MHSR Apartments
Noise Impact Study
City of Murrieta, CA

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1.0 Introduction

1.1 Purpose of Analysis and Study Objectives

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

The following is provided in this report:

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

1.2 Site Location and Study Area

The project site is located at the south east corner of Delhaven Street and Date Street in Murrieta, California, as shown in Exhibit A. The site is currently zoned as neighborhood commercial and classified as General Commercial in the City of Murrieta General Plan. The project includes Change of Zone to Multi-family Residential 3 and a General Plan Amendment to Multi-family Residential. The proposed use is multifamily residential. Land uses surrounding the site include single-family residential uses and commercial uses adjacent to the south, vacant land and commercial uses adjacent to the north, commercial uses and Highway 79 to the east, and multi-family residential uses and vacant land to the west.

1.3 Proposed Project Description

The project is a General Plan Amendment, Zone change and Development Plan to change the Existing Commercial General Plan land use, Neighborhood Commercial zoning to Multifamily Residential General Plan land use, Multi-Family 3 zoning and to develop multi-family housing totaling 234 units on a 8.37 acre site.

The project site is located at the intersection of Delhaven Avenue and Date Street the south east corner and is comprised of Assessor Parcel Numbers (APN) 913-210-005, 006, 007, 010-013, 033, 034, 035 and portions of 913-210-032. The site is subject to the Commercial General Plan Land Use Designation and is Zoned Neighborhood Commercial. A General Plan and Zone Change Amendment is proposed. The site is undeveloped. Access would be provided by two private drives proposed to be located at Date Street and at Rising Hill Drive. Currently Earthwork being proposed would have an excavation depth of four feet below finish grade or two feet below the deepest footing, whichever is greater.

This study assesses traffic noise to and from the project site and compares the results to the applicable City noise limits. The primary source of traffic noise propagates from Murrieta Hot Springs Road and S. Winchester Road. The site plan used for this is illustrated in Exhibit B.

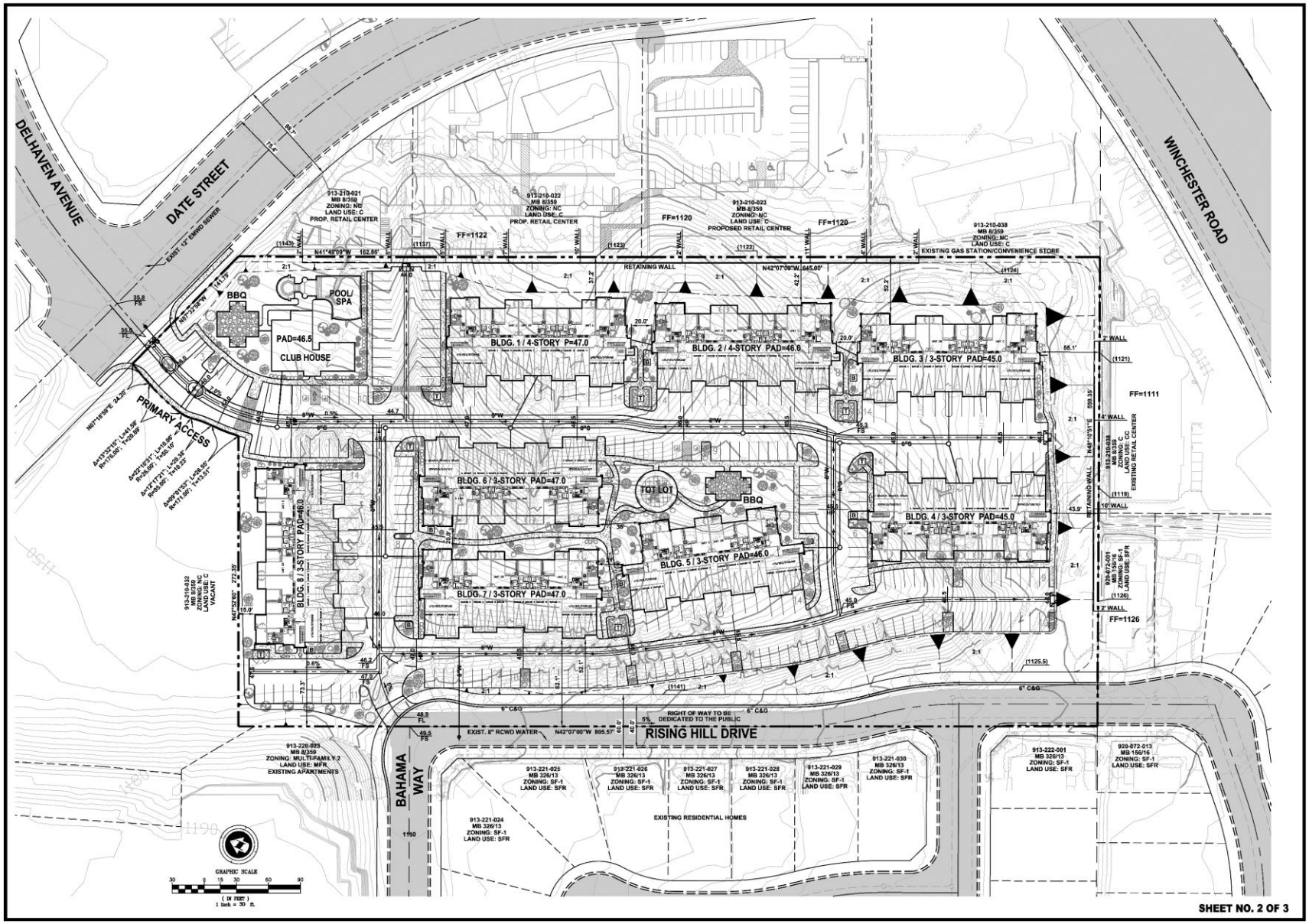
Construction activities within the Project area will consist of on-site grading, building, paving, and architectural coating.

Exhibit A

Location Map

Exhibit B

Site Plan



2.0 Fundamentals of Noise

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

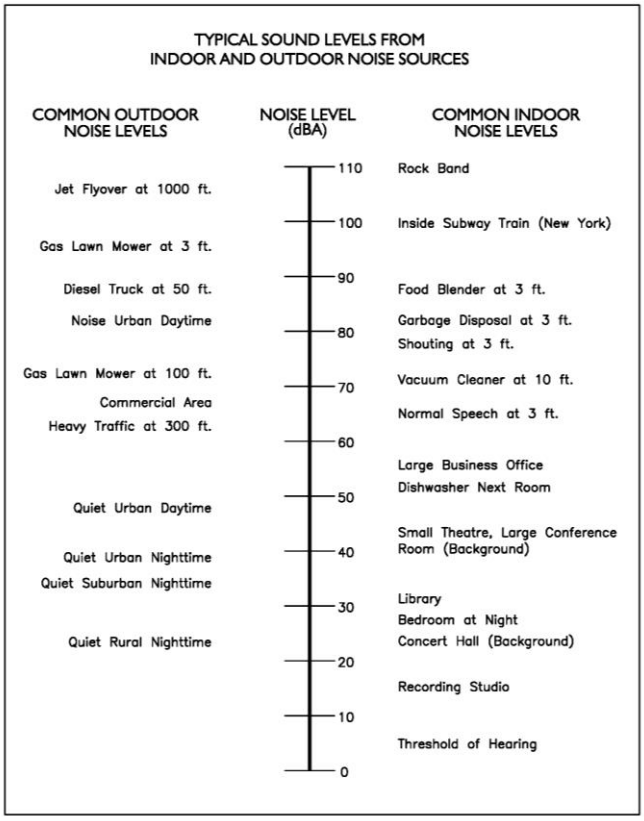
2.1 Sound, Noise and Acoustics

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

2.2 Frequency and Hertz

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

Exhibit C: Typical A-Weighted Noise Levels



2.3 Sound Pressure Levels and Decibels

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

2.4 Addition of Decibels

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

2.5 Human Response to Changes in Noise Levels

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

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

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

2.6 Noise Descriptors

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

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

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

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

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

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

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

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

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

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

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

Percent Noise Levels: See L(n).

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

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

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

2.7 Traffic Noise Prediction

Noise levels associated with traffic depends on a variety of factors: (1) volume of traffic, (2) speed of traffic, (3) auto, medium truck (2–3 axle) and heavy truck percentage (4 axle and greater), and sound propagation. The greater the volume of traffic, higher speeds and truck percentages equate to a louder volume in noise. A doubling of the Average Daily Traffic (ADT) along a roadway will increase noise levels by approximately 3 dB; reasons for this are discussed in the sections above.

2.8 Sound Propagation

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

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

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

3.0 Ground-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.

3.3 Vibration Perception

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 Murrieta and noise regulations are addressed through the efforts of various federal, state and local government agencies. The agencies responsible for regulating noise are discussed below.

4.1 Federal Regulations

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

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

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

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

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

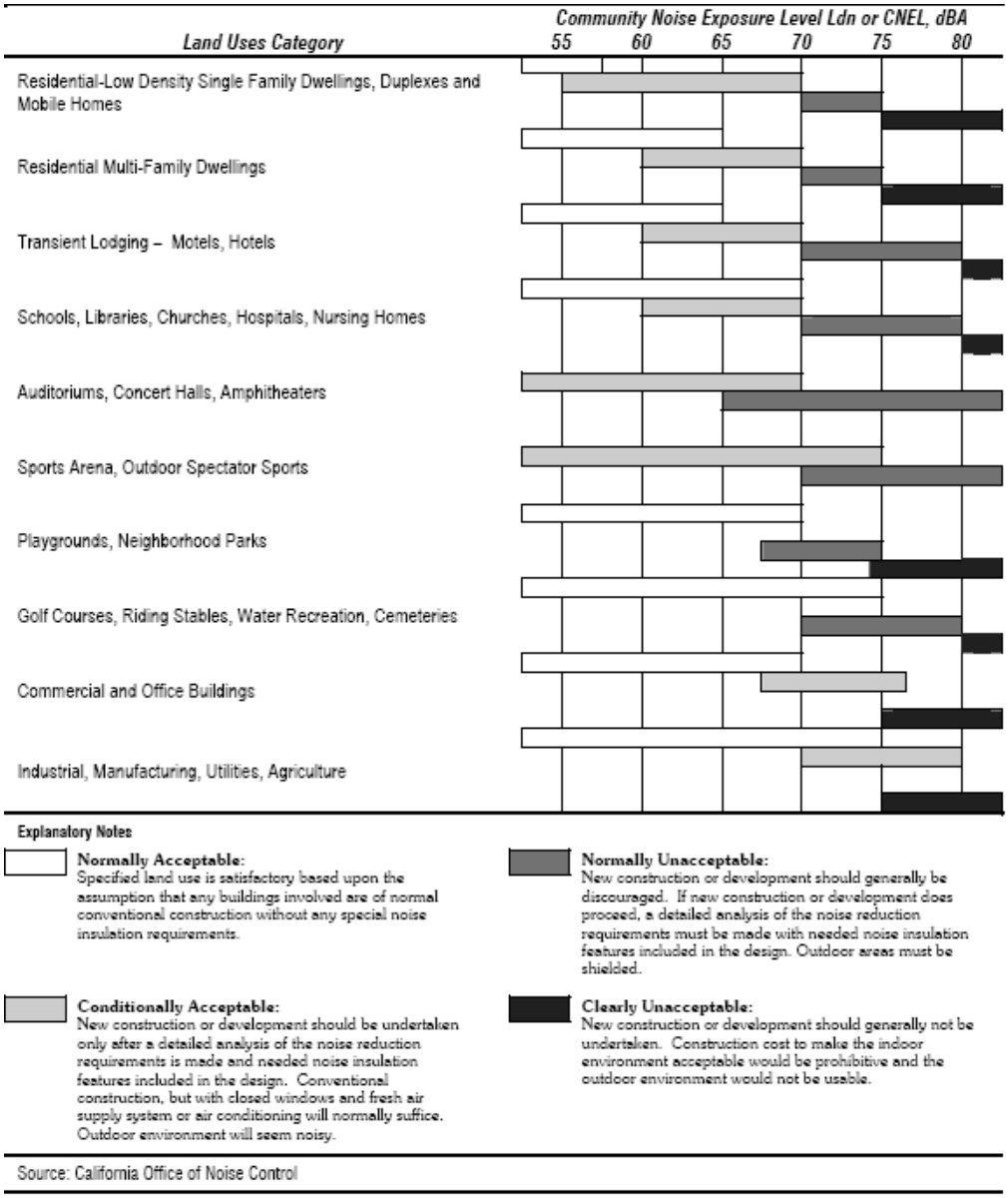
4.2 State Regulations

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

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

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

Exhibit D: Land Use Compatibility Guidelines



4.3 City of Murrieta Noise Regulations

The City of Murrieta outlines their noise regulations and standards within the Noise Element from the General Plan and the Noise Ordinance from the Municipal Code.

City of Murrieta General Plan

Applicable policies and standards governing environmental noise in the City are set forth in the General Plan Noise Element. Table 11-2 of the Murrieta Noise Element outlines the land use compatibility matrix for community noise environments. According to the matrix for multifamily residential land uses noise levels ranging from 50 - 65 dBA CNEL are normally acceptable while levels from 60 – 70 dBA CNEL are conditionally acceptable. The project will be compared to these noise ranges.

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

Goals, Policies, and Implementation Measures

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

Goal N-1: Noise sensitive land uses are properly and effectively protected from excessive noise generators.

Policy N-1.1: Comply with the Land Use Compatibility for Community Noise Environments.

Policy N-1.2: Protect schools, hospitals, libraries, churches, convalescent homes, and other noise sensitive uses from excessive noise levels by incorporating site planning and project design techniques to minimize noise impacts. The use of noise barriers shall be considered after all practical design-related noise measures have been integrated into the project. In cases where sound walls are necessary, they should help create an attractive setting with features such as setbacks, changes in alignment, detail and texture, murals, pedestrian access (if appropriate), and landscaping.

Policy N-1.3: Discourage new residential development where the ambient noise level exceeds the noise level standards set forth in the Noise and Land Use Compatibility Guidelines and the City Noise Ordinance.

Policy N-1.4: Coordinate with the County of Riverside and adjacent jurisdictions to minimize noise conflicts between land uses along the City's boundaries

Goal N-2: A comprehensive and effective land use planning and development review process that ensures noise impacts are adequately addressed.

Policy N-2.1: Review and update the Noise Ordinance to ensure that noise exposure information and specific policies and regulations are current.

Policy N-2.2: Integrate noise considerations into land use planning decisions to prevent new noise/land use conflicts.

Policy N-2.3: Consider the compatibility of proposed land uses with the noise environment when preparing, revising, or reviewing development proposals.

Policy N-2.4: Encourage proper site planning and architecture to reduce noise impacts.

Policy N-2.5: Permit only those new development or redevelopment projects that have incorporated mitigation measures, so that standards contained in the Noise Element and Noise Ordinance are met.

Policy N-2.6: Incorporate noise reduction features for items such as, but not limited to, parking and loading areas, ingress/egress point, HVAC units, and refuse collection areas, during site planning to mitigate anticipated noise impacts on affected noise sensitive land uses.

Policy N-2.7: Require that new mixed-use developments be designed to limit potential noise from loading areas, refuse collection, and other activities typically associated with commercial activity through strategic placement of these sources to minimize noise levels on-site.

Policy N-2.8: Encourage commercial uses in mixed-use developments that are not noise intensive.

Policy N-2.9: Orient mixed-use residential units, where possible, away from major noise sources.

Policy N-2.10: Locate balconies and operable windows of residential units in mixed-use projects away from the primary street and other major noise sources, where possible, or provide appropriate mitigation.

Goal N-3: Noise from mobile noise sources is minimized.

Policy N-3.1: Consider noise mitigation measures in the design of all future streets and highways and when improvements occur along existing freeway and highway segments.

Policy N-3.2: Work with Caltrans to achieve maximum noise abatement in the design of new highway projects or with improvements to interchanges along the I-15 and I-215 Freeways, and with widening of SR-79.

Policy N-3.3: Encourage the construction of noise barriers and maintenance of existing noise barriers for sensitive receptors located along the I-15 and I-215 Freeways.

Policy N-3.4: Enforce the use of truck routes to limit unnecessary truck traffic in residential and commercial areas. Consider requiring traffic plans for construction projects and new commercial and industrial uses.

Policy N-3.5: Consider the use of rubberized asphalt for new roadways or roadway rehabilitation projects.

Policy N-3.6: Coordinate with appropriate agencies in the siting, design, and construction of rail stations and track alignments to ensure that adjacent land uses are considered and noise attenuation measures are addressed.

Goal N-4: Reduced noise levels from construction activities.

Policy N-4.1: Regulate construction activities to ensure construction noise complies with the City's Noise Ordinance.

Policy N-4.2: Limit the hours of construction activity in residential areas to reduce intrusive noise in early morning and evening hours and on Sundays and holidays.

