Appendix M Noise Analysis

Appendices

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Fundamentals of Noise

NOISE

Noise is most often defined as unwanted sound; whether it is loud, unpleasant, unexpected, or otherwise undesirable. Although sound can be easily measured, the perception of noise and the physical response to sound complicate the analysis of its impact on people. People judge the relative magnitude of sound sensation in subjective terms such as "noisiness" or "loudness."

Noise Descriptors

The following are brief definitions of terminology used in this chapter:

- **Sound.** A disturbance created by a vibrating object, which, when transmitted by pressure waves through a medium such as air, is capable of being detected by a receiving mechanism, such as the human ear or a microphone.

- **Noise.** Sound that is loud, unpleasant, unexpected, or otherwise undesirable.

- **Decibel (dB).** A unitless measure of sound, expressed on a logarithmic scale and with respect to a defined reference sound pressure. The standard reference pressure is 20 micropascals (20 μPa).

- **Vibration Decibel (VdB).** A unitless measure of vibration, expressed on a logarithmic scale and with respect to a defined reference vibration velocity. In the U.S., the standard reference velocity is 1 micro-inch per second ($1x10^{-6}$ in/sec).

- **A-Weighted Decibel (dBA).** An overall frequency-weighted sound level in decibels that approximates the frequency response of the human ear.

- **Equivalent Continuous Noise Level (L_{eq}); also called the Energy-Equivalent Noise Level.** The value of an equivalent, steady sound level which, in a stated time period (often over an hour) and at a stated location, has the same A-weighted sound energy as the time-varying sound. Thus, the L_{eq} metric is a single numerical value that represents the equivalent amount of variable sound energy received by a receptor over the specified duration.

- **Statistical Sound Level (L_n).** The sound level that is exceeded "n" percent of time during a given sample period. For example, the L_{50} level is the statistical indicator of the time-varying noise signal that is exceeded 50 percent of the time (during each sampling period); that is, half of the sampling time, the changing noise levels are above this value and half of the time they are below it. This is called the "median sound level." The L_{10} level, likewise, is the value that is exceeded 10 percent of the time (i.e., near the maximum) and this is often known as the "intrusive sound level." The L_{90} is the sound level exceeded 90 percent of the time and is often considered the "effective background level" or "residual noise level."

- **Maximum Sound Level (L_{max})**. The highest RMS sound level measured during the measurement period.
- **Root Mean Square Sound Level (RMS).** The square root of the average of the square of the sound pressure over the measurement period.
- **Day-Night Sound Level (L_{dn} or DNL).** The energy-average of the A-weighted sound levels occurring during a 24-hour period, with 10 dB added to the sound levels occurring during the period from 10:00 PM to 7:00 AM.
- **Community Noise Equivalent Level (CNEL).** The energy average of the A-weighted sound levels occurring during a 24-hour period, with 5 dB added from 7:00 PM to 10:00 PM and 10 dB from 10:00 PM to 7:00 AM. NOTE: For general community/environmental noise, CNEL and L_{dn} values rarely differ by more than 1 dB (with the CNEL being only slightly more restrictive – that is, higher than the L_{dn} value). As a matter of practice, L_{dn} and CNEL values are interchangeable and are treated as equivalent in this assessment.
- **Peak Particle Velocity (PPV).** The peak rate of speed at which soil particles move (e.g., inches per second) due to ground vibration.
- **Sensitive Receptor.** Noise- and vibration-sensitive receptors include land uses where quiet environments are necessary for enjoyment and public health and safety. Residences, schools, motels and hotels, libraries, religious institutions, hospitals, and nursing homes are examples.

Characteristics of Sound

When an object vibrates, it radiates part of its energy in the form of a pressure wave. Sound is that pressure wave transmitted through the air. Technically, airborne sound is a rapid fluctuation or oscillation of air pressure above and below atmospheric pressure that creates sound waves.

Sound can be described in terms of amplitude (loudness), frequency (pitch), or duration (time). Loudness or amplitude is measured in dB, frequency or pitch is measured in Hertz [Hz] or cycles per second, and duration or time variations is measured in seconds or minutes.

