32	31	30	29	28	27
280	85.3	0.5	42	41	40	39	38	37	36	35	34	33	32	31	30	29	28	27
290	88.4	0.5	41	40	39	38	37	36	35	34	33	32	31	30	29	28	27	26
300	91.4	0.5	41	40	39	38	37	36	35	34	33	32	31	30	29	28	27	26
310	94.5	0.5	41	40	39	38	37	36	35	34	33	32	31	30	29	28	27	26
320	97.5	0.5	40	39	38	37	36	35	34	33	32	31	30	29	28	27	26	25
330	100.6	0.5	40	39	38	37	36	35	34	33	32	31	30	29	28	27	26	25
340	103.6	0.5	40	39	38	37	36	35	34	33	32	31	30	29	28	27	26	25
350	106.7	0.5	39	38	37	36	35	34	33	32	31	30	29	28	27	26	25	24
360	109.7	0.5	39	38	37	36	35	34	33	32	31	30	29	28	27	26	25	24
370	112.8	0.5	39	38	37	36	35	34	33	32	31	30	29	28	27	26	25	24

Appendix E:

Construction Vibration Modeling Output

VIBRATION LEVEL IMPACT

Project:	Pilot	Date: 1/7/21
Source:	Large Bulldozer	
Scenario:	Unmitigated	
Location:	SFR to West	
Address:		

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

DATA INPUT

Equipment = Type	2	Large Bulldozer	INPUT SECTION IN BLUE
PPVref =	0.089	Reference PPV (in/sec) at 25 ft.	
D =	185.00	Distance from Equipment to Receiver (ft)	
n =	1.10	Vibration attenuation rate through the ground	

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

DATA OUT RESULTS

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