Policy N-4.3: Employ construction noise reduction methods to the maximum extent feasible. These measures may include, but not limited to, shutting off idling equipment, installing temporary acoustic barriers around stationary construction noise sources, maximizing the distance between construction equipment staging areas and occupied sensitive receptor areas, and use of electric air compressors and similar power tools, rather than diesel equipment.

Policy N-4.4: Encourage municipal vehicles and noise-generating mechanical equipment purchased or used by the City to comply with noise standards specified in the City's Municipal Code, or other applicable codes.

Policy N-4.5: Allow exceedance of noise standards on a case-by-case basis for special circumstances including emergency situations, special events, and expedited development projects.

Policy N-4.6: Ensure acceptable noise levels are maintained near schools, hospitals, convalescent homes, churches, and other noise-sensitive areas.

Operational Noise Regulations

Section 16.30.090 and 16.30.100 of the City of Murrieta Noise Ordinance regulates exterior and interior operational noise generated between two properties and does not regulate noise from transportation sources. Table 11-4, City of Murrieta Exterior and Interior noise Limits (see Table 1) is the same as Section 16.30.90 and 16.30.100 (below). This table was developed to provide an overview of the City's Development Code Section 16.30.90 and 16.30.100 but should not be applied as the interior noise level limit for transportation noise sources (the City's Noise Element discusses this in further detail on page 11-6 of the Noise Element).

Table 1: City of Murrieta Exterior and Interior Noise Limits

Noise Zone	Land Use (Receptor Property)	Time Period	Allowed Exterior Noise Level (dBA)
Exterior Noise Limits			
I	Noise-sensitive area	Anytime	45
II	Residential properties	10:00 PM to 7:00 AM	45
		7:00 AM to 10:00 PM	50
	Residential properties within 500 feet of a kennel(s)	7:00 AM to 10:00 PM	70
III	Commercial properties	10:00 PM to 7:00 AM	55
		7:00 AM to 10:00 PM	60
IV	Industrial properties	Anytime	70
Interior Noise Limits			
All noise zones	Multi-family residential	10:00 PM to 7:00 AM	40
		7:00 AM to 10:00 PM	45
Source: City of Murrieta, *City of Murrieta Development Code Section 16.30.090.*			

As previously mentioned, Table 1 (Table 11-4 from the Noise Element) provides an overall summary of allowable noise levels (Exterior/Interior) associated with Operational Noise between two properties. This table summarizes the values found within Section 16.30.90 and 16.30.100. Table 11-4 and Section 16.30.100B establish an interior noise limit of 45 dBA Leq during daytime hours and 40 dBA Leq during nighttime hours for multi-family. Operational noise typically refers to stationary noise levels such as HVAC units, compressors, pumps, loudspeakers and other noise associated with non-transportation noise sources. These interior noise limits would not be associated with the application of forcing a development to build separating assemblies (building facades, demising walls) such that the interior level is 40 dBA but rather designed to limit the amount of noise intrusion from one property to the other.

Construction Noise Regulations

Section 16.30.130(A) of the City of Murrieta Noise Ordinance regulates construction noise. The Noise Ordinance prohibits noise generated by construction activities between the hours of 7:00 PM and 7:00 AM and on Sundays and holidays. Construction activities shall be conducted in a manner that the maximum noise levels at the affected structures will not exceed those listed in Table 11-3, City of Murrieta Construction Noise Standards see Table 2 (below).

Table 2: City of Murrieta Construction Noise Standards

Equipment Type	Single-Family Residential	Multi-Family Residential	Commercial
Mobile Equipment			
Daily, except Sundays and holidays, 7:00 AM to 8:00 PM	75 dBA	80 dBA	85 dBA
Daily, except Sundays and holidays, 8:00 PM to 7:00 AM	60 dBA	64 dBA	70 dBA
Stationary Equipment			
Daily, except Sundays and holidays, 7:00 AM to 8:00 PM	60 dBA	65 dBA	70 dBA
Daily, except Sundays and holidays, 8:00 PM to 7:00 AM	50 dBA	55 dBA	60 dBA
Source: City of Murrieta, *City of Murrieta Development Code Section 16.30.130.*			

Project construction is anticipated to occur between 7AM to 8PM and therefore the standard would be 75 dBA.

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 CalTrans technical noise specifications. All measurements equipment meets American National Standards Institute (ANSI) specifications for sound level meters (S1.4-1983 identified in Chapter 19.68.020.AA). The following gives a brief description of the Caltrans Technical Noise Supplement procedures for sound level measurements:

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

5.2 Noise Measurement Locations

Noise monitoring locations were selected based on the distance of the project’s stationary noise sources to the nearest sensitive on-site receptors. Long-term noise measurements were conducted near the northeastern corner of the project site and represent ambient levels at the site. Appendix A includes photos, field sheet, and measured noise data. Exhibit E illustrates the location of the measurements.

5.3 FHWA Traffic Noise Prediction Model/SoundPlan

Traffic noise from vehicular traffic was projected using a computer program that replicates the FHWA Traffic Noise Prediction Model (FHWA-RD-77-108). The FHWA model arrives at the predicted noise level through a series of adjustments to the Reference Energy Mean Emission Level (REMEL). Roadway volumes and percentages correspond to the project’s traffic impact study as prepared by TJW Engineering (TJW Engineering, TNC-18-01 – MHSR Apartments Traffic Impact Assessment, Jan 2019) and

roadway classification. The referenced traffic data was applied to the model and is in Appendix B. The following outlines the key adjustments made to the REMEL for the roadway inputs:

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

Table 3 indicates the roadway parameters and vehicle distribution utilized for this study.

Table 3: Roadway Parameters and Vehicle Distribution

Roadway	Segment	Existing ADT	Existing Plus Project ADT	Speed (MPH)	Site Conditions
Murrieta Hot Springs	Margarita Rd to Delhaven St	35,958	41,090	45	Soft
Murrieta Hot Springs	Delhaven St to Winchester Rd	39,679	40,289	45	Soft
Winchester Rd	North of Murrieta Hot Springs	37,300	37,800	55	Soft
Winchester Rd	South of Murrieta Hot Springs	43,500	44,100	55	Soft
Major Arterial Vehicle Distribution (Truck Mix)[2]					
Motor-Vehicle Type		**Daytime % (7AM to 7 PM)**	**Evening % (7 PM to 10 PM)**	**Night % (10 PM to 7 AM)**	**Total % of Traffic Flow**
Automobiles		75.5	14.0	10.4	92.00
Medium Trucks		48.0	2.0	50.0	3.00
Heavy Trucks		48.0	2.0	50.0	5.00
Secondary and Collector Vehicle Distribution (Truck Mix)[2]					
Motor-Vehicle Type		**Daytime % (7AM to 7 PM)**	**Evening % (7 PM to 10 PM)**	**Night % (10 PM to 7 AM)**	**Total % of Traffic Flow**
Automobiles		75.5	14.0	10.5	97.42
Medium Trucks		48.9	2.2	48.9	1.84
Heavy Trucks		47.3	5.4	47.3	0.74

Notes:
[1] Per TIA (Traffic Impact Assessment, City of Murrieta, CA – TJW Engineering, Inc., 07/2018)
[2] Vehicle distribution data is based on Riverside County Mix data for collectors and secondary roadways.

The following outlines key adjustments to the REMEL for project site parameter inputs:

- Vertical and horizontal distances (Sensitive receptor distance from noise source)
- Noise barrier vertical and horizontal distances (Noise barrier distance from sound source and receptor).
- Traffic noise source spectra

- Topography

The project noise calculation worksheet outputs are located in Appendix B.

In addition, MD utilize SoundPLAN (SP) acoustic modeling software to illustrate the traffic noise level projections to the project site and on-site receptors. The worst-case traffic noise was modeled using SP acoustical modeling software. SP is capable of evaluating traffic noise levels following the FHWA's traffic noise model (TNM) which incorporates the FHWA's RD-77-108 software program. The programs use the same information as provide in Table 2 (above) and allows the user to input specific noise sources, spectral content, sound barriers, building placement, topography, and sensitive receptor locations (see Appendix C).

MD utilized the existing 24-hour baseline noise data to calibrate the SP model. The model incorporates the traffic volumes along the subject roadway and demonstrates the noise levels at the project site at the various floor heights. Modeling inputs and outputs are provided in Appendix C.

5.4 Interior Noise Modeling

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

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

5.5 FHWA Roadway Construction Noise Model

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

The project was analyzed based on the different construction phases. Construction noise is expected to be loudest during the grading, concrete and building phases of construction. The construction noise calculation output worksheet is located in Appendix E. The following assumptions relevant to short-term construction noise impacts were used:

- It is estimated that construction will occur over a year to year and a half time period. Construction noise is expected to be the loudest during the grading, concrete, and building phases.

Exhibit E
Measurement Location

X = Measurement location

= boundary

6.0 Existing Noise Environment

A twenty-four (24) hour ambient noise measurement was conducted at the project site approximately 417 feet from the center of Murrieta Hot Springs Rd and 235 feet from the center of Winchester Rd. The measurement measured the 1-hour Leq, Lmin, Lmax and other statistical data (e.g. L2, L8). The noise measurement was taken to determine the existing baseline noise conditions.

6.1 Long-Term Noise Measurement Results

The results of the Long-term noise data are presented in Table 4.

Table 4: Long-Term Nosie Measurement Data (dBA)[1]

Date	Time	1-Hour dB(A)							
		L_{EQ}	L_{MAX}	L_{MIN}	L_2	L_8	L_{25}	L_{50}	L_{90}
11/19/2018	10AM-11AM	66.6	78.6	59.9	77.3	75.7	67.5	61.9	60.4
11/19/2018	11AM-12PM	65.7	97.0	59.6	95.2	87.3	64.6	61.8	60.2
11/19/2018	12PM-1PM	56.8	67.7	57.1	67.1	66.2	62.8	60.2	57.6
11/19/2018	1PM-2PM	57.6	76.9	56.4	74.0	66.5	62.9	61.9	57.9
11/19/2018	2PM-3PM	59.2	79.6	57.1	78.7	71.8	66.1	62.2	58.5
11/19/2018	3PM-4PM	60.1	81.7	59.5	79.8	75.5	70.4	67.6	60.6
11/19/2018	4PM-5PM	59.9	82.7	58.9	80.1	71.1	67.3	63.1	61.0
11/19/2018	5PM-6PM	58.8	75.4	58.2	75.2	71.8	63.8	61.2	58.9
11/19/2018	6PM-7PM	59.6	75.7	58.6	74.0	69.7	67.3	65.0	60.4
11/19/2018	7PM-8PM	59.1	74.0	59.0	73.2	67.1	64.4	62.6	60.0
11/19/2018	8PM-9PM	57.8	73.5	54.9	71.4	67.5	62.7	61.8	56.6
11/19/2018	9PM-10PM	57.7	77.6	56.5	76.4	67.5	66.1	62.9	56.9
11/19/2018	10PM-11PM	56.5	69.6	54.5	68.7	65.4	62.8	59.7	55.6
11/19/2018	11PM-12AM	54.8	73.8	52.5	73.0	69.8	61.8	57.3	54.1
11/20/2018	12AM-1AM	56.1	81.3	51.5	80.9	77.5	62.4	57.9	52.2
11/20/2018	1AM-2AM	51.2	68.2	52.5	67.8	65.4	58.6	56.2	54.4
11/20/2018	2AM-3AM	52.2	77.6	49.7	76.5	71.1	58.8	54.2	50.2
11/20/2018	3AM-4AM	53.2	66.0	51.2	65.4	62.8	59.9	56.4	52.6
11/20/2018	4AM-5AM	57.5	75.8	55.6	74.7	69.1	64.1	61.2	57.2
11/20/2018	5AM-6AM	59.6	79.8	56.1	79.1	72.7	64.9	62.4	60.2
11/20/2018	6AM-7AM	59.9	75.8	60.2	75.2	69.2	64.1	62.7	61.3
11/20/2018	7AM-8AM	59.7	79.6	56.1	79.3	73.9	66.0	62.8	59.5
11/20/2018	8AM-9AM	58.4	73.3	58.4	72.9	69.5	64.7	61.7	59.4
11/20/2018	9AM-10AM	58.2	75.6	57.3	75.1	71.6	64.8	60.7	58.3
CNEL		64.2							

Notes:
1. Long-term noise monitoring location (LT1) is illustrated in Exhibit E.

Noise data indicates the ambient hourly level ranged between 51.2 dBA to 66.6 dBA near the project site. Maximum levels reach 66.6 dBA during the 10AM-11AM hour. The quietest noise level measured

51.2 dBA during the 1AM-2AM hour. The measured CNEL at or near the project site was 64.2 dBA CNEL. Additional field notes and photographs are provided in Appendix A.

For this evaluation, MD utilized the existing measured CNEL level (64.2 dBA CNEL) to establish baseline conditions and as a calibration point for acoustic modeling purposes. When comparing the acoustic model to the measured CNEL there is a 2 dBA difference at the calibration point. The model shows that it is 2 dBA quieter. A 2 dBA difference is acceptable for calibration purposes due to the fact that it takes a 3 dBA difference for the ear to hear a perceptible difference. The 2 dBA difference is attributed to the typography and noise from the gas station which is approximately 110 feet away from the calibration point.

7.0 Future Noise Environment Impacts and Mitigation

This assessment analyzes future noise impacts to and from the project compares the results to the City's Noise Standards. The analysis details the estimated exterior noise levels associated with traffic from adjacent roadway sources.

7.1 Future Exterior Noise

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

7.1.1 Noise Impacts to Off-Site Receptors Due to Project Generated Traffic

A worst-case project generated traffic noise level was modeled utilizing the FHWA Traffic Noise Prediction Model - FHWA-RD-77-108. Traffic noise levels were calculated 50 feet from the centerline of the analyzed roadway. The modeling is theoretical and does not take into account any existing barriers, structures, and/or topographical features that may further reduce noise levels. Therefore, the levels are shown for comparative purposes only to show the difference in noise level with and without project conditions. In addition, the noise contours for 60, 65 and 70 dBA CNEL were calculated. The potential off-site noise impacts caused by an increase of traffic from operation of the proposed project on the nearby roadways were calculated for the following scenarios:

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

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

Table 5 compares the without and with project scenario and shows the change in traffic noise levels as a result of the proposed project. It takes a change of 3 dB or more to hear a perceptible difference. As demonstrated in Table 4, the project is anticipated to change the noise up to 0.6 dBA CNEL. Although there is a nominal increase along these roadways, the proposed increase would still be below the City's conditionally acceptable 60 to 70 dBA CNEL residential and multi-family standard at any off-site receptors. Furthermore, the existing plus project scenario indicates that the contours extend at maximum an additional 8-feet beyond the existing condition.

The change in noise level is less than significant as the noise increase is nominal (less than a 3-dBA change). No further mitigation is required.

Table 5: Existing Scenario - Noise Levels Along Roadways (dBA CNEL)

Existing Without Project Exterior Noise Levels

Roadway	Segment	CNEL at 50 Ft (dBA)	Distance to Contour (Ft)			
			70 dBA CNEL	65 dBA CNEL	60 dBA CNEL	55 dBA CNEL
Murrieta Hot Springs Rd	Margarita Rd to Delhaven St	75.4	114	246	531	1,144
Murrieta Hot Springs Rd	Delhaven St to Winchester Rd	75.8	122	263	567	1,221
Winchester Rd	North of Murrieta Hot Springs Rd	80.5	251	540	1,164	2,509
Winchester Rd	South of Murrieta Hot Springs Rd	81.2	278	599	1,290	2,780

Table 5: Existing Scenario - Noise Levels Along Roadways (dBA CNEL) – Cont.

Existing With Project Exterior Noise Levels

Roadway	Segment	CNEL at 50 Ft (dBA)	Distance to Contour (Ft)			
			70 dBA CNEL	65 dBA CNEL	60 dBA CNEL	55 dBA CNEL
Murrieta Hot Springs Rd	Margarita Rd to Delhaven St	76.0	125	269	580	1,250
Murrieta Hot Springs Rd	Delhaven St to Winchester Rd	75.9	123	266	573	1,234
Winchester Rd	North of Murrieta Hot Springs Rd	80.6	253	545	1,175	2,531
Winchester Rd	South of Murrieta Hot Springs Rd	81.2	281	604	1,302	2,805

Change in Existing Noise Levels as a Result of Project

Roadway[1]	Segment	CNEL at 50 Feet dBA[2]			
		Existing Without Project	Existing With Project	Change in Noise Level	Potential Significant Impact
Murrieta Hot Springs Rd	Margarita Rd to Delhaven St	75.4	76.0	0.6	No
Murrieta Hot Springs Rd	Delhaven St to Winchester Rd	75.8	75.9	0.1	No
Winchester Rd	North of Murrieta Hot Springs Rd	80.5	80.6	0.1	No
Winchester Rd	South of Murrieta Hot Springs Rd	81.2	81.2	0.1	No

Notes:
[1] Exterior noise levels calculated at 5 feet above ground level.
[2] Noise levels calculated from centerline of subject roadway.
[3] Noise level projected 100 feet from centerline.