Amplitude

Unlike linear units such as inches or pounds, decibels are measured on a logarithmic scale. Because of the physical characteristics of noise transmission and perception, the relative loudness of sound does not closely match the actual amounts of sound energy. Table 1 presents the subjective effect of changes in sound pressure levels. Ambient sounds generally range from 30 dBA (very quiet) to 100 dBA (very loud). Changes of 1 to 3 dB are detectable under quiet, controlled conditions, and changes of less than 1 dB are usually not discernible (even under ideal conditions). A 3 dB change in noise levels is considered the minimum change that is detectable with human hearing in outside environments. A change of 5 dB is readily discernible to most people in an exterior environment, and a 10 dB change is perceived as a doubling (or halving) of the sound.

Table 1 Noise Perceptibility

Change in dB	Noise Level
± 3 dB	Barely perceptible increase
± 5 dB	Readily perceptible increase
± 10 dB	Twice or half as loud
± 20 dB	Four times or one-quarter as loud

Source: California Department of Transportation (Caltrans). 2013, September. Technical Noise Supplement ("TeNS").

Frequency

The human ear is not equally sensitive to all frequencies. Sound waves below 16 Hz are not heard at all, but are "felt" more as a vibration. Similarly, though people with extremely sensitive hearing can hear sounds as high as 20,000 Hz, most people cannot hear above 15,000 Hz. In all cases, hearing acuity falls off rapidly above about 10,000 Hz and below about 200 Hz.

When describing sound and its effect on a human population, A-weighted (dBA) sound levels are typically used to approximate the response of the human ear. The A-weighted noise level has been found to correlate well with people's judgments of the "noisiness" of different sounds and has been used for many years as a measure of community and industrial noise. Although the A-weighted scale and the energy-equivalent metric are commonly used to quantify the range of human response to individual events or general community sound levels, the degree of annoyance or other response also depends on several other perceptibility factors, including:

- Ambient (background) sound level
- General nature of the existing conditions (e.g., quiet rural or busy urban)
- Difference between the magnitude of the sound event level and the ambient condition
- Duration of the sound event
- Number of event occurrences and their repetitiveness
- Time of day that the event occurs

Duration

Time variation in noise exposure is typically expressed in terms of a steady-state energy level equal to the energy content of the time varying period (called L_{eq}), or alternately, as a statistical description of the sound level that is exceeded over some fraction of a given observation period. For example, the L_{50} noise level represents the noise level that is exceeded 50 percent of the time; half the time the noise level exceeds this level and half the time the noise level is less than this level. This level is also representative of the level that is exceeded 30 minutes in an hour. Similarly, the L_2, L_8 and L_{25} values represent the noise levels that are exceeded 2, 8, and 25 percent of the time or 1, 5, and 15 minutes per hour, respectively. These "n" values are typically used to demonstrate compliance for stationary noise sources with many cities' noise ordinances. Other values typically noted during a noise survey are the L_{min} and L_{max}. These values represent the minimum and maximum root-mean-square noise levels obtained over the measurement period, respectively.

Because community receptors are more sensitive to unwanted noise intrusion during the evening and at night, state law and many local jurisdictions use an adjusted 24-hour noise descriptor called the Community Noise Equivalent Level (CNEL) or Day-Night Noise Level (L_{dn}). The CNEL descriptor requires that an artificial increment (or "penalty") of 5 dBA be added to the actual noise level for the hours from 7:00 PM to 10:00

PM and 10 dBA for the hours from 10:00 PM to 7:00 AM. The L_{dn} descriptor uses the same methodology except that there is no artificial increment added to the hours between 7:00 PM and 10:00 PM. Both descriptors give roughly the same 24-hour level, with the CNEL being only slightly more restrictive (i.e., higher). The CNEL or L_{dn} metrics are commonly applied to the assessment of roadway and airport-related noise sources.

Sound Propagation

Sound dissipates exponentially with distance from the noise source. This phenomenon is known as "spreading loss." For a single-point source, sound levels decrease by approximately 6 dB for each doubling of distance from the source (conservatively neglecting ground attenuation effects, air absorption factors, and barrier shielding). For example, if a backhoe at 50 feet generates 84 dBA, at 100 feet the noise level would be 79 dBA, and at 200 feet it would be 73 dBA. This drop-off rate is appropriate for noise generated by on-site operations from stationary equipment or activity at a project site. If noise is produced by a line source, such as highway traffic, the sound decreases by 3 dB for each doubling of distance over a reflective ("hard site") surface such as concrete or asphalt. Line source noise in a relatively flat environment with ground-level absorptive vegetation decreases by an additional 1.5 dB for each doubling of distance.

Psychological and Physiological Effects of Noise

Physical damage to human hearing begins at prolonged exposure to noise levels higher than 85 dBA. Exposure to high noise levels affects the entire system, with prolonged noise exposure in excess of 75 dBA increasing body tensions, thereby affecting blood pressure and functions of the heart and the nervous system. Extended periods of noise exposure above 90 dBA results in permanent cell damage, which is the main driver for employee hearing protection regulations in the workplace. For community environments, the ambient or background noise problem is widespread, through generally worse in urban areas than in outlying, less-developed areas. Elevated ambient noise levels can result in noise interference (e.g., speech interruption/masking, sleep disturbance, disturbance of concentration) and cause annoyance. Since most people do not routinely work with decibels or A-weighted sound levels, it is often difficult to appreciate what a given sound pressure level number means. To help relate noise level values to common experience, Table 2 shows typical noise levels from familiar sources.

Table 2 Typical Noise Levels

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
Onset of physical discomfort	120+	
	110	Rock Band (near amplification system)
Jet Flyover at 1,000 feet		
	100	
Gas Lawn Mower at three feet		
	90	
Diesel Truck at 50 feet, at 50 mph		Food Blender at 3 feet
	80	Garbage Disposal at 3 feet
Noisy Urban Area, Daytime		
	70	Vacuum Cleaner at 10 feet
Commercial Area		Normal speech at 3 feet
Heavy Traffic at 300 feet	60	
		Large Business Office
Quiet Urban Daytime	50	Dishwasher Next Room
Quiet Urban Nighttime	40	Theater, Large Conference Room (background)
Quiet Suburban Nighttime		
	30	Library
Quiet Rural Nighttime		Bedroom at Night, Concert Hall (background)
	20	
		Broadcast/Recording Studio
	10	
Lowest Threshold of Human Hearing	0	Lowest Threshold of Human Hearing

Source: California Department of Transportation (Caltrans). 2013, September. Technical Noise Supplement ("TeNS").

Vibration Fundamentals

Vibration is an oscillatory motion through a solid medium in which the motion's amplitude can be described in terms of displacement, velocity, or acceleration. Vibration is normally associated with activities stemming from operations of railroads or vibration-intensive stationary sources, but can also be associated with construction equipment such as jackhammers, pile drivers, and hydraulic hammers. As with noise, vibration can be described by both its amplitude and frequency. Vibration displacement is the distance that a point on a surface moves away from its original static position; velocity is the instantaneous speed that a point on a surface moves; and acceleration is the rate of change of the speed. Each of these descriptors can be used to correlate vibration to human response, building damage, and acceptable equipment vibration levels. During construction, the operation of construction equipment can cause groundborne vibration. During the operational phase of a project, receptors may be subject to levels of vibration that can cause annoyance due to noise generated from vibration of a structure or items within a structure.

Vibration amplitudes are usually described in terms of either the peak particle velocity (PPV) or the root mean square (RMS) velocity. PPV is the maximum instantaneous peak of the vibration signal and RMS is the

square root of the average of the squared amplitude of the signal. PPV is more appropriate for evaluating potential building damage and RMS is typically more suitable for evaluating human response.

As with airborne sound, annoyance with vibrational energy is a subjective measure, depending on the level of activity and the sensitivity of the individual. To sensitive individuals, vibrations approaching the threshold of perception can be annoying. Persons accustomed to elevated ambient vibration levels, such as in an urban environment, may tolerate higher vibration levels. Table 3 displays the human response and the effects on buildings resulting from continuous vibration (in terms of various levels of PPV).

Table 3 Human Reaction to Typical Vibration Levels

Vibration Level, PPV (in/sec)	Human Reaction	Effect on Buildings
0.006–0.019	Threshold of perception, possibility of intrusion	Vibrations unlikely to cause damage of any type
0.08	Vibrations readily perceptible	Recommended upper level of vibration to which ruins and ancient monuments should be subjected
0.10	Level at which continuous vibration begins to annoy people	Virtually no risk of "architectural" (i.e. not structural) damage to normal buildings
0.20	Vibrations annoying to people in buildings	Threshold at which there is a risk to "architectural" damage to normal dwelling – houses with plastered walls and ceilings
0.4–0.6	Vibrations considered unpleasant by people subjected to continuous vibrations and unacceptable to some people walking on bridges	Vibrations at a greater level than normally expected from traffic, but would cause "architectural" damage and possibly minor structural damage

Source: California Department of Transportation (Caltrans). 2020, April. *Transportation and Construction Vibration Guidance Manual.* Prepared by ICF International.