7.1.2 Noise Impacts to On-Site Receptors Due to Traffic

Traffic noise from the local roadway network was evaluated and compared to the City's noise compatibility matrix. Per the City's Noise Compatibility Matrix (Table 11-2, page 11-5 from the City's General Plan, Noise Element), multi-family residential is conditionally acceptable up to 70 dBA CNEL. As shown in Table 4, Existing Plus Project traffic 70 dBA CNEL noise projections from the Winchester Road will reach up to 281 feet from the centerline of the road. Residential structures are located approximately 300 feet away from the centerline of Winchester Road and fall within the 65 to 70 dBA CNEL contour of Winchester Rd and are located within the conditionally acceptable region. In addition, the residential structures are located approximately 700 feet away from the centerline of Murrieta Hot Springs Road and fall under the 50 – 65 dBA CNEL contour (normally acceptable region of the land use compatibility matrix).

Exhibit F shows the existing plus project traffic CNEL noise levels/contours to the project site. A total of twelve (12) receptors were modeled to evaluate the traffic noise impact to the project site. A receptor is denoted by a yellow dot. All yellow dots represent either a calibration point or the building facade for floors 1 through 3. Receptor one (R1) is a calibration point and compared to the baseline noise data from Table 3. Traffic noise levels at the building facades are anticipated to range between 51.8 to 64.9 dBA CNEL at residential receptors (R2 – R12), as shown in Exhibit F.

7.1.3 Noise Impacts to Receptors Due to Stationary Noise

Section 16.30.90/100 of the City of Murrieta Noise Ordinance Exterior/Interior Noise Standards and Chapter 11 of the City of Murrieta's Noise Element, Operational Noise governs operational noise generated between two properties and **does not regulate noise from transportation sources, such as traffic, aircraft, and railways.** As mentioned, the interior limit as defined within the ordinance is not designed as a noise limit for transportation noise. Instead it is designed to limit operational stationary noise sources (e.g. AC unit, pump, compressor).

Noises associated with this project (e.g. roof top AC units, pool and other stationary noise sources) will comply with said ordinance due to project design features such as the AC units placed on the roof-top and pool equipment positioned and shielded away from sensitive uses. This report has provided mitigation measures (Section 7.3) to meet the City's interior noise standard. Furthermore, the project is required to adhere to Title 24 Chapter 12 Section 1207 building code requirements which has been developed to limit unit to unit intrusion noise. Therefore, the impact is less than significant, and no further mitigation is required.

7.1.4 French Valley Noise Impact to Project Site

Appendix D illustrates the noise contours and approach/departure profile for the French Valley Airport. The project site is located approximately 6,018 feet from the French Valley Airports runway and falls within the aircraft approach/departure profile however the project does fall outside the 65 dBA CNEL contour. The impact is considered less than significant since the project falls well outside the noise contours.

7.2 Interior Noise Levels

Normal building shell construction is expected to provide a 20 dB of exterior to interior noise reduction as long as the air condition/circulation is provided to allow a closed window condition. To mitigate exterior to interior noise levels to the multifamily uses the project shall implement noise control solutions to mitigate interior noise levels down to 45 dBA CNEL which requires a noise reduction of at least 20 dBA or more.

7.3 Mitigation Measures

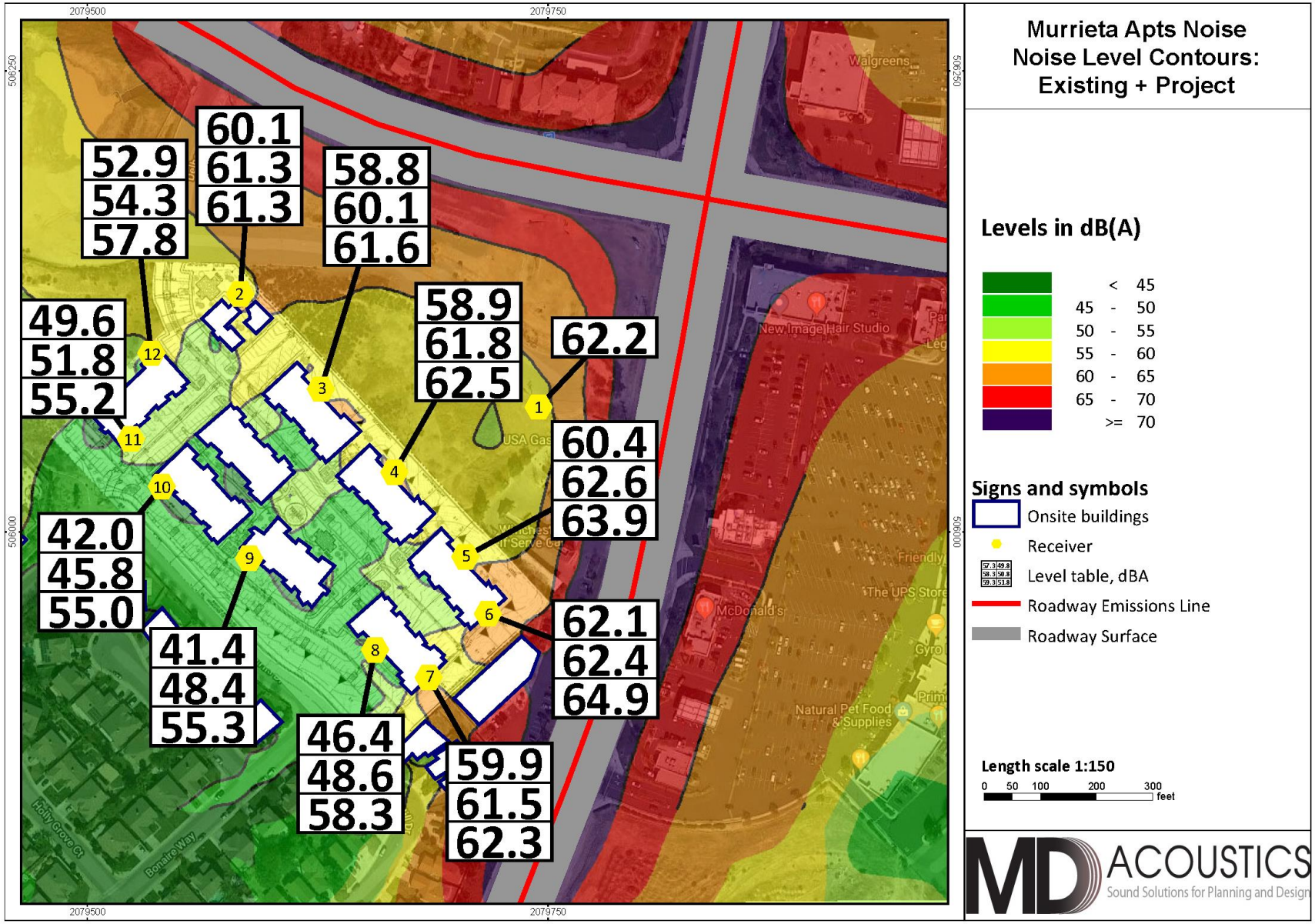
In order to comply with the City's noise requirements, the following mitigation measures are required:

MM-1: The project shall achieve a minimum 20 dBA noise reduction in the resident building shell design to meet the City's 45 dBA CNEL interior residential requirement.

MM-2: Prior issuance of building permits, a final noise study shall be prepared based on the architectural building design verifying compliance to the 45 dBA CNEL interior noise limit

Exhibit F

Existing Plus Project Traffic CNEL Noise Level Contours



8.0 Construction Noise Impact

The degree of construction noise may vary for different areas of the project site and also vary depending on the construction activities. Noise levels associated with the construction will vary with the different phases of construction. The construction noise and vibration level projections are provided in the sections below.

8.1 Construction Noise

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

Table 6: Typical Construction Noise Levels[1]

Equipment Powered by Internal Combustion Engines

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

Impact Equipment

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

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

Construction is anticipated to occur during the permissible hours according the City's Municipal Code. Construction noise is considered a short-term impact and would be considered significant if construction activities are taken outside the allowable times as described in the City's Municipal Code (Section 16.30.130(A)). Construction noise will have a temporary or periodic increase in the ambient noise level above the existing within the project vicinity. Furthermore, noise reduction measures are provided to further reduce construction noise. The construction noise impact is considered less than significant however construction noise level projections are provided.

Typical operating cycles for these types of construction equipment may involve one or two minutes of full power operation followed by three to four minutes at lower power settings. Noise levels will be loudest during grading phase. A likely worst-case construction noise scenario during grading assumes the use of a grader, a dozer, an excavator, and three (3) backhoes operating at 80 feet from the nearest sensitive receptor.

The nearest off-site sensitive receptors (residential uses) are located approximately 80 feet to the south of the project.

Assuming a usage factor of 40 percent for each piece of equipment, unmitigated noise levels at 80 feet have the potential to reach 71 dBA L_{eq} and 72 dBA L_{max} at the nearest sensitive receptors during grading which takes into account the existing 6 to 7-foot wall at the property line separating the project site from residences. The existing wall will provide approximately 11 dB of reduction due to the height and current design and insertion loss calculations are provided in Appendix E. Noise levels for the other construction phases would be lower and range between 56 to 57 dBA. The impact would be considered less than significant and no mitigation is required since the construction noise levels are below the City's 75 dBA construction noise limit.

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

<Table 7, next page>

Table 7: 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 8 gives approximate vibration levels for particular construction activities. This data provides a reasonable estimate for a wide range of soil conditions.

Table 8: Vibration Source Levels for Construction Equipment[1]

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

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

At a distance of 80 feet, a large bull dozer would yield a worst-case 0.025 PPV (in/sec) which slightly perceptible but sustainably below any risk of damage (0.5 in/sec PPV is the threshold of residential structures). The impact is less than significant and no mitigation is required.

8.3 Construction Noise Reduction Measures

Construction operations must follow the City's General Plan and the Noise Ordinance, which states that construction, repair or excavation work performed must occur within the permissible hours. To further

ensure that construction activities do not disrupt the adjacent land uses, the following measures should be taken:

1. Construction should occur during the permissible hours as defined in Section 16.30.130.

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

3. 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.

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

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

9.0 References

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

City of Murrieta: General Plan Noise Element. Chapter 11.

TJW Engineering, TNC-18-01 – MHSR Apartments Traffic Impact Assessment, Jan 2019

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: Murrieta Apts
Site Address/Location: Southwest corner of Rising Hill Dr and Date St
Date: 11/19/2018 to 11/20/2018
Field Tech/Engineer: Jason Schylur

Site Observations: Clear sky, measurement was performed at the north east edge of the property, 10 feet south of the road.

General Location:
Sound Meter: LD 831 **SN:** 3715
Settings: A-weighted, slow, 1-sec, 1-hour interval, 24-hour duration
Meteorological Con.: 77 degrees F, 2 to 5 mph wind, eastern direction
Site ID: LT-1

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

Noise Source(s) w/ Distance:
10 feet from Date St
92 feet from nearest Chevron Station

Figure 1: LT-1 Monitoring Location

Figure 2: LT-1 Photo

MD ACOUSTICS
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Chandler, AZ 85249

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

24-Hour Continuous Noise Measurement Datasheet - Cont.

Project: Murrieta Apts **Day:** 1 of 1
Site Address/Location: Southwest corner of Rising Hill Dr and Date St
Site ID: LT-1

Date	Start	Stop	Leq	Lmax	Lmin	L2	L8	L25	L50	L90
11/19/2018	10:04 AM	11:04 AM	66.6	78.6	59.9	77.3	75.7	67.5	61.9	60.4
11/19/2018	11:04 AM	12:04 PM	65.7	97.0	59.6	95.2	87.3	64.6	61.8	60.2
11/19/2018	12:04 PM	1:04 PM	56.8	67.7	57.1	67.1	66.2	62.8	60.2	57.6
11/19/2018	1:04 PM	2:04 PM	57.6	76.9	56.4	74.0	66.5	62.9	61.9	57.9
11/19/2018	2:04 PM	3:04 PM	59.2	79.6	57.1	78.7	71.8	66.1	62.2	58.5
11/19/2018	3:04 PM	4:04 PM	60.1	81.7	59.5	79.8	75.5	70.4	67.6	60.6
11/19/2018	4:04 PM	5:04 PM	59.9	82.7	58.9	80.1	71.1	67.3	63.1	61.0
11/19/2018	5:04 PM	6:04 PM	58.8	75.4	58.2	75.2	71.8	63.8	61.2	58.9
11/19/2018	6:04 PM	7:04 PM	59.6	75.7	58.6	74.0	69.7	67.3	65.0	60.4
11/19/2018	7:04 PM	8:04 PM	59.1	74.0	59.0	73.2	67.1	64.4	62.6	60.0
11/19/2018	8:04 PM	9:04 PM	57.8	73.5	54.9	71.4	67.5	62.7	61.8	56.6
11/19/2018	9:04 PM	10:04 PM	57.7	77.6	56.5	76.4	67.5	66.1	62.9	56.9
11/19/2018	10:04 PM	11:04 PM	56.5	69.6	54.5	68.7	65.4	62.8	59.7	55.6
11/19/2018	11:04 PM	12:04 AM	54.8	73.8	52.5	73.0	69.8	61.8	57.3	54.1
11/20/2018	12:04 AM	1:04 AM	56.1	81.3	51.5	80.9	77.5	62.4	57.9	52.2
11/20/2018	1:04 AM	2:04 AM	51.2	68.2	52.5	67.8	65.4	58.6	56.2	54.4
11/20/2018	2:04 AM	3:04 AM	52.2	77.6	49.7	76.5	71.1	58.8	54.2	50.2
11/20/2018	3:04 AM	4:04 AM	53.2	66.0	51.2	65.4	62.8	59.9	56.4	52.6
11/20/2018	4:04 AM	5:04 AM	57.5	75.8	55.6	74.7	69.1	64.1	61.2	57.2
11/20/2018	5:04 AM	6:04 AM	59.6	79.8	56.1	79.1	72.7	64.9	62.4	60.2
11/20/2018	6:04 AM	7:04 AM	59.9	75.8	60.2	75.2	69.2	64.1	62.7	61.3
11/20/2018	7:04 AM	8:04 AM	59.7	79.6	56.1	79.3	73.9	66.0	62.8	59.5
11/20/2018	8:04 AM	9:04 AM	58.4	73.3	58.4	72.9	69.5	64.7	61.7	59.4
11/20/2018	9:04 AM	10:04 AM	58.2	75.6	57.3	75.1	71.6	64.8	60.7	58.3

CNEL: 64.2

MD ACOUSTICS
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AZ Office
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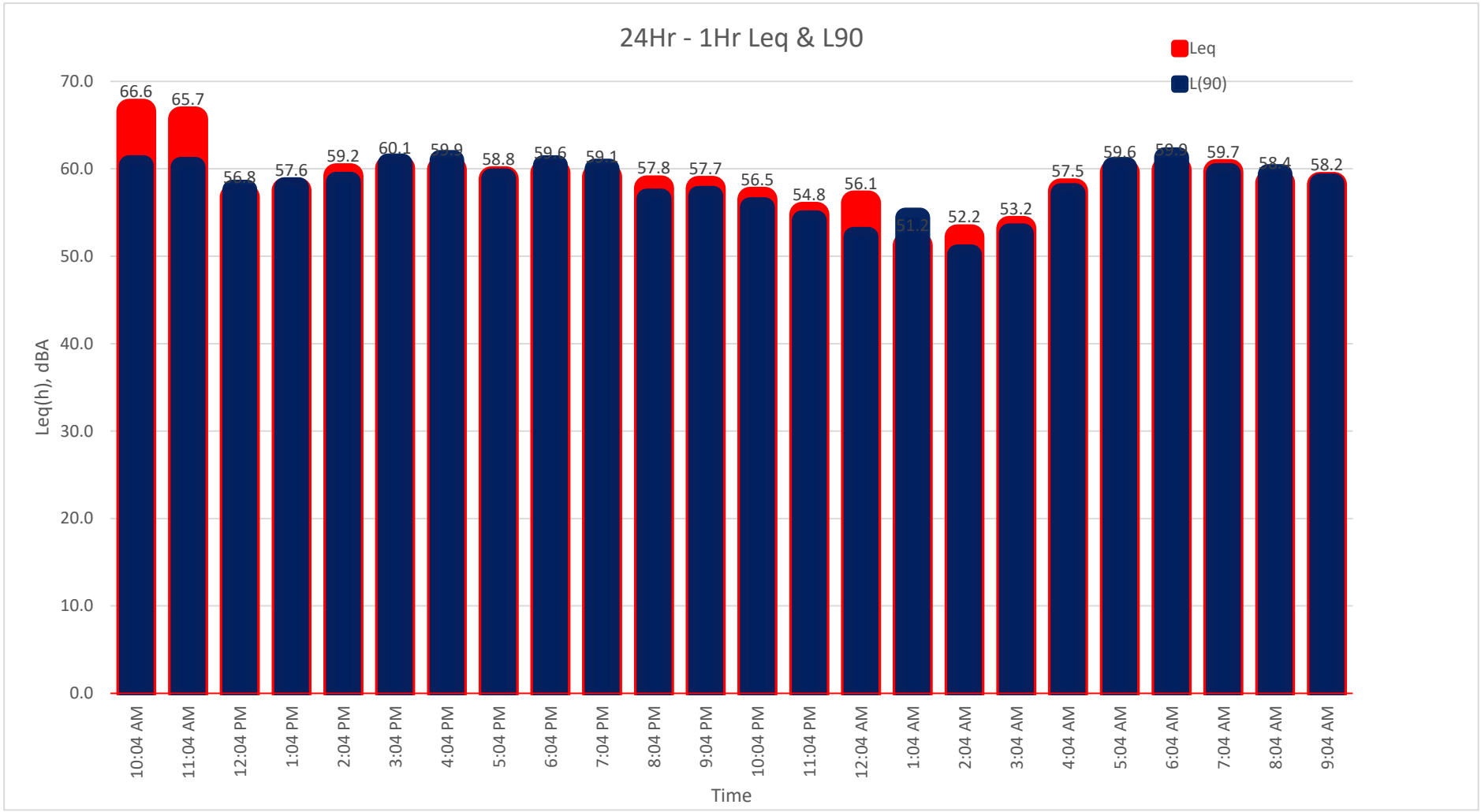
Chandler, AZ 85249

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

24-Hour Continuous Noise Measurement Datasheet - Cont.

Project: Murrieta Apts **Day:** 1 of 1
Site Address/Location: Southwest corner of Rising Hill Dr and Date St
Site ID: LT-1



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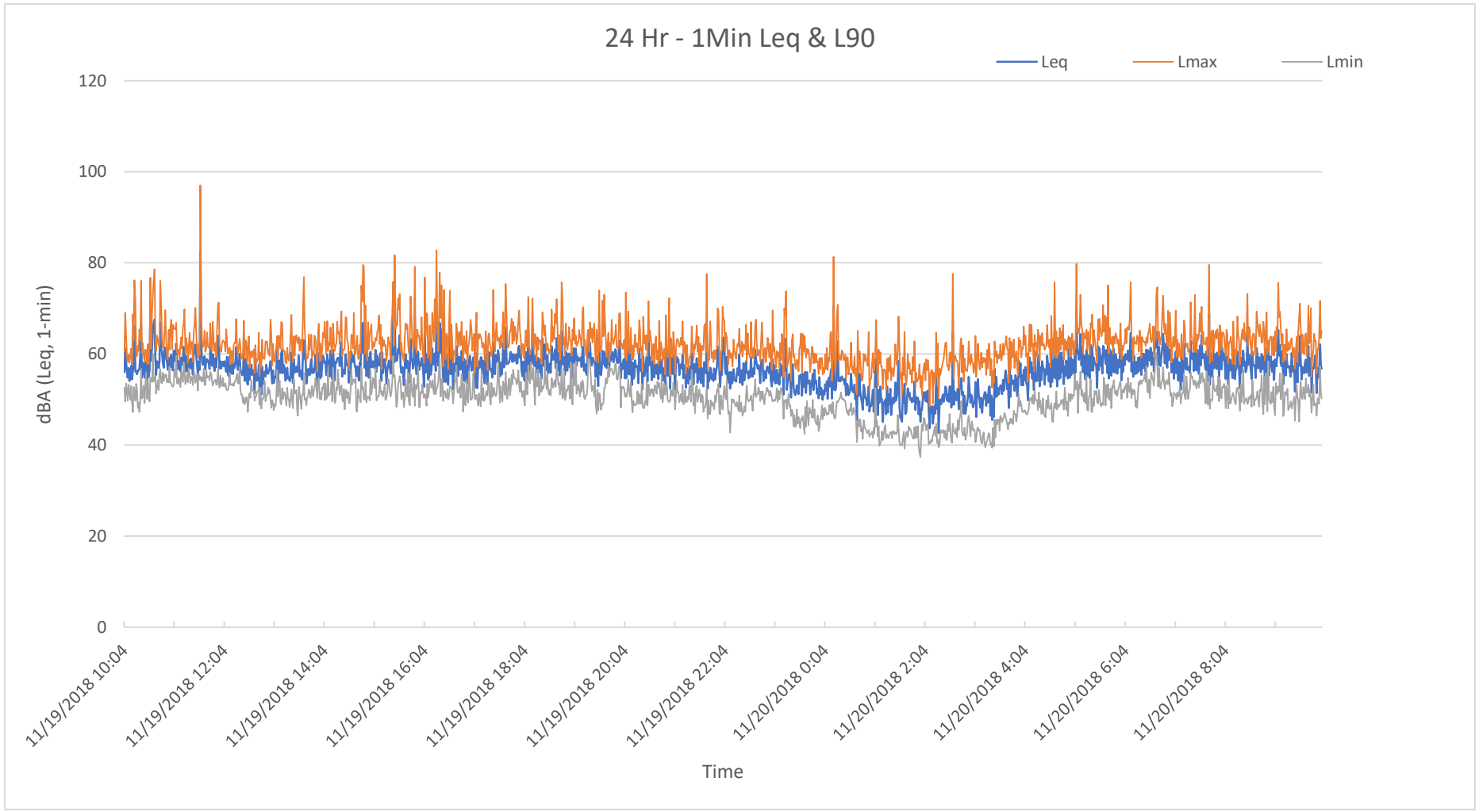
24-Hour Continuous Noise Measurement Datasheet - Cont.

Project: Murrieta Apts **Day:** 1 of 1
Site Address/Location: Southwest corner of Rising Hill Dr and Date St
Site ID: LT-1



Appendix B:
Traffic FHWA Worksheets

FHWA-RD-77-108 ROADWAY TRAFFIC NOISE PREDICTION MODEL (CNEL) - CALVENO

PROJECT: Murrieta Apartment Noise Impact Study
ROADWAY Murrieta Hot Springs Rd
SEGMENT Margarita Rd to Delhaven St
LOCATION: City of Murrieta SCENARIO: Existing

JOB #: 0398-2018-02
DATE: 29-Nov-18
ENGINEER: R. Pearson

NOISE INPUT DATA

ROADWAY CONDITIONS

ADT =	35,958
SPEED =	45
PK HR % =	10
NEAR LANE/FAR LANE DIST =	66
ROAD ELEVATION =	0
GRADE =	0
PK HR VOL =	3,596

RECEIVER INPUT DATA

RECEIVER DISTANCE =		50
DIST C/L TO WALL =		0
RECEIVER HEIGHT =		5
WALL DISTANCE FROM RECEIVER =		50
PAD ELEVATION =		0
ROADWAY VIEW:	LF ANGLE	-90
	RT ANGLE	90
	DF ANGLE	180

SITE CONDITIONS

AUTOMOBILES	15	
MED TRUCKS	15	(HARD SITE=10, SOFT SITE=15)
HVY TRUCKS	15	

WALL INFORMATION

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

VEHICLE MIX DATA

VEHICLE TYPE	DAY	EVE	NIGHT	DAILY
AUTOMOBILES	0.755	0.140	0.105	0.974
MEDIUM TRUCKS	0.489	0.022	0.489	0.018
HEAVY TRUCKS	0.473	0.054	0.473	0.007

MISC. VEHICLE INFO

VEHICLE TYPE	HEIGHT	SLE DISTANCE	GRADE ADJUSTMENT
AUTOMOBILES =	2.00	37.7	- -
MEDIUM TRUCKS=	4.00	37.6	- -
HEAVY TRUCKS =	8.01	37.7	0.0

NOISE OUTPUT DATA

NOISE IMPACTS (WITHOUT TOPO OR BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	73.5	71.5	70.2	64.2	72.6	73.2
MEDIUM TRUCKS	64.5	60.6	53.2	61.9	68.1	68.1
HEAVY TRUCKS	65.1	61.0	57.7	62.3	68.5	68.6
VEHICULAR NOISE	74.5	72.2	70.5	67.7	75.0	**75.4**

NOISE CONTOUR (FT)				
NOISE LEVELS	70 dBA	65 dBA	60 dBA	55 dBA
CNEL	114	246	531	1144
LDN	108	232	500	1076

FHWA-RD-77-108 ROADWAY TRAFFIC NOISE PREDICTION MODEL (CNEL) - CALVENO

PROJECT: Murrieta Apartment Noise Impact Study
ROADWAY Murrieta Hot Springs Rd
SEGMENT Delhaven St to Winchester Rd (SR 79)
LOCATION: City of Murrieta SCENARIO: Existing

JOB #: 0398-2018-02
DATE: 29-Nov-18
ENGINEER: R. Pearson

NOISE INPUT DATA

ROADWAY CONDITIONS

ADT =	39,679
SPEED =	45
PK HR % =	10
NEAR LANE/FAR LANE DIST =	66
ROAD ELEVATION =	0
GRADE =	0
PK HR VOL =	3,968

RECEIVER INPUT DATA

RECEIVER DISTANCE =		50
DIST C/L TO WALL =		0
RECEIVER HEIGHT =		5
WALL DISTANCE FROM RECEIVER =		50
PAD ELEVATION =		0
ROADWAY VIEW:	LF ANGLE	-90
	RT ANGLE	90
	DF ANGLE	180

SITE CONDITIONS

AUTOMOBILES	15	
MED TRUCKS	15	(HARD SITE=10, SOFT SITE=15)
HVY TRUCKS	15	

WALL INFORMATION

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

VEHICLE MIX DATA

VEHICLE TYPE	DAY	EVE	NIGHT	DAILY
AUTOMOBILES	0.755	0.140	0.105	0.974
MEDIUM TRUCKS	0.489	0.022	0.489	0.018
HEAVY TRUCKS	0.473	0.054	0.473	0.007

MISC. VEHICLE INFO

VEHICLE TYPE	HEIGHT	SLE DISTANCE	GRADE ADJUSTMENT
AUTOMOBILES =	2.00	37.7	- -
MEDIUM TRUCKS=	4.00	37.6	- -
HEAVY TRUCKS =	8.01	37.7	0.0

NOISE OUTPUT DATA

NOISE IMPACTS (WITHOUT TOPO OR BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	73.9	71.9	70.6	64.6	73.0	73.6
MEDIUM TRUCKS	65.0	61.1	53.6	62.3	68.5	68.5
HEAVY TRUCKS	65.5	61.5	58.1	62.7	68.9	69.0
VEHICULAR NOISE	75.0	72.6	70.9	68.1	75.4	**75.8**

NOISE CONTOUR (FT)				
NOISE LEVELS	70 dBA	65 dBA	60 dBA	55 dBA
CNEL	122	263	567	1221
LDN	115	248	533	1149

FHWA-RD-77-108 ROADWAY TRAFFIC NOISE PREDICTION MODEL (CNEL) - CALVENO

PROJECT: Murrieta Apartment Noise Impact Study
ROADWAY Winchester Rd
SEGMENT North of Murrieta Hot Springs Rd
LOCATION: City of Murrieta SCENARIO: Existing

JOB #: 0398-2018-02
DATE: 29-Nov-18
ENGINEER: R. Pearson

NOISE INPUT DATA

ROADWAY CONDITIONS

ADT =	37,300
SPEED =	55
PK HR % =	10
NEAR LANE/FAR LANE DIST =	88
ROAD ELEVATION =	0
GRADE =	0
PK HR VOL =	3,730

RECEIVER INPUT DATA

RECEIVER DISTANCE =		50
DIST C/L TO WALL =		0
RECEIVER HEIGHT =		5
WALL DISTANCE FROM RECEIVER =		50
PAD ELEVATION =		0
ROADWAY VIEW:	LF ANGLE	-90
	RT ANGLE	90
	DF ANGLE	180

SITE CONDITIONS

AUTOMOBILES	15	
MED TRUCKS	15	(HARD SITE=10, SOFT SITE=15)
HVY TRUCKS	15	

WALL INFORMATION

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

VEHICLE MIX DATA

VEHICLE TYPE	DAY	EVE	NIGHT	DAILY
AUTOMOBILES	0.755	0.140	0.105	0.974
MEDIUM TRUCKS	0.489	0.022	0.489	0.018
HEAVY TRUCKS	0.473	0.054	0.473	0.007

MISC. VEHICLE INFO

VEHICLE TYPE	HEIGHT	SLE DISTANCE	GRADE ADJUSTMENT
AUTOMOBILES =	2.00	23.9	- -
MEDIUM TRUCKS=	4.00	23.8	- -
HEAVY TRUCKS =	8.01	23.9	0.0

NOISE OUTPUT DATA

NOISE IMPACTS (WITHOUT TOPO OR BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	79.1	77.1	75.8	69.8	78.2	78.8
MEDIUM TRUCKS	69.1	65.2	57.7	66.4	72.6	72.6
HEAVY TRUCKS	69.0	65.0	61.6	66.2	72.4	72.5
VEHICULAR NOISE	79.9	77.6	76.0	72.6	80.1	**80.5**

NOISE CONTOUR (FT)				
NOISE LEVELS	70 dBA	65 dBA	60 dBA	55 dBA
CNEL	251	540	1164	2509
LDN	235	505	1089	2345

FHWA-RD-77-108 ROADWAY TRAFFIC NOISE PREDICTION MODEL (CNEL) - CALVENO

PROJECT: Murrieta Apartment Noise Impact Study
ROADWAY Winchester Rd
SEGMENT South of Murrieta Hot Springs Rd
LOCATION: City of Murrieta SCENARIO: Existing

JOB #: 0398-2018-02
DATE: 29-Nov-18
ENGINEER: R. Pearson

NOISE INPUT DATA

ROADWAY CONDITIONS

ADT =	43,500
SPEED =	55
PK HR % =	10
NEAR LANE/FAR LANE DIST =	88
ROAD ELEVATION =	0
GRADE =	0
PK HR VOL =	4,350

RECEIVER INPUT DATA

RECEIVER DISTANCE =		50
DIST C/L TO WALL =		0
RECEIVER HEIGHT =		5
WALL DISTANCE FROM RECEIVER =		50
PAD ELEVATION =		0
ROADWAY VIEW:	LF ANGLE	-90
	RT ANGLE	90
	DF ANGLE	180

SITE CONDITIONS

AUTOMOBILES	15	
MED TRUCKS	15	(HARD SITE=10, SOFT SITE=15)
HVY TRUCKS	15	

WALL INFORMATION

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

VEHICLE MIX DATA

VEHICLE TYPE	DAY	EVE	NIGHT	DAILY
AUTOMOBILES	0.755	0.140	0.105	0.974
MEDIUM TRUCKS	0.489	0.022	0.489	0.018
HEAVY TRUCKS	0.473	0.054	0.473	0.007

MISC. VEHICLE INFO

VEHICLE TYPE	HEIGHT	SLE DISTANCE	GRADE ADJUSTMENT
AUTOMOBILES =	2.00	23.9	- -
MEDIUM TRUCKS=	4.00	23.8	- -
HEAVY TRUCKS =	8.01	23.9	0.0

NOISE OUTPUT DATA

NOISE IMPACTS (WITHOUT TOPO OR BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	79.8	77.8	76.5	70.4	78.9	79.5
MEDIUM TRUCKS	69.7	65.8	58.4	67.1	73.2	73.3
HEAVY TRUCKS	69.7	65.6	62.2	66.9	73.1	73.2
VEHICULAR NOISE	80.6	78.3	76.7	73.2	80.7	**81.2**

NOISE CONTOUR (FT)				
NOISE LEVELS	70 dBA	65 dBA	60 dBA	55 dBA
CNEL	278	599	1290	2780
LDN	260	560	1206	2598

FHWA-RD-77-108 ROADWAY TRAFFIC NOISE PREDICTION MODEL (CNEL) - CALVENO

PROJECT: Murrieta Apartment Noise Impact Study
ROADWAY Murrieta Hot Springs Rd
SEGMENT Margarita Rd to Delhaven St
LOCATION: City of Murrieta SCENARIO: E+P

JOB #: 0398-2018-02
DATE: 29-Nov-18
ENGINEER: R. Pearson

NOISE INPUT DATA

ROADWAY CONDITIONS

ADT =	41,090
SPEED =	45
PK HR % =	10
NEAR LANE/FAR LANE DIST =	66
ROAD ELEVATION =	0
GRADE =	0
PK HR VOL =	4,109

RECEIVER INPUT DATA

RECEIVER DISTANCE =		50
DIST C/L TO WALL =		0
RECEIVER HEIGHT =		5
WALL DISTANCE FROM RECEIVER =		50
PAD ELEVATION =		0
ROADWAY VIEW:	LF ANGLE	-90
	RT ANGLE	90
	DF ANGLE	180

SITE CONDITIONS

AUTOMOBILES	15	
MED TRUCKS	15	(HARD SITE=10, SOFT SITE=15)
HVY TRUCKS	15	

WALL INFORMATION

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

VEHICLE MIX DATA

VEHICLE TYPE	DAY	EVE	NIGHT	DAILY
AUTOMOBILES	0.755	0.140	0.105	0.974
MEDIUM TRUCKS	0.489	0.022	0.489	0.018
HEAVY TRUCKS	0.473	0.054	0.473	0.007