LOCAL REGULATIONS AND STANDARDS

Walnut, California Municipal Code

Title 3 PUBLIC HEALTH, SAFETY AND WELFARE

Chapter 3.40 NOISE

3.40.010 Purpose and intent.

Generation of excessive noise on a continuing basis plus false alarms can create conditions causing both danger and annoyance to the general public. It is an unnecessary waste of taxpayers' dollars for response created by false alarms and ongoing noise complaints, which must be eliminated. The tying up of emergency personnel through emergency response created by false alarms is unnecessary and potentially hazardous to both the citizens and emergency personnel. Therefore, no person shall make, or cause or suffer, or permit to be made upon any premises owned, occupied or controlled by such person, any unnecessary noises, sounds or vibrations which are physically annoying to persons of ordinary sensitiveness or which are so harsh or so prolonged or unnatural or unusual in their use, time or place as to occasion unnecessary discomfort to any person or persons within any neighborhood. Such action is determined to create a public nuisance.

3.40.020 Definitions.

For the purpose of this chapter, the following words and phrases shall have the meanings respectively ascribed to them by this section:

"Alarm, owner" means the person who owns, leases, rents, uses or makes available for use by his or her agents, employees, representatives or family, any alarm system.

"Alarm system" means any device, whether known as a burglary, robbery, fire or intrusion alarm, direct dial telephone service, audible or silent alarm or by another name, which is used for the detection of an unauthorized entry into a building, structure or facility, vehicle or to signal the commission of dangerous or unlawful acts. It shall include those devices which emit a signal within the protected premises only, are supervised by the proprietor of the premises where located, and are otherwise known as "proprietary alarm systems," auxiliary devices installed by a telephone company to protect telephone company systems which might be damaged or disrupted by the use of an alarm system are not included in this definition.

"Audible alarm" means a device designed to notify persons in the immediate vicinity of the protected premises by emission of an audible sound caused by an unauthorized entry or the Commission of an unlawful act or of a fire.

"A-weighted sound level" means the sound level in decibels as measured on a sound-level meter using the A-weighting network. The level so read is designated dB(A) or dBA.

"City official" means the City Manager, Community Development Director, Building Official, Code Enforcement Officer, plus any agency or official hired or appointed by the City (including law enforcement, fire, health, animal control, etc) to conduct City business.

"Decibel (dB)" means a unit for measuring the amplitude of a sound, equal to 20 times the logarithm to the base of 10 of the ratio of the pressure of the sound measured to the reference pressure which is 20 microPascals.

"Direct dial device" means a device which is connected to a telephone line and upon activation of an alarm system, automatically dials a predetermined telephone number and transmits a message or signal indicating a need for emergency response.

"False alarm" means an alarm signal activated by causes other than the commission or attempted commission of an unlawful act or of a fire, which the alarm system is designed to detect.

"Sound-level meter" means an instrument including a microphone, an amplifier, an output meter and frequency weighting network for the measurement of sound levels which satisfies the requirements pertinent for type S2A meters in the American National Standards Institute (ANSI) specifications for sound level meters, S1.4-1971, or the most recent revision thereof.

3.40.030 Certain noise prohibited.

Notwithstanding any other provisions of this chapter, the following acts and the causing or permitting thereof are declared to be a public nuisance in violation of this chapter:

A. Construction. Operating or causing the operation of any tools, equipment, impact devices, derricks or hoists used in construction, drilling, repair, alteration, demolition or earthwork, between the weekday hours of 8:00 p.m. and 7:00 a.m. the following day, or at any time on Saturdays, Sundays or holidays; except as provided in Section 3.40.040.

B. Emergency Signaling Devices. Sounding or permitting the sounding of any:

1. Exterior burglar or fire alarm unless such alarm is terminated within 15 minutes of activation, except as provided in Section 3.40.040.

2. Motor vehicle alarms unless such alarm is terminated within five minutes of activation.

3. Motor vehicle alarm more than three times of any duration in any 24-hour period.

4. False activation of an emergency signaling device where a law enforcement officer or fire department is required to respond.