MISC. VEHICLE INFO

VEHICLE TYPE	HEIGHT	SLE DISTANCE	GRADE ADJUSTMENT
AUTOMOBILES =	2.00	37.7	- -
MEDIUM TRUCKS=	4.00	37.6	- -
HEAVY TRUCKS =	8.01	37.7	0.0

NOISE OUTPUT DATA

NOISE IMPACTS (WITHOUT TOPO OR BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	74.1	72.1	70.7	64.7	73.2	73.8
MEDIUM TRUCKS	65.1	61.2	53.8	62.5	68.7	68.7
HEAVY TRUCKS	65.7	61.6	58.2	62.9	69.1	69.2
VEHICULAR NOISE	75.1	72.8	71.1	68.3	75.6	**76.0**

NOISE CONTOUR (FT)				
NOISE LEVELS	70 dBA	65 dBA	60 dBA	55 dBA
CNEL	125	269	580	1250
LDN	118	253	546	1176

FHWA-RD-77-108 ROADWAY TRAFFIC NOISE PREDICTION MODEL (CNEL) - CALVENO

PROJECT: Murrieta Apartment Noise Impact Study
ROADWAY Murrieta Hot Springs Rd
SEGMENT Delhaven St to Winchester Rd (SR 79)
LOCATION: City of Murrieta SCENARIO: E+P

JOB #: 0398-2018-02
DATE: 29-Nov-18
ENGINEER: R. Pearson

NOISE INPUT DATA

ROADWAY CONDITIONS

ADT =	40,289
SPEED =	45
PK HR % =	10
NEAR LANE/FAR LANE DIST =	66
ROAD ELEVATION =	0
GRADE =	0
PK HR VOL =	4,029

RECEIVER INPUT DATA

RECEIVER DISTANCE =		50
DIST C/L TO WALL =		0
RECEIVER HEIGHT =		5
WALL DISTANCE FROM RECEIVER =		50
PAD ELEVATION =		0
ROADWAY VIEW:	LF ANGLE	-90
	RT ANGLE	90
	DF ANGLE	180

SITE CONDITIONS

AUTOMOBILES	15	
MED TRUCKS	15	(HARD SITE=10, SOFT SITE=15)
HVY TRUCKS	15	

WALL INFORMATION

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

VEHICLE MIX DATA

VEHICLE TYPE	DAY	EVE	NIGHT	DAILY
AUTOMOBILES	0.755	0.140	0.105	0.974
MEDIUM TRUCKS	0.489	0.022	0.489	0.018
HEAVY TRUCKS	0.473	0.054	0.473	0.007

MISC. VEHICLE INFO

VEHICLE TYPE	HEIGHT	SLE DISTANCE	GRADE ADJUSTMENT
AUTOMOBILES =	2.00	37.7	- -
MEDIUM TRUCKS=	4.00	37.6	- -
HEAVY TRUCKS =	8.01	37.7	0.0

NOISE OUTPUT DATA

NOISE IMPACTS (WITHOUT TOPO OR BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	74.0	72.0	70.7	64.6	73.1	73.7
MEDIUM TRUCKS	65.0	61.1	53.7	62.4	68.6	68.6
HEAVY TRUCKS	65.6	61.5	58.1	62.8	69.0	69.1
VEHICULAR NOISE	75.0	72.7	71.0	68.2	75.5	**75.9**

NOISE CONTOUR (FT)				
NOISE LEVELS	70 dBA	65 dBA	60 dBA	55 dBA
CNEL	123	266	573	1234
LDN	116	250	539	1161

FHWA-RD-77-108 ROADWAY TRAFFIC NOISE PREDICTION MODEL (CNEL) - CALVENO

PROJECT: Murrieta Apartment Noise Impact Study
ROADWAY Winchester Rd
SEGMENT North of Murrieta Hot Springs Rd
LOCATION: City of Murrieta SCENARIO: E+P

JOB #: 0398-2018-02
DATE: 29-Nov-18
ENGINEER: R. Pearson

NOISE INPUT DATA

ROADWAY CONDITIONS

ADT =	37,800
SPEED =	55
PK HR % =	10
NEAR LANE/FAR LANE DIST =	88
ROAD ELEVATION =	0
GRADE =	0
PK HR VOL =	3,780

RECEIVER INPUT DATA

RECEIVER DISTANCE =		50
DIST C/L TO WALL =		0
RECEIVER HEIGHT =		5
WALL DISTANCE FROM RECEIVER =		50
PAD ELEVATION =		0
ROADWAY VIEW:	LF ANGLE	-90
	RT ANGLE	90
	DF ANGLE	180

SITE CONDITIONS

AUTOMOBILES	15	
MED TRUCKS	15	(HARD SITE=10, SOFT SITE=15)
HVY TRUCKS	15	

WALL INFORMATION

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

VEHICLE MIX DATA

VEHICLE TYPE	DAY	EVE	NIGHT	DAILY
AUTOMOBILES	0.755	0.140	0.105	0.974
MEDIUM TRUCKS	0.489	0.022	0.489	0.018
HEAVY TRUCKS	0.473	0.054	0.473	0.007

MISC. VEHICLE INFO

VEHICLE TYPE	HEIGHT	SLE DISTANCE	GRADE ADJUSTMENT
AUTOMOBILES =	2.00	23.9	- -
MEDIUM TRUCKS=	4.00	23.8	- -
HEAVY TRUCKS =	8.01	23.9	0.0

NOISE OUTPUT DATA

NOISE IMPACTS (WITHOUT TOPO OR BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	79.2	77.2	75.9	69.8	78.3	78.9
MEDIUM TRUCKS	69.1	65.2	57.8	66.5	72.6	72.7
HEAVY TRUCKS	69.1	65.0	61.6	66.3	72.5	72.6
VEHICULAR NOISE	80.0	77.7	76.1	72.6	80.1	**80.6**

NOISE CONTOUR (FT)				
NOISE LEVELS	70 dBA	65 dBA	60 dBA	55 dBA
CNEL	253	545	1175	2531
LDN	237	510	1098	2366

FHWA-RD-77-108 ROADWAY TRAFFIC NOISE PREDICTION MODEL (CNEL) - CALVENO

PROJECT: Murrieta Apartment Noise Impact Study
ROADWAY Winchester Rd
SEGMENT South of Murrieta Hot Springs Rd
LOCATION: City of Murrieta SCENARIO: E+P

JOB #: 0398-2018-02
DATE: 29-Nov-18
ENGINEER: R. Pearson

NOISE INPUT DATA

ROADWAY CONDITIONS

ADT =	44,100
SPEED =	55
PK HR % =	10
NEAR LANE/FAR LANE DIST =	88
ROAD ELEVATION =	0
GRADE =	0
PK HR VOL =	4,410

RECEIVER INPUT DATA

RECEIVER DISTANCE =		50
DIST C/L TO WALL =		0
RECEIVER HEIGHT =		5
WALL DISTANCE FROM RECEIVER =		50
PAD ELEVATION =		0
ROADWAY VIEW:	LF ANGLE	-90
	RT ANGLE	90
	DF ANGLE	180

SITE CONDITIONS

AUTOMOBILES	15	
MED TRUCKS	15	(HARD SITE=10, SOFT SITE=15)
HVY TRUCKS	15	

WALL INFORMATION

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

VEHICLE MIX DATA

VEHICLE TYPE	DAY	EVE	NIGHT	DAILY
AUTOMOBILES	0.755	0.140	0.105	0.974
MEDIUM TRUCKS	0.489	0.022	0.489	0.018
HEAVY TRUCKS	0.473	0.054	0.473	0.007

MISC. VEHICLE INFO

VEHICLE TYPE	HEIGHT	SLE DISTANCE	GRADE ADJUSTMENT
AUTOMOBILES =	2.00	23.9	- -
MEDIUM TRUCKS=	4.00	23.8	- -
HEAVY TRUCKS =	8.01	23.9	0.0

NOISE OUTPUT DATA

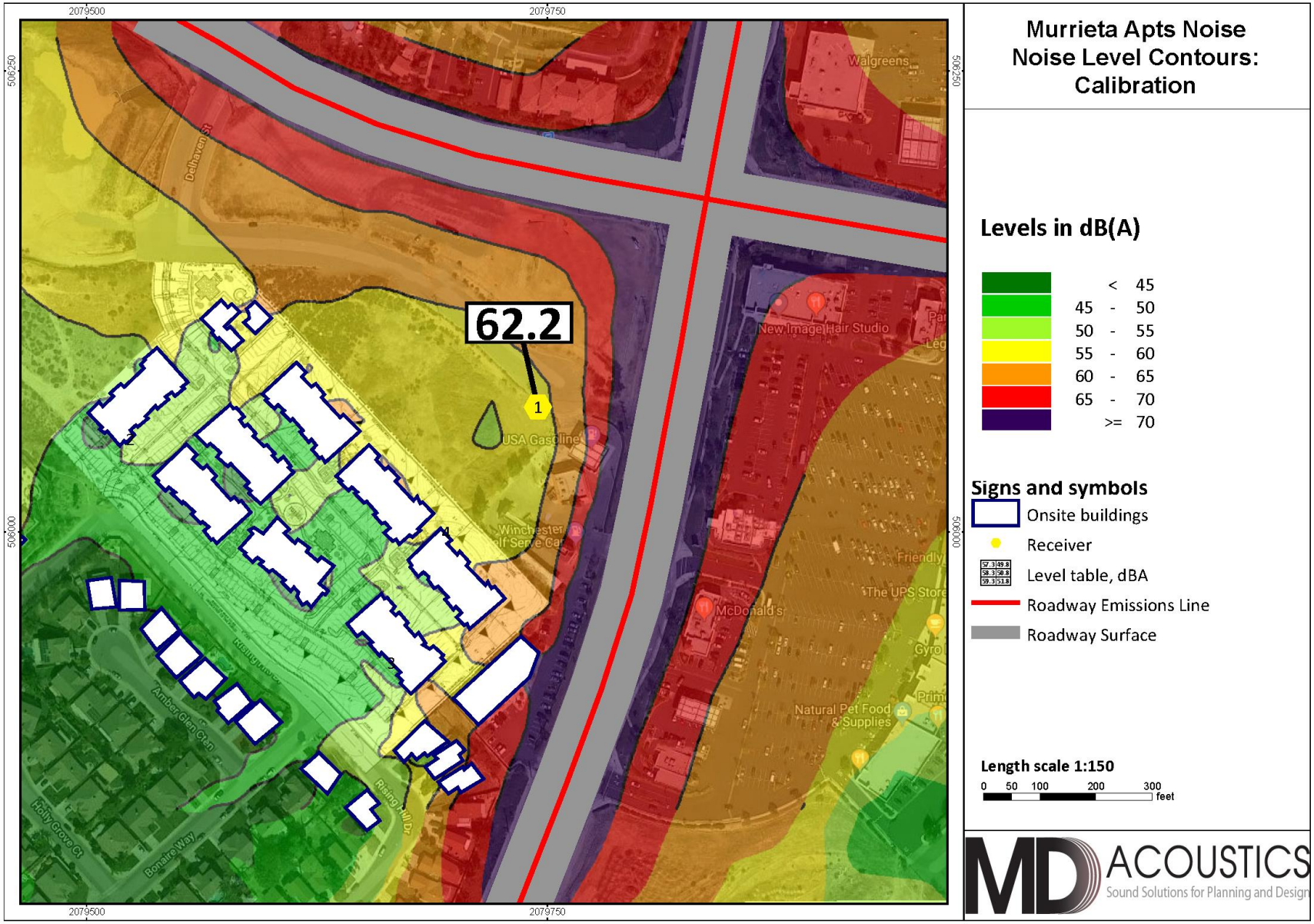
NOISE IMPACTS (WITHOUT TOPO OR BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	79.8	77.8	76.5	70.5	78.9	79.6
MEDIUM TRUCKS	69.8	65.9	58.4	67.1	73.3	73.3
HEAVY TRUCKS	69.7	65.7	62.3	66.9	73.1	73.2
VEHICULAR NOISE	80.6	78.3	76.7	73.3	80.8	**81.2**

NOISE CONTOUR (FT)				
NOISE LEVELS	70 dBA	65 dBA	60 dBA	55 dBA
CNEL	281	604	1302	2805
LDN	262	565	1217	2622

Appendix C:
Soundplan Input/Output

Existing Noise Level Contours



Murrieta Apts Noise
Assessed contribution level - Situation1: SP - Existing +

Source	Source ty	Tr. lane	LrD dB(A)	A dB	
Receive 1	Fl G	LrD,lim	dB(A)	LrD 62.2	dB(A)
Winchester Road	Road		60.9	0.0	
Murrieta Hot Springs Road	Road		56.2	0.0	
Receive 2	Fl G	LrD,lim	dB(A)	LrD 60.1	dB(A)
Winchester Road	Road		47.6	0.0	
Murrieta Hot Springs Road	Road		59.9	0.0	
Receive 2	Fl F2	LrD,lim	dB(A)	LrD 61.3	dB(A)
Winchester Road	Road		50.9	0.0	
Murrieta Hot Springs Road	Road		60.8	0.0	
Receive 2	Fl F3	LrD,lim	dB(A)	LrD 61.3	dB(A)
Winchester Road	Road		54.6	0.0	
Murrieta Hot Springs Road	Road		60.2	0.0	
Receive 3	Fl G	LrD,lim	dB(A)	LrD 58.8	dB(A)
Winchester Road	Road		54.1	0.0	
Murrieta Hot Springs Road	Road		57.0	0.0	
Receive 3	Fl F2	LrD,lim	dB(A)	LrD 60.1	dB(A)
Winchester Road	Road		56.2	0.0	
Murrieta Hot Springs Road	Road		57.9	0.0	
Receive 3	Fl F3	LrD,lim	dB(A)	LrD 61.6	dB(A)
Winchester Road	Road		58.0	0.0	
Murrieta Hot Springs Road	Road		59.0	0.0	
Receive 4	Fl G	LrD,lim	dB(A)	LrD 58.9	dB(A)
Winchester Road	Road		56.4	0.0	
Murrieta Hot Springs Road	Road		55.2	0.0	
Receive 4	Fl F2	LrD,lim	dB(A)	LrD 61.8	dB(A)
Winchester Road	Road		60.2	0.0	
Murrieta Hot Springs Road	Road		56.6	0.0	
Receive 4	Fl F3	LrD,lim	dB(A)	LrD 62.5	dB(A)
Winchester Road	Road		60.9	0.0	
Murrieta Hot Springs Road	Road		57.6	0.0	
Receive 5	Fl G	LrD,lim	dB(A)	LrD 60.4	dB(A)
Winchester Road	Road		59.7	0.0	
Murrieta Hot Springs Road	Road		52.3	0.0	
Receive 5	Fl F2	LrD,lim	dB(A)	LrD 62.6	dB(A)
Winchester Road	Road		62.0	0.0	
Murrieta Hot Springs Road	Road		54.2	0.0	
Receive 5	Fl F3	LrD,lim	dB(A)	LrD 63.9	dB(A)
Winchester Road	Road		63.0	0.0	
Murrieta Hot Springs Road	Road		56.1	0.0	
Receive 6	Fl G	LrD,lim	dB(A)	LrD 62.1	dB(A)
Winchester Road	Road		62.0	0.0	

Source	Source ty	Tr. lane	LrD dB(A)	A dB	
Murrieta Hot Springs Road	Road		43.6	0.0	
Receiver 6	Fl F2	LrD,lim	dB(A)	LrD 62.4	dB(A)
Winchester Road	Road		62.3	0.0	
Murrieta Hot Springs Road	Road		46.1	0.0	
Receiver 6	Fl F3	LrD,lim	dB(A)	LrD 64.9	dB(A)
Winchester Road	Road		64.3	0.0	
Murrieta Hot Springs Road	Road		55.6	0.0	
Receiver 7	Fl G	LrD,lim	dB(A)	LrD 59.9	dB(A)
Winchester Road	Road		59.7	0.0	
Murrieta Hot Springs Road	Road		46.6	0.0	
Receiver 7	Fl F2	LrD,lim	dB(A)	LrD 61.5	dB(A)
Winchester Road	Road		61.2	0.0	
Murrieta Hot Springs Road	Road		50.0	0.0	
Receiver 7	Fl F3	LrD,lim	dB(A)	LrD 62.3	dB(A)
Winchester Road	Road		61.8	0.0	
Murrieta Hot Springs Road	Road		52.3	0.0	
Receiver 8	Fl G	LrD,lim	dB(A)	LrD 46.4	dB(A)
Winchester Road	Road		46.0	0.0	
Murrieta Hot Springs Road	Road		36.4	0.0	
Receiver 8	Fl F2	LrD,lim	dB(A)	LrD 48.6	dB(A)
Winchester Road	Road		47.9	0.0	
Murrieta Hot Springs Road	Road		40.2	0.0	
Receiver 8	Fl F3	LrD,lim	dB(A)	LrD 58.3	dB(A)
Winchester Road	Road		57.3	0.0	
Murrieta Hot Springs Road	Road		51.3	0.0	
Receiver 9	Fl G	LrD,lim	dB(A)	LrD 41.4	dB(A)
Winchester Road	Road		39.9	0.0	
Murrieta Hot Springs Road	Road		36.1	0.0	
Receiver 9	Fl F2	LrD,lim	dB(A)	LrD 48.4	dB(A)
Winchester Road	Road		47.1	0.0	
Murrieta Hot Springs Road	Road		42.2	0.0	
Receiver 9	Fl F3	LrD,lim	dB(A)	LrD 55.3	dB(A)
Winchester Road	Road		53.6	0.0	
Murrieta Hot Springs Road	Road		50.5	0.0	
Receiver 10	Fl G	LrD,lim	dB(A)	LrD 42.0	dB(A)
Winchester Road	Road		41.6	0.0	
Murrieta Hot Springs Road	Road		31.0	0.0	
Receiver 10	Fl F2	LrD,lim	dB(A)	LrD 45.8	dB(A)
Winchester Road	Road		45.0	0.0	
Murrieta Hot Springs Road	Road		38.1	0.0	
Receiver 10	Fl F3	LrD,lim	dB(A)	LrD 55.0	dB(A)