5. No person shall use any alarm system, which is equipped with a direct dial device, and which when activated, automatically dials any telephone number in any office of the sheriff.

C. Radios, Bands, etc. Using, operating or permitting to be played, used or operated between the hours of 10:00 p.m. and 7:00 a.m. of any radio, musical instrument, phonograph, television, or similar instrument or device for the production or reproduction of sound in volume that is plainly audible from a distance of 50 feet or more from the source.

D. Noise by Animals. Any person having charge, care, custody, possession or control of any animal to permit such animal to emit any excessive noise which is disturbing or offensive, including, but not limited to, barking dogs and roosters.

E. Nonemergency Signaling Devices. Sounding or permitting the sounding of any amplified signal from any bell, chime, siren, whistle or similar device, intended primarily for non-emergency purposes, from any place, for more than 10 consecutive seconds in any one hour period. Houses of religious worship shall be exempt from the operation of this provision.

F. Business Services Near Residential Neighborhood.

1. Loading, unloading, opening, closing or handling of boxes, crates, containers, building materials, garbage cans, or other similar objects between the hours of 10:00 p.m. and 7:00 a.m. daily in such a manner to exceed the noise levels established in Section 3.40.050 when measured from the receptor property.

2. The use or operation of any mechanized machine or equipment used to clean, cut, blow, vacuum, or sweep dirt, grass, leaves, and any other debris off driveways and parking lots between the hours of 10:00 p.m. and 7:00 a.m. daily.

G. Loud or Unruly Gatherings. Generating any noise from a party or gathering of two or more people on private property (whether from a home, a nightclub, or any other location in the City) that is plainly audible from a distance of 50 feet or more therefrom. This subsection shall be enforced as follows:

1. No person shall make, cause or suffer, or permit to be made upon any premises owned, occupied or controlled by him or her any unnecessary noises or sounds which are physically annoying to persons of ordinary sensitiveness or which are so harsh or so prolonged or unnatural or unusual in their use, time or place as to occasion physical discomfort to the inhabitants of any neighborhood.

2. When any loud or unruly assemblage occurs or is held, and the City's law enforcement agency is required to respond to the scene in response to citizen complaints, and the handling peace officer at the scene determines that there is a threat to the public peace, health, safety or general welfare, then that peace officer shall notify the owner of the property and/or the person in charge of the property where the assemblage exists, and/or person responsible for said assemblage, that such person or persons, or in the case of a minor, the parents and/or guardian of such minor, shall be held personally liable for the cost of providing additional law enforcement personnel on special security assignment over and above the normal services provided by the law enforcement agency in response to such assemblage. Such person or persons shall be given a warning, in the form of notification by the peace officer, that the cost of any response by the Sheriff's Department totaling two or more responses within 24 hours at the same location or totaling four or more incidents within 12 months to the same location will be charged to such person. Such notice may include a written notice, receipt of which is signed by the owner, responsible person or person in charge. The police personnel necessarily utilized in responding to two or more responses in 24 hours or four or more incidents within any 12-month period at the same location to control the threat to the public peace, health, safety or general welfare shall be deemed to be on special security assignment over and above the normal services provided and the owner of the property and/or the person in charge of the property where such assemblage occurs, and/or the person responsible for such assemblage, shall be personally responsible for the cost of such special security assignment in an amount determined upon a cost accounting basis by the City. The cost of such special security assignment shall include damage to City/County property and/or injuries to City/County personnel. A fee charged will not be in excess of $3,000.00 for a single occurrence. The City reserves its legal options to elect any other legal remedies to collect said costs or damage. For purposes of this section, an incident means any response by the Sheriff's Department to a loud or unruly assemblage which occurs more than 24 hours apart from each other. Multiple responses, which occur within 24 hours of the first response, shall be considered as one incident.

H. Leaf Blowers. The use or operation of any mechanized machine or equipment used to clean, cut, blow, vacuum, or sweep grass, leaves, dirt and other debris off sidewalks, driveways, lawns and other surfaces shall not be allowed between the hours of 8:00 p.m. and 7:00 a.m. daily.

3.40.040 Exceptions.

The following activities shall be exempt from Section 3.40.030:

A. Construction by Approval. Any person who performs the construction, repair, excavation or earthmoving work involved pursuant to the express written permission by a City Manager to perform such work. A request for an exemption shall be made in writing stating the reasons for the request and the facts upon which such reasons are based. Permission may be granted if any of the following conditions exist:

1. The work proposed to be done is in the public interest.

2. Hardship, including, but not limited to, unreasonable delay due to weather, acts of God or labor strikes, would result in the interruption thereof during the hours and days specified.