Source	Source ty	Tr. lane	LrD dB(A)	A dB	
Winchester Road	Road		51.0	0.0	
Murrieta Hot Springs Road	Road		52.8	0.0	
Receiver 11	Fl G	LrD,lim	dB(A)	LrD 49.6	dB(A)
Winchester Road	Road		43.1	0.0	
Murrieta Hot Springs Road	Road		48.5	0.0	
Receiver 11	Fl F2	LrD,lim	dB(A)	LrD 51.8	dB(A)
Winchester Road	Road		47.3	0.0	
Murrieta Hot Springs Road	Road		49.9	0.0	
Receiver 11	Fl F3	LrD,lim	dB(A)	LrD 55.2	dB(A)
Winchester Road	Road		50.1	0.0	
Murrieta Hot Springs Road	Road		53.6	0.0	
Receiver 12	Fl G	LrD,lim	dB(A)	LrD 52.9	dB(A)
Winchester Road	Road		32.6	0.0	
Murrieta Hot Springs Road	Road		52.9	0.0	
Receiver 12	Fl F2	LrD,lim	dB(A)	LrD 54.3	dB(A)
Winchester Road	Road		39.6	0.0	
Murrieta Hot Springs Road	Road		54.1	0.0	
Receiver 12	Fl F3	LrD,lim	dB(A)	LrD 57.8	dB(A)
Winchester Road	Road		50.7	0.0	
Murrieta Hot Springs Road	Road		56.9	0.0	

Murrieta Apts Noise
Contribution spectra - Situation1: SP - Existing + Project

Source	Time slice	Sum dB(A)	50Hz dB(A)	63Hz dB(A)	80Hz dB(A)	100Hz dB(A)	125Hz dB(A)	160Hz dB(A)	200Hz dB(A)	250Hz dB(A)	315Hz dB(A)	400Hz dB(A)	500Hz dB(A)	630Hz dB(A)	800Hz dB(A)	1kHz dB(A)	1.25kHz dB(A)	1.6kHz dB(A)	2kHz dB(A)	2.5kHz dB(A)	3.15kHz dB(A)	4kHz dB(A)	5kHz dB(A)	6.3kHz dB(A)	8kHz dB(A)	10kHz dB(A)	
Receive 1 Fl G LrD,lim dB(A LrD 62.2 dB(A																											
Winchester Road	LrD	60.9	24.9	34.0	38.9	41.2	42.4	43.3	44.2	44.8	46.2	48.3	51.0	53.5	51.6	52.3	50.8	49.8	47.9	45.3	42.6	38.2	33.8	33.1	30.1	26.9	
Murrieta Hot Springs Road	LrD	56.2	23.2	31.8	36.4	38.5	39.5	40.2	40.7	40.5	41.6	43.3	45.1	46.3	47.1	47.8	47.0	45.7	44.0	40.9	37.2	32.6	27.3	27.6	24.7	21.6	
Remaining sources (best guess)	LrD																										
Receive 2 Fl G LrD,lim dB(A LrD 60.1 dB(A																											
Winchester Road	LrD	47.6	18.1	27.1	31.9	34.1	35.0	35.4	35.2	30.4	31.1	33.2	35.6	37.8	37.1	38.2	37.3	37.2	35.3	32.6	29.1	23.0	15.3	17.9	14.9	11.2	
Murrieta Hot Springs Road	LrD	59.9	25.1	33.7	38.4	40.5	41.6	42.4	43.1	43.4	44.6	46.3	48.2	49.2	51.1	52.0	51.4	50.1	48.4	45.2	41.2	36.0	30.7	30.7	27.9	24.9	
Remaining sources (best guess)	LrD																										
Receive 2 Fl F2 LrD,lim dB(A LrD 61.3 dB(A																											
Winchester Road	LrD	50.9	18.3	27.3	32.2	34.3	35.4	35.9	36.1	34.2	35.6	37.7	40.2	42.4	41.6	42.6	41.3	40.3	37.3	32.9	28.5	23.7	15.8	18.6	15.5	11.7	
Murrieta Hot Springs Road	LrD	60.8	25.0	33.7	38.4	40.5	41.6	42.5	43.3	43.9	45.5	47.4	49.5	50.9	52.0	52.9	52.1	51.1	49.5	46.4	43.1	38.5	32.7	33.3	30.5	27.7	
Remaining sources (best guess)	LrD																										
Receive 2 Fl F3 LrD,lim dB(A LrD 61.3 dB(A																											
Winchester Road	LrD	54.6	19.5	28.5	33.4	35.6	36.7	37.4	37.9	37.3	39.2	41.4	44.1	46.6	45.6	46.7	45.2	44.2	41.5	37.9	33.5	27.4	20.0	22.1	19.1	16.1	
Murrieta Hot Springs Road	LrD	60.2	24.4	33.0	37.7	39.9	41.0	41.9	42.8	43.6	45.2	46.9	49.1	50.5	51.4	52.2	51.5	50.3	48.7	45.8	42.4	37.6	31.8	32.5	29.7	26.9	
Remaining sources (best guess)	LrD																										
Receive 3 Fl G LrD,lim dB(A LrD 58.8 dB(A																											
Winchester Road	LrD	54.1	19.6	28.7	33.5	35.7	36.7	37.4	37.6	36.0	37.2	39.4	42.3	45.1	44.8	46.3	45.2	44.7	42.5	39.2	35.4	30.7	25.4	25.6	22.6	19.7	
Murrieta Hot Springs Road	LrD	57.0	22.1	30.7	35.4	37.5	38.5	39.3	40.0	40.2	41.6	43.6	45.7	47.3	48.2	49.2	48.2	47.0	45.2	42.2	38.7	33.9	27.9	28.8	26.0	23.1	
Remaining sources (best guess)	LrD																										
Receive 3 Fl F2 LrD,lim dB(A LrD 60.1 dB(A																											
Winchester Road	LrD	56.2	20.0	29.0	33.9	36.2	37.3	38.1	38.6	38.5	40.1	42.3	45.1	47.8	47.1	48.4	47.1	46.2	44.2	41.1	37.8	32.9	26.1	27.3	24.5	21.8	
Murrieta Hot Springs Road	LrD	57.9	22.4	31.0	35.7	37.8	38.9	39.7	40.5	41.0	42.7	44.7	47.1	49.0	49.1	49.9	48.8	47.6	45.9	42.8	39.4	34.8	28.9	29.7	26.9	24.1	
Remaining sources (best guess)	LrD																										
Receive 3 Fl F3 LrD,lim dB(A LrD 61.6 dB(A																											
Winchester Road	LrD	58.0	21.3	30.4	35.3	37.6	38.7	39.6	40.3	40.7	42.4	44.5	47.2	49.5	49.2	50.2	49.1	47.9	46.0	42.8	39.2	33.6	27.3	28.0	25.1	22.5	
Murrieta Hot Springs Road	LrD	59.0	23.6	32.2	36.9	39.0	40.1	41.0	41.8	42.4	44.0	45.9	48.3	50.2	50.2	51.0	50.0	48.7	47.0	43.8	40.4	35.7	29.3	30.6	27.8	25.0	
Remaining sources (best guess)	LrD																										

Murrieta Apts Noise
Contribution spectra - Situation1: SP - Existing + Project

Source	Time slice	Sum dB(A)	50Hz dB(A)	63Hz dB(A)	80Hz dB(A)	100Hz dB(A)	125Hz dB(A)	160Hz dB(A)	200Hz dB(A)	250Hz dB(A)	315Hz dB(A)	400Hz dB(A)	500Hz dB(A)	630Hz dB(A)	800Hz dB(A)	1kHz dB(A)	1.25kHz dB(A)	1.6kHz dB(A)	2kHz dB(A)	2.5kHz dB(A)	3.15kHz dB(A)	4kHz dB(A)	5kHz dB(A)	6.3kHz dB(A)	8kHz dB(A)	10kHz dB(A)	
Receive 4 Fl G	LrD,lim		dB(A	LrD	58.9	dB(A																					
Winchester Road	LrD	56.4	21.3	30.3	35.2	37.4	38.5	39.2	39.6	38.9	40.0	42.0	44.6	47.1	47.1	48.5	47.5	47.1	44.9	41.9	38.8	34.5	29.0	29.1	26.2	23.3	
Murrieta Hot Springs Road	LrD	55.2	20.9	29.5	34.2	36.3	37.3	38.1	38.6	38.7	40.0	41.9	44.2	45.8	46.4	47.2	46.2	45.2	43.1	39.8	36.2	31.2	25.5	26.2	23.4	20.5	
Remaining sources (best guess)	LrD																										
Receive 4 Fl F2	LrD,lim		dB(A	LrD	61.8	dB(A																					
Winchester Road	LrD	60.2	22.4	31.6	36.5	38.8	40.0	40.9	41.8	42.6	44.4	46.6	49.1	51.1	51.3	52.4	51.4	50.2	48.6	45.6	42.2	37.0	30.8	31.4	28.6	26.0	
Murrieta Hot Springs Road	LrD	56.6	21.3	29.9	34.6	36.7	37.8	38.6	39.4	39.9	41.5	43.5	45.9	47.8	47.8	48.7	47.5	46.3	44.4	41.4	37.9	32.7	26.4	27.6	24.8	22.0	
Remaining sources (best guess)	LrD																										
Receive 4 Fl F3	LrD,lim		dB(A	LrD	62.5	dB(A																					
Winchester Road	LrD	60.9	23.4	32.5	37.4	39.7	40.9	41.9	42.8	43.5	45.4	47.5	49.8	51.8	52.1	53.1	52.0	50.7	49.2	46.2	42.2	37.0	30.5	31.5	28.6	26.0	
Murrieta Hot Springs Road	LrD	57.6	22.4	31.0	35.7	37.8	38.9	39.7	40.4	40.9	42.5	44.6	46.9	48.9	48.8	49.6	48.5	47.1	45.6	42.4	38.8	33.5	26.9	28.4	25.6	22.8	
Remaining sources (best guess)	LrD																										
Receive 5 Fl G	LrD,lim		dB(A	LrD	60.4	dB(A																					
Winchester Road	LrD	59.7	23.6	32.7	37.6	39.8	41.0	41.9	42.6	43.0	44.5	46.5	49.0	50.8	50.5	51.2	50.3	49.6	48.2	45.4	42.3	37.7	32.8	32.2	29.3	26.6	
Murrieta Hot Springs Road	LrD	52.3	19.8	28.4	33.0	35.1	36.0	36.7	37.0	36.1	37.3	39.2	41.2	42.7	43.3	44.1	43.1	42.1	40.1	36.9	33.3	28.0	21.8	23.1	20.2	17.2	
Remaining sources (best guess)	LrD																										
Receive 5 Fl F2	LrD,lim		dB(A	LrD	62.6	dB(A																					
Winchester Road	LrD	62.0	23.5	32.6	37.6	39.9	41.2	42.3	43.4	44.6	46.6	48.9	51.2	52.7	52.6	53.4	53.1	52.5	51.2	48.1	44.8	40.6	35.2	35.0	32.1	29.5	
Murrieta Hot Springs Road	LrD	54.2	19.8	28.4	33.1	35.2	36.2	37.0	37.6	37.7	39.3	41.3	43.5	45.2	45.3	46.2	45.1	44.0	41.9	38.6	35.1	30.1	23.5	24.9	22.1	19.3	
Remaining sources (best guess)	LrD																										
Receive 5 Fl F3	LrD,lim		dB(A	LrD	63.9	dB(A																					
Winchester Road	LrD	63.0	24.8	33.9	38.9	41.2	42.5	43.5	44.7	45.9	47.9	50.0	52.1	53.1	53.5	55.0	54.6	54.1	51.7	48.8	45.6	40.7	35.2	35.1	32.2	29.7	
Murrieta Hot Springs Road	LrD	56.1	21.2	29.8	34.5	36.6	37.6	38.5	39.2	39.7	41.3	43.4	45.7	47.5	47.3	48.0	46.9	45.5	43.5	40.4	36.7	31.2	24.5	26.0	23.2	20.5	
Remaining sources (best guess)	LrD																										
Receive 6 Fl G	LrD,lim		dB(A	LrD	62.1	dB(A																					
Winchester Road	LrD	62.0	23.5	32.6	37.6	39.9	41.2	42.2	43.3	44.4	46.2	48.4	50.7	52.2	52.9	53.8	53.4	52.6	51.4	48.6	45.5	41.5	36.9	35.8	33.0	30.4	
Murrieta Hot Springs Road	LrD	43.6	14.3	22.8	27.4	29.4	30.3	30.7	30.6	27.4	28.6	30.3	32.2	33.6	34.0	34.7	33.5	32.6	30.5	27.4	23.7	18.2	11.0	12.9	10.1	7.3	
Remaining sources (best guess)	LrD																										

Murrieta Apts Noise
Contribution spectra - Situation1: SP - Existing + Project

Source	Time slice	Sum dB(A)	50Hz dB(A)	63Hz dB(A)	80Hz dB(A)	100Hz dB(A)	125Hz dB(A)	160Hz dB(A)	200Hz dB(A)	250Hz dB(A)	315Hz dB(A)	400Hz dB(A)	500Hz dB(A)	630Hz dB(A)	800Hz dB(A)	1kHz dB(A)	1.25kHz dB(A)	1.6kHz dB(A)	2kHz dB(A)	2.5kHz dB(A)	3.15kHz dB(A)	4kHz dB(A)	5kHz dB(A)	6.3kHz dB(A)	8kHz dB(A)	10kHz dB(A)	
Receive 6 Fl F2	LrD,lim		dB(A	LrD	62.4	dB(A																					
Winchester Road	LrD	62.3	23.7	32.8	37.8	40.1	41.4	42.4	43.6	44.7	46.7	48.7	50.7	51.3	52.8	54.3	54.1	53.6	51.5	48.6	45.8	41.3	36.4	35.6	32.7	30.1	
Murrieta Hot Springs Road	LrD	46.1	16.3	24.8	29.4	31.4	32.3	32.8	32.7	29.9	30.9	32.5	34.6	36.3	36.4	37.6	36.3	35.5	33.1	29.7	25.9	20.2	12.0	15.0	12.2	9.4	
Remaining sources (best guess)	LrD																										
Receive 6 Fl F3	LrD,lim		dB(A	LrD	64.9	dB(A																					
Winchester Road	LrD	64.3	25.6	34.7	39.7	42.0	43.3	44.4	45.5	46.8	48.8	50.6	52.5	54.1	55.6	57.2	55.9	54.4	53.1	49.9	46.6	41.9	36.8	36.3	33.5	30.9	
Murrieta Hot Springs Road	LrD	55.6	20.6	29.3	33.9	36.1	37.1	37.9	38.7	39.1	40.8	42.7	45.0	46.9	46.9	47.7	46.5	45.1	43.2	40.1	36.1	30.0	22.5	24.9	22.1	19.3	
Remaining sources (best guess)	LrD																										
Receive 7 Fl G	LrD,lim		dB(A	LrD	59.9	dB(A																					
Winchester Road	LrD	59.7	22.4	31.5	36.4	38.7	39.9	40.9	41.7	42.4	44.0	46.0	48.3	49.9	50.9	51.8	51.2	50.1	48.5	45.5	42.0	37.1	31.4	31.6	28.7	26.0	
Murrieta Hot Springs Road	LrD	46.6	15.5	24.0	28.7	30.7	31.6	32.1	32.2	30.2	31.9	34.1	36.3	37.8	37.2	38.0	36.3	35.3	32.9	29.8	26.4	21.3	14.1	16.1	13.3	10.5	
Remaining sources (best guess)	LrD																										
Receive 7 Fl F2	LrD,lim		dB(A	LrD	61.5	dB(A																					
Winchester Road	LrD	61.2	23.2	32.4	37.3	39.6	40.8	41.8	42.7	43.6	45.5	47.6	49.9	51.4	52.2	53.1	52.6	51.7	50.2	47.3	43.9	39.3	33.8	33.6	30.8	28.3	
Murrieta Hot Springs Road	LrD	50.0	16.9	25.5	30.1	32.2	33.1	33.7	34.1	33.4	35.0	36.9	39.1	41.0	41.2	42.1	40.9	39.5	37.5	33.9	29.2	22.5	15.2	17.3	14.6	11.9	
Remaining sources (best guess)	LrD																										
Receive 7 Fl F3	LrD,lim		dB(A	LrD	62.3	dB(A																					
Winchester Road	LrD	61.8	23.8	32.9	37.9	40.2	41.5	42.5	43.6	44.8	46.3	48.3	50.5	52.0	52.7	54.0	53.3	52.2	50.5	47.6	44.2	39.4	33.2	33.8	30.9	28.4	
Murrieta Hot Springs Road	LrD	52.3	18.4	27.0	31.6	33.7	34.7	35.4	35.8	35.6	37.0	39.0	41.4	43.6	43.6	44.3	43.1	41.7	40.0	36.5	31.9	25.7	18.7	20.6	17.9	15.1	
Remaining sources (best guess)	LrD																										
Receive 8 Fl G	LrD,lim		dB(A	LrD	46.4	dB(A																					
Winchester Road	LrD	46.0	14.2	23.2	28.1	30.2	31.3	31.8	31.9	29.6	30.7	32.5	34.4	35.6	37.1	37.8	36.9	35.3	33.2	29.6	25.6	19.8	13.9	14.2	11.2	8.3	
Murrieta Hot Springs Road	LrD	36.4	10.8	19.3	23.9	25.8	26.6	26.9	26.4	19.5	19.8	21.5	24.2	26.1	25.8	26.1	23.9	21.0	17.6	13.3	8.9	1.8	-7.5	-3.0	-6.1	-10.0	
Remaining sources (best guess)	LrD																										
Receive 8 Fl F2	LrD,lim		dB(A	LrD	48.6	dB(A																					
Winchester Road	LrD	47.9	17.2	26.2	31.1	33.2	34.2	34.7	34.7	31.9	33.0	34.9	36.8	38.0	38.4	39.0	38.0	36.9	34.8	31.5	27.8	22.3	16.9	16.9	14.0	11.3	
Murrieta Hot Springs Road	LrD	40.2	14.0	22.5	27.1	29.0	29.9	30.1	29.7	24.9	25.8	27.2	29.1	30.2	29.2	29.3	27.7	26.2	23.7	19.9	15.2	7.1	-3.4	1.9	-0.9	-3.8	
Remaining sources (best guess)	LrD																										