3. The building or structure involved is devoted or intended to be devoted to a use immediately incident to public defense.

B. Emergency Work. Work performed for the purpose of preventing or alleviating the physical trauma or property damage threatened or caused by an emergency or work by private or public utilities when restoring utility service shall be permitted, provided the person performing such work notifies the City Manager within one day after the office of said manager is first opened subsequent to performing such activity.

C. Testing of Emergency Signaling Devices. Testing on emergency signaling devices may be performed between the hours of 8:00 a.m. and 10:00 p.m. Such testing shall use only the minimum cycle test time, and in no case shall such test time exceed 60 seconds. Testing shall not occur more than one time in each calendar month.

D. An alarm signal activated by violent conditions of nature or other extraordinary circumstances which are not subject to the control of the alarm owner shall not constitute a false alarm.

E. Audible alarms affixed to a public telephone utility whose only duty is to furnish telephone service pursuant to tariffs on file with the California Public Utilities Commission.

3.40.050 Exterior noise standards.

Citations for violations are hereby authorized when:

A. Exterior noise levels shall apply to all receptor properties as follows, unless otherwise noted:

Receptor—Land Use	Time Interval	Noise Level
Residential properties	22:00—07:00	45 dB
	07:00—22:00	50 dB
Commercial properties	22:00—07:00	55 dB
	07:00—22:00	60 dB
Industrial properties	Anytime	70 dB

B. If the measurement location is on a boundary property between two different zones, exterior noise level utilized in subsection A of this section to determine the exterior standard shall be the daytime exterior noise level of the subject receptor property.

3.40.060 Decibel measurement.

Any decibel measurement made pursuant to the provisions of this chapter shall be based on a reference sound pressure of 20 microPascals, as measured with a sound level meter using the A-weighted network (scale) at slow response, or at the fast response when measuring impulsive sound levels and vibrations.

3.40.070 Measurement methods.

Utilizing the A-weighted scale of the sound-level meter as noted in this chapter, the noise level shall be measured at a position or positions at any point on the receptor property. In general, the microphone shall be located four to five feet above the ground; 10 feet or more from the nearest reflective surface, where possible. However, in those cases where another elevation is deemed appropriate, the latter shall be utilized.

3.40.080 Audible alarm requirement.

For every audible alarm, the alarm owner thereof shall post the names and telephone number of persons to be notified to render repairs during any hour of the day or night during which the audible alarm is operated. An audible alarm shall terminate its operation or the audible alarm shall automatically reset within 30 minutes of its being activated.

3.40.090 Alarm repair report.

After any false, alarm, the alarm owner shall, upon request by the City official, submit a written report to the City official describing actions taken or to be taken to eliminate the cause of the false alarm. This report shall be submitted within 10 days of request by the City official.

3.40.100 Enforcement.

Except as otherwise provided herein, the provisions of this chapter shall be administered and enforced in accordance with the procedures described in Sections 3.36.040 and 3.36.090 through 3.36.240 of this title.

3.40.110 Maintaining a public nuisance alarm.

In addition to any other penalty or enforcement procedure, an alarm owner shall:

A. Not operate an alarm system, which generates more than three false alarms in any 12-month period. After a City official responds to any false, alarm, the owner shall submit, upon request by the City official, a written report to the City official describing actions taken to eliminate the cause of the false alarm. The alarm owner shall submit the report within 20 days of the date requested by the City official. Failure to provide such report is a violation of this chapter.

B. Pay a service fee, as determined by resolution of the City Council, for each false alarm in excess of three false alarms in any calendar year.

3.40.120 Additional remedies.

In addition to the remedies set forth in this chapter, the City official may undertake such procedures as are reasonably necessary in the following circumstances:

A. Law enforcement may deactivate a motor vehicle alarm generating noise in violation of this chapter. If the law enforcement agency is unable to deactivate the alarm, they may cause such vehicle to be removed according to the procedure set forth in Section 22651.5 of the California Vehicle Code. Any costs associates with the removal or storage of a motor vehicle and any costs incurred by the City in connection therewith shall be paid by the registered owner of the vehicle.