Murrieta Apts Noise
Contribution spectra - Situation1: SP - Existing + Project

Source	Time slice	Sum dB(A)	50Hz dB(A)	63Hz dB(A)	80Hz dB(A)	100Hz dB(A)	125Hz dB(A)	160Hz dB(A)	200Hz dB(A)	250Hz dB(A)	315Hz dB(A)	400Hz dB(A)	500Hz dB(A)	630Hz dB(A)	800Hz dB(A)	1kHz dB(A)	1.25kHz dB(A)	1.6kHz dB(A)	2kHz dB(A)	2.5kHz dB(A)	3.15kHz dB(A)	4kHz dB(A)	5kHz dB(A)	6.3kHz dB(A)	8kHz dB(A)	10kHz dB(A)
Receive 8 Fl F3	LrD,lim		dB(A	LrD	58.3	dB(A																				
Winchester Road	LrD	57.3	22.0	31.0	35.9	38.2	39.3	40.1	40.7	40.6	42.0	44.0	46.3	48.1	48.3	49.3	48.3	47.0	45.2	42.0	38.4	33.4	26.0	27.9	25.0	22.2
Murrieta Hot Springs Road	LrD	51.3	18.9	27.5	32.1	34.2	35.1	35.7	36.0	35.1	36.5	38.3	40.6	42.5	42.5	43.2	41.9	40.4	38.2	34.7	30.4	23.9	15.9	18.8	16.0	13.0
Remaining sources (best guess)	LrD																									
Receive 9 Fl G	LrD,lim		dB(A	LrD	41.4	dB(A																				
Winchester Road	LrD	39.9	14.1	23.1	27.9	30.0	31.0	31.3	31.0	24.7	23.9	24.1	25.5	26.4	26.6	27.2	26.5	26.0	24.5	22.2	19.5	14.4	7.7	8.9	5.8	2.6
Murrieta Hot Springs Road	LrD	36.1	12.5	21.0	25.6	27.5	28.3	28.5	27.9	20.6	19.3	19.1	20.0	20.8	20.8	21.1	19.6	17.9	15.7	12.1	6.9	-3.4	-13.8	-8.3	-11.2	-14.4
Remaining sources (best guess)	LrD																									
Receive 9 Fl F2	LrD,lim		dB(A	LrD	48.4	dB(A																				
Winchester Road	LrD	47.1	18.1	27.1	31.9	34.0	35.0	35.4	35.1	30.4	32.2	34.0	35.8	36.6	37.3	38.0	37.1	35.4	33.2	29.4	24.9	18.6	10.6	12.9	10.0	7.1
Murrieta Hot Springs Road	LrD	42.2	15.7	24.2	28.7	30.7	31.5	31.7	31.2	25.1	26.5	28.1	30.0	31.5	31.9	33.0	31.6	29.6	26.2	21.8	17.1	8.0	-1.2	2.8	0.0	-2.7
Remaining sources (best guess)	LrD																									
Receive 9 Fl F3	LrD,lim		dB(A	LrD	55.3	dB(A																				
Winchester Road	LrD	53.6	20.6	29.6	34.5	36.6	37.7	38.3	38.5	36.7	38.7	40.5	42.7	44.7	44.6	45.7	44.1	42.9	40.8	37.6	33.2	26.3	19.2	21.0	18.0	15.0
Murrieta Hot Springs Road	LrD	50.5	19.7	28.3	32.9	34.9	35.8	36.2	36.3	34.1	35.6	37.3	39.6	41.9	41.2	42.2	40.6	39.3	36.8	33.3	29.0	22.1	13.7	17.1	14.3	11.2
Remaining sources (best guess)	LrD																									
Receive 10 Fl G	LrD,lim		dB(A	LrD	42.0	dB(A																				
Winchester Road	LrD	41.6	12.7	21.6	26.5	28.6	29.6	30.0	29.7	25.5	25.5	27.2	29.2	30.6	32.0	32.8	31.8	30.3	27.6	23.9	19.7	14.0	7.9	8.6	5.5	2.3
Murrieta Hot Springs Road	LrD	31.0	8.0	16.5	21.1	23.0	23.8	24.0	23.4	16.3	13.5	11.5	12.1	12.7	13.4	13.4	8.6	7.3	2.3	0.3	-5.1	-11.9	-19.9	-16.9	-19.7	-22.9
Remaining sources (best guess)	LrD																									
Receive 10 Fl F2	LrD,lim		dB(A	LrD	45.8	dB(A																				
Winchester Road	LrD	45.0	16.3	25.3	30.1	32.2	33.2	33.5	33.3	28.9	29.9	31.8	33.5	34.9	35.2	35.4	34.3	33.3	30.7	27.0	23.1	17.6	11.2	12.0	9.1	6.3
Murrieta Hot Springs Road	LrD	38.1	13.8	22.3	26.9	28.8	29.6	29.8	29.4	24.4	23.6	24.8	25.0	25.1	24.7	24.1	21.6	19.2	16.4	12.5	7.9	1.2	-7.7	-3.2	-6.4	-10.5
Remaining sources (best guess)	LrD																									
Receive 10 Fl F3	LrD,lim		dB(A	LrD	55.0	dB(A																				
Winchester Road	LrD	51.0	18.1	27.1	32.0	34.2	35.2	35.8	36.0	34.1	35.7	37.8	40.1	42.3	42.1	43.2	41.5	40.2	37.7	34.4	29.9	23.6	15.4	18.1	15.2	12.3
Murrieta Hot Springs Road	LrD	52.8	20.5	29.1	33.7	35.7	36.7	37.2	37.4	36.1	37.4	39.3	41.6	44.3	44.0	44.7	43.3	42.0	39.9	36.2	32.4	26.9	19.4	21.9	19.0	16.1
Remaining sources (best guess)	LrD																									

Murrieta Apts Noise
Contribution spectra - Situation1: SP - Existing + Project

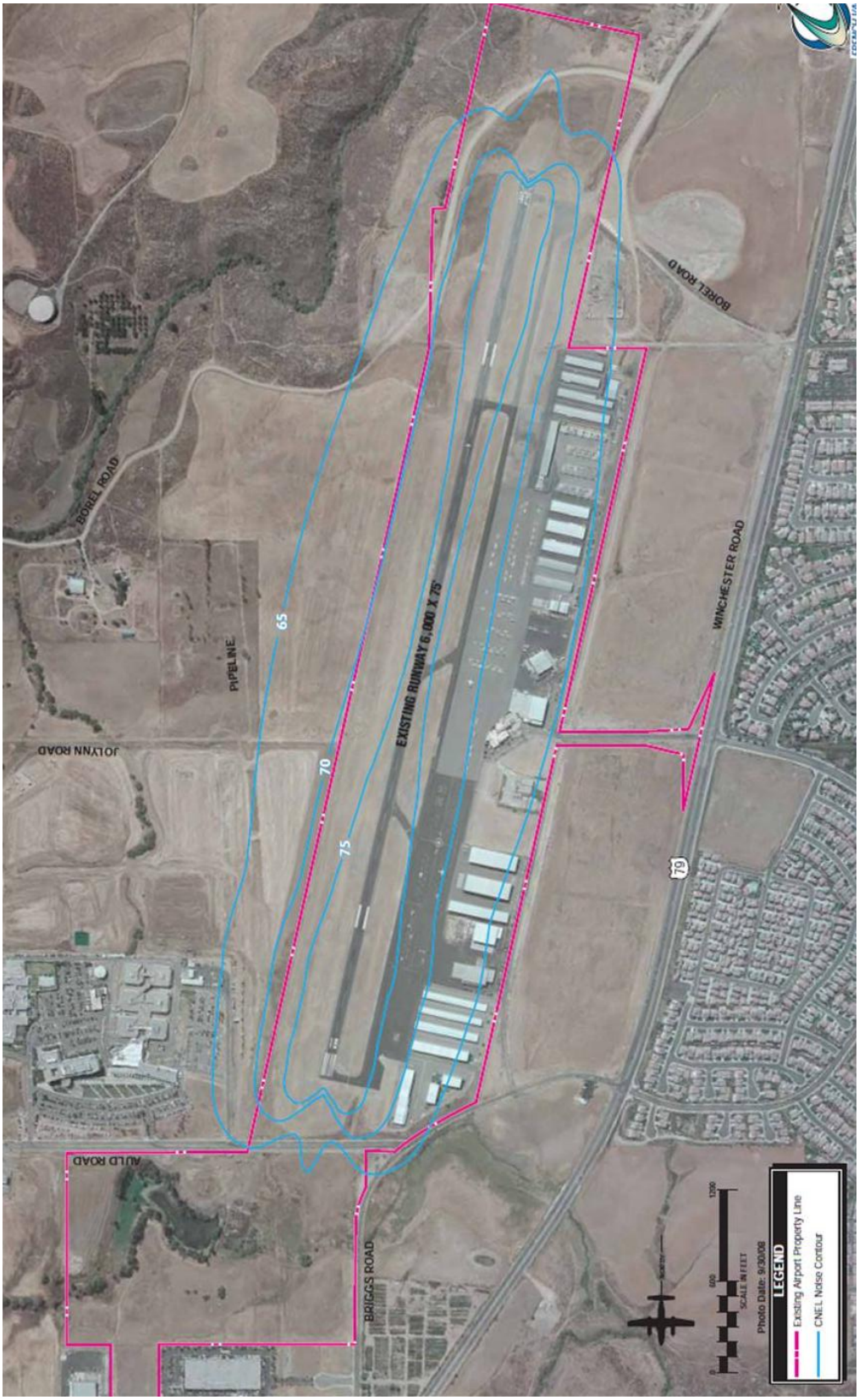
Source	Time slice	Sum dB(A)	50Hz dB(A)	63Hz dB(A)	80Hz dB(A)	100Hz dB(A)	125Hz dB(A)	160Hz dB(A)	200Hz dB(A)	250Hz dB(A)	315Hz dB(A)	400Hz dB(A)	500Hz dB(A)	630Hz dB(A)	800Hz dB(A)	1kHz dB(A)	1.25kHz dB(A)	1.6kHz dB(A)	2kHz dB(A)	2.5kHz dB(A)	3.15kHz dB(A)	4kHz dB(A)	5kHz dB(A)	6.3kHz dB(A)	8kHz dB(A)	10kHz dB(A)	
Receive 11 Fl G	LrD,lim			dB(A	LrD	49.6	dB(A																			
Winchester Road	LrD	43.1	14.9	23.8	28.7	30.8	31.7	32.0	31.6	24.5	24.7	26.7	29.8	33.0	32.9	34.3	33.0	32.1	29.9	26.5	20.5	13.3	6.6	8.1	5.0	1.5
Murrieta Hot Springs Road	LrD	48.5	17.4	26.0	30.6	32.6	33.5	33.9	33.8	31.3	32.2	34.0	36.4	38.5	39.4	40.5	39.4	38.6	36.2	33.0	29.7	25.0	18.8	19.9	17.1	14.3
Remaining sources (best guess)	LrD																									
Receive 11 Fl F2	LrD,lim			dB(A	LrD	51.8	dB(A																			
Winchester Road	LrD	47.3	15.8	24.8	29.6	31.8	32.7	33.2	33.1	29.8	31.8	34.3	36.6	38.3	38.2	39.3	37.6	36.4	33.2	28.6	24.4	16.9	9.1	11.7	8.7	5.8
Murrieta Hot Springs Road	LrD	49.9	18.2	26.8	31.4	33.4	34.3	34.8	34.8	32.8	34.3	36.2	38.7	41.3	40.8	42.1	40.3	39.1	37.0	33.9	30.1	24.5	18.8	19.8	16.9	14.0
Remaining sources (best guess)	LrD																									
Receive 11 Fl F3	LrD,lim			dB(A	LrD	55.2	dB(A																			
Winchester Road	LrD	50.1	16.3	25.4	30.3	32.5	33.5	34.2	34.5	33.1	34.7	36.5	38.8	41.4	40.8	42.0	41.0	40.4	37.8	32.3	28.7	23.5	16.0	18.0	15.1	12.3
Murrieta Hot Springs Road	LrD	53.6	21.0	29.6	34.2	36.2	37.2	37.8	38.1	37.2	38.7	40.5	42.8	45.1	44.8	45.4	44.0	42.8	40.7	37.2	33.2	28.2	20.7	23.1	20.2	17.3
Remaining sources (best guess)	LrD																									
Receive 12 Fl G	LrD,lim			dB(A	LrD	52.9	dB(A																			
Winchester Road	LrD	32.6	8.5	17.5	22.3	24.4	25.2	25.4	24.7	16.0	15.4	17.5	15.7	15.5	16.9	15.1	12.7	11.2	7.6	4.4	-1.3	-5.9	-14.8	-11.7	-14.5	-16.9
Murrieta Hot Springs Road	LrD	52.9	18.5	27.1	31.7	33.8	34.9	35.6	36.2	36.3	37.5	39.3	41.3	42.6	44.1	45.0	44.2	43.2	41.3	38.1	34.7	29.7	24.4	24.7	21.9	19.0
Remaining sources (best guess)	LrD																									
Receive 12 Fl F2	LrD,lim			dB(A	LrD	54.3	dB(A																			
Winchester Road	LrD	39.6	14.1	23.0	27.9	29.9	30.8	31.1	30.6	25.0	26.0	26.0	26.5	27.2	26.1	27.3	25.3	22.5	19.7	15.0	10.3	3.5	-5.1	-2.1	-4.9	-7.3
Murrieta Hot Springs Road	LrD	54.1	19.3	27.9	32.5	34.6	35.7	36.4	37.1	37.3	38.8	40.6	42.7	44.2	45.3	46.3	45.4	44.3	42.3	39.1	35.9	31.5	25.6	26.3	23.5	20.7
Remaining sources (best guess)	LrD																									
Receive 12 Fl F3	LrD,lim			dB(A	LrD	57.8	dB(A																			
Winchester Road	LrD	50.7	16.7	25.7	30.5	32.7	33.8	34.4	34.7	33.1	35.0	37.2	40.3	43.2	42.0	42.8	40.7	39.5	37.2	33.7	29.6	23.1	15.1	17.6	14.7	11.8
Murrieta Hot Springs Road	LrD	56.9	22.4	31.0	35.7	37.8	38.8	39.5	40.1	40.2	41.9	43.8	46.0	47.7	48.1	48.9	47.8	46.4	44.6	41.4	38.0	33.4	27.7	28.3	25.5	22.8
Remaining sources (best guess)	LrD																									

Murrieta Apts Noise
Emission calculation road - Situation1: SP - Existing + Project

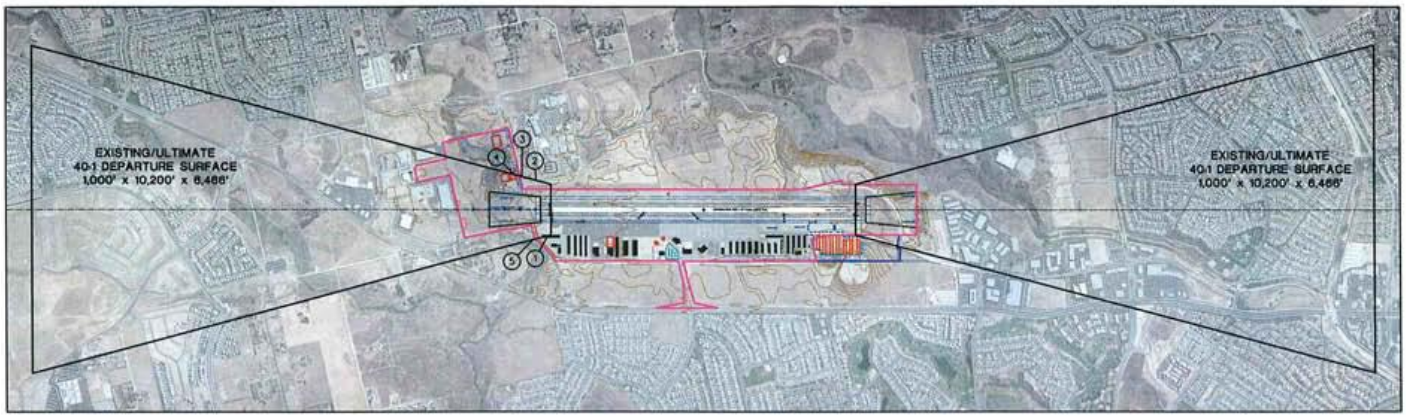
Road	Section name	KM km	ADT Veh/24h	Gradient %	
Winchester Road		0.000	43501	-0.1	
Murrieta Hot Springs Road		0.000	39680	-0.9	

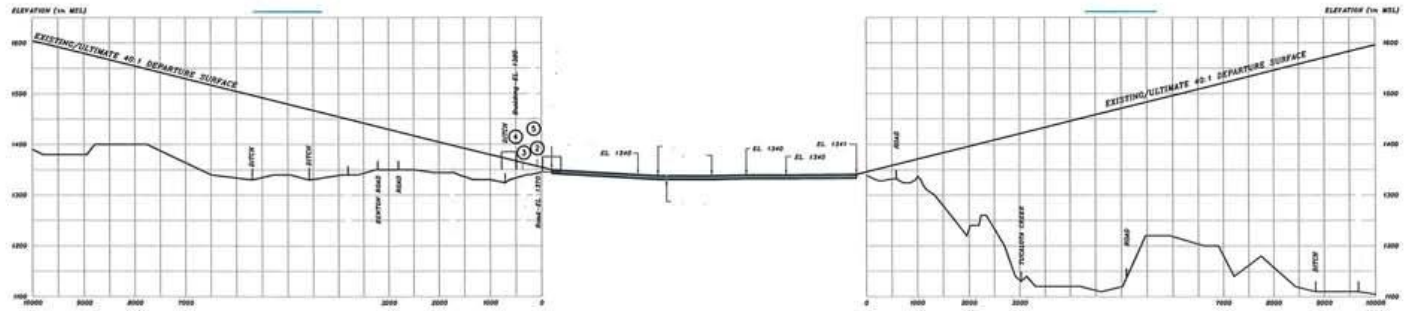
Appendix D:
French Valley Airport Contours

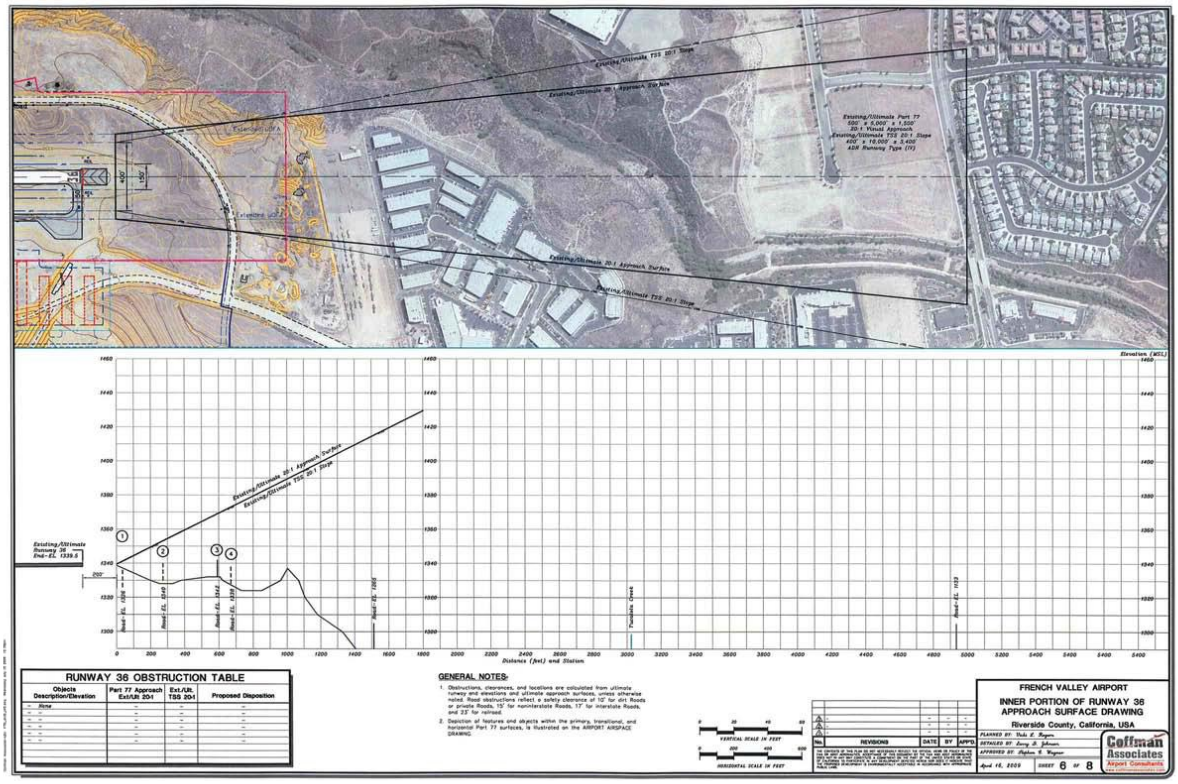
CNEL NOISE CONTOURS



APPROACH – DEPARTURE PROFILE







Appendix E:

Construction Noise Modeling Output

Activity	L_{eq} at 80 feet dBA (w/ existing P/L barrier)*	L_{Max} at 80 feet dBA (w/ existing P/L barrier)*
Grading	71	72
Building Construction	56	57
Paving	71	72

Equipment Summary	Reference (dBA) 50 ft Lmax
Rock Drills	96
Jack Hammers	82
Pneumatic Tools	85
Pavers	80
Dozers	85
Scrappers	87
Haul Trucks	88
Cranes	82
Portable Generators	80
Rollers	80
Tractors	80
Front-End Loaders	86
Hydraulic Excavators	86
Graders	86
Air Compressors	86
Trucks	86

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
1	Grader	86	1	40	80	0.5	0	80.9	76.9	49176773.9
2	Dozer	85	1	40	80	0.5	0	79.9	75.9	39062500
3	Excavator	86	1	40	80	0.5	0	80.9	76.9	49176773.9
4	Tractor/Backhoe	80	3	40	80	0.5	0	79.7	75.7	37057941.3
							Lmax*	**83**	**Leq**	**82**
							Lw	**113**	**Lw**	**114**

Source: MD Acoustics, Sept. 2018.
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	82	81	80	79	78	77	76	75	74	73	72	71	70	69	68	67
60	18.3	0.5	80	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65
70	21.3	0.5	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65	64
80	24.4	0.5	77	76	75	74	73	72	71	70	69	68	67	**66**	65	64	63	62
90	27.4	0.5	76	75	74	73	72	71	70	69	68	67	66	65	64	63	62	61
100	30.5	0.5	75	74	73	72	71	70	69	68	67	66	65	64	63	62	61	60
110	33.5	0.5	74	73	72	71	70	69	68	67	66	65	64	63	62	61	60	59
120	36.6	0.5	73	72	71	70	69	68	67	66	65	64	63	62	61	60	59	58
130	39.6	0.5	72	71	70	69	68	67	66	65	64	63	62	61	60	59	58	57
140	42.7	0.5	71	70	69	68	67	66	65	64	63	62	61	60	59	58	57	56
150	45.7	0.5	70	69	68	67	66	65	64	63	62	61	60	59	58	57	56	55
160	48.8	0.5	70	69	68	67	66	65	64	63	62	61	60	59	58	57	56	55
170	51.8	0.5	69	68	67	66	65	64	63	62	61	60	59	58	57	56	55	54
180	54.9	0.5	69	68	67	66	65	64	63	62	61	60	59	58	57	56	55	54
190	57.9	0.5	68	67	66	65	64	63	62	61	60	59	58	57	56	55	54	53
200	61.0	0.5	67	66	65	64	63	62	61	60	59	58	57	56	55	54	53	52
210	64.0	0.5	67	66	65	64	63	62	61	60	59	58	57	56	55	54	53	52
220	67.1	0.5	66	65	64	63	62	61	60	59	58	57	56	55	54	53	52	51
230	70.1	0.5	66	65	64	63	62	61	60	59	58	57	56	55	54	53	52	51
240	73.1	0.5	65	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50
250	76.2	0.5	65	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50
260	79.2	0.5	65	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50
270	82.3	0.5	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49
280	85.3	0.5	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49
290	88.4	0.5	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49	48
300	91.4	0.5	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49	48
310	94.5	0.5	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49	48
320	97.5	0.5	62	61	60	59	58	57	56	55	54	53	52	51	50	49	48	47
330	100.6	0.5	62	61	60	59	58	57	56	55	54	53	52	51	50	49	48	47
340	103.6	0.5	62	61	60	59	58	57	56	55	54	53	52	51	50	49	48	47
350	106.7	0.5	61	60	59	58	57	56	55	54	53	52	51	50	49	48	47	46
360	109.7	0.5	61	60	59	58	57	56	55	54	53	52	51	50	49	48	47	46
370	112.8	0.5	61	60	59	58	57	56	55	54	53	52	51	50	49	48	47	46

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
1	Cranes	82	1	40	263	0.5	0	64.0	60.0	999069.339
2	Forklift/Tractor	80	3	40	263	0.5	0	66.7	62.8	1891110.41
3	Generator	80	1	40	263	0.5	0	62.0	58.0	630370.137
4	Tractor/Backhoe	80	3	40	263	0.5	0	66.7	62.8	1891110.41
							Lmax*	**69**	**Leq**	**67**
							Lw	**100**	**Lw**	**99**

Source: MD Acoustics, Sept. 2018.
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**	**67**	**66**	**65**	**64**	**63**	**62**	**61**	**60**	**59**	**58**	**57**	**56**	**55**	**54**	**53**	**52**
60	18.3	0.5	65	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50
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	62	61	60	59	58	57	56	55	54	53	52	51	50	49	48	47
90	27.4	0.5	61	60	59	58	57	56	55	54	53	52	51	50	49	48	47	46
100	30.5	0.5	60	59	58	57	56	55	54	53	52	51	50	49	48	47	46	45
110	33.5	0.5	59	58	57	56	55	54	53	52	51	50	49	48	47	46	45	44
120	36.6	0.5	58	57	56	55	54	53	52	51	50	49	48	47	46	45	44	43
130	39.6	0.5	57	56	55	54	53	52	51	50	49	48	47	46	45	44	43	42
140	42.7	0.5	56	55	54	53	52	51	50	49	48	47	46	45	44	43	42	41
150	45.7	0.5	55	54	53	52	51	50	49	48	47	46	45	44	43	42	41	40
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	54	53	52	51	50	49	48	47	46	45	44	43	42	41	40	39
180	54.9	0.5	53	52	51	50	49	48	47	46	45	44	43	42	41	40	39	38
190	57.9	0.5	53	52	51	50	49	48	47	46	45	44	43	42	41	40	39	38
200	61.0	0.5	52	51	50	49	48	47	46	45	44	43	42	41	40	39	38	37
210	64.0	0.5	52	51	50	49	48	47	46	45	44	43	42	41	40	39	38	37
220	67.1	0.5	51	50	49	48	47	46	45	44	43	42	41	40	39	38	37	36
230	70.1	0.5	51	50	49	48	47	46	45	44	43	42	41	40	39	38	37	36
240	73.1	0.5	50	49	48	47	46	45	44	43	42	41	40	39	38	37	36	35
250	76.2	0.5	50	49	48	47	46	45	44	43	42	41	40	39	38	37	36	35
260	79.2	0.5	49	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34
270	82.3	0.5	49	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34
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	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33
300	91.4	0.5	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33
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	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32
330	100.6	0.5	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32
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	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32	31
360	109.7	0.5	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32	31
370	112.8	0.5	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32	31

Paving

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
1	Pavers	86	2	40	80	0.5	0	83.9	79.9	98353547.8
2	Rollers	80	2	40	80	0.5	0	77.9	73.9	24705294.2
3	Paving Equipment	80	2	40	80	0.5	0	77.9	73.9	24705294.2
							Lmax*	**85**	**Leq**	**82**
							Lw	**117**	**Lw**	**113**

Source: MD Acoustics, Sept. 2018.
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**	**82**	**81**	**80**	**79**	**78**	**77**	**76**	**75**	**74**	**73**	**72**	**71**	**70**	**69**	**68**	**67**
60	18.3	0.5	80	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65
70	21.3	0.5	78	77	76	75	74	73	72	71	70	69	68	67	66	65	64	63
80	24.4	0.5	77	76	75	74	73	72	71	70	69	68	67	**66**	65	64	63	62
90	27.4	0.5	75	74	73	72	71	70	69	68	67	66	65	64	63	62	61	60
100	30.5	0.5	74	73	72	71	70	69	68	67	66	65	64	63	62	61	60	59
110	33.5	0.5	73	72	71	70	69	68	67	66	65	64	63	62	61	60	59	58
120	36.6	0.5	72	71	70	69	68	67	66	65	64	63	62	61	60	59	58	57
130	39.6	0.5	71	70	69	68	67	66	65	64	63	62	61	60	59	58	57	56
140	42.7	0.5	71	70	69	68	67	66	65	64	63	62	61	60	59	58	57	56
150	45.7	0.5	70	69	68	67	66	65	64	63	62	61	60	59	58	57	56	55
160	48.8	0.5	69	68	67	66	65	64	63	62	61	60	59	58	57	56	55	54
170	51.8	0.5	68	67	66	65	64	63	62	61	60	59	58	57	56	55	54	53
180	54.9	0.5	68	67	66	65	64	63	62	61	60	59	58	57	56	55	54	53
190	57.9	0.5	67	66	65	64	63	62	61	60	59	58	57	56	55	54	53	52
200	61.0	0.5	67	66	65	64	63	62	61	60	59	58	57	56	55	54	53	52
210	64.0	0.5	66	65	64	63	62	61	60	59	58	57	56	55	54	53	52	51
220	67.1	0.5	66	65	64	63	62	61	60	59	58	57	56	55	54	53	52	51
230	70.1	0.5	65	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50
240	73.1	0.5	65	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50
250	76.2	0.5	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49
260	79.2	0.5	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49
270	82.3	0.5	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49	48
280	85.3	0.5	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49	48
290	88.4	0.5	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49	48
300	91.4	0.5	62	61	60	59	58	57	56	55	54	53	52	51	50	49	48	47
310	94.5	0.5	62	61	60	59	58	57	56	55	54	53	52	51	50	49	48	47
320	97.5	0.5	62	61	60	59	58	57	56	55	54	53	52	51	50	49	48	47
330	100.6	0.5	61	60	59	58	57	56	55	54	53	52	51	50	49	48	47	46
340	103.6	0.5	61	60	59	58	57	56	55	54	53	52	51	50	49	48	47	46
350	106.7	0.5	61	60	59	58	57	56	55	54	53	52	51	50	49	48	47	46
360	109.7	0.5	60	59	58	57	56	55	54	53	52	51	50	49	48	47	46	45
370	112.8	0.5	60	59	58	57	56	55	54	53	52	51	50	49	48	47	46	45

VIBRATION LEVEL IMPACT

Project:	Murrieta Apts		Date: 1/14/19
Source:	Large Bulldozer		
Scenario:	Unmitigated		
Location:	Project Site		
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 =	80.00	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 =	**0.025**	IN/SEC	OUTPUT IN RED