B. City officials, or their duly appointed representative, shall have the authority to remove any animal that continues to create a nuisance in violation of this chapter. Any costs associated with the removal or storage of an animal and any costs incurred by the City, or their duly appointed representative, in connection therewith shall be paid by the property owner from where the animal is removed.

Contact:

City Clerk: 909-595-7543

CHAPTER 7
NOISE

INTRODUCTION

Walnut's rural character—with low-density housing and open spaces—lends itself to the quiet environment that residents enjoy. By monitoring and regulating noise and noise sources, the City helps maintain the conditions that contribute to the local quality of life that residents have come to enjoy.

Noise commonly is defined as any "unwanted sound." Excessive and unwanted noise may interfere with communication, work, rest, recreation, sleep, and can impact residents' quality of life. For these reasons, the City includes the consideration of new noise-generating sources and ambient noise conditions in land use planning as well as decision-making activities.

This Element addresses noise that affects the broader community, rather than noise associated with site-specific conditions. The goals and policies in this Element guide decisions concerning how properties are used in relation to roads, the existing railroad within the adjacent City of Industry, and commercial and industrial businesses; as these tend to be the most common sources of noise in an urbanized area. This Element explores noise reduction and noise exposure strategies and establishes noise/land use compatibility standards that seek to minimize these effects.

Noise

Contents

Summer Concerts and Movies in the Park at Creekside Park

FOUNDATION FOR NOISE

Noise is part of every urbanized environment, however, excessive noise, or noises that interfere with normal community activities often require a proactive approach. Many variables come into effect when a noise becomes an annoyance: the noise level, the time of day that the noise occurs, cumulative noise sources that create irksome background sounds, and the activity someone is engaged in as the noise occurs. The most significant noise concerns in Walnut arise from traffic noise along arterial roadways, construction activity, the horns and sounds of trains along the City's southern border, as well as outdoor industrial and commercial operations. Noise also comes from yard equipment (i.e. leaf blowers), power tools, loud music, or even parties and events at local parks. Some noise sources—like traffic and train noise—are for the most part, outside of the City's control. However, the City has taken a proactive approach to minimize these approaches (e.g. quiet zone).

Notwithstanding, the City can regulate the interplay of noise and land use patterns to address community noise concerns, particularly by separating traditionally noisy uses from noise-sensitive uses like homes, schools, child-care centers, and elderly-care facilities. This is effective because noise levels decrease over spatial distance. In addition, mitigation measures, such as the incorporation of walls, can be used in some instances to shield people with heightened noise sensitivities.

In recognition of the fact that noise affects a community's quality of life, Section 65302(f) of the Government Code identifies the specific noise analysis and policy direction that must be included in a General Plan, with attention paid as well to Section 46050.1 of the Health and Safety Code.

Noise Basics

Noise is most often defined as unwanted sound. Although sound can be easily measured, the perception of noise and the physical response to sound complicate the analysis of its impact on people. Often, people

judge the relative magnitude of sound sensation in subjective terms such as "noisiness" or "loudness."

Measurement and Perception

Sound intensity is measured and expressed in decibels (dB), with an adjustment referred to as the A-weighted measure to correct for the relative frequency response of the human ear. Of the various scales available for measuring noise, the A-weighted sound pressure level (dBA) is the scale of measurement that is most useful in community noise measurement. The A-scale approximates the frequency response of the average ear when listening to most ordinary everyday sounds.

The limit to using decibels as the basic measurement of sound is that decibels represent a rough connection between the physical intensity of sound and its perceived loudness to the human ear. For example, a 10-decibel increase in sound level is perceived by the human ear as only doubling of the loudness of the sound. Ambient sounds in the urban environment generally range from 30 dBA (very quiet) to 100 dBA (very loud).

Another key factor of how sound is interpreted by the listener is the time of day or night during which the sound is heard. Noise typically is more bothersome at night than during the daytime due to the reduction of overall ambient noise.

The duration of a sound also affects how it is perceived or how much of a nuisance it may be. A given level of noise may be tolerable depending on the duration of exposure experienced by an individual. For example, a quick airplane flyover may be less annoying than a freeway that hums consistently at all hours of the day. Measures of noise exposure have been developed to consider not just the A-level variation of noise but also the duration of the disturbance.

Community Noise Equivalent Level (CNEL)

To provide a standard measure for community noise exposure that considers the time-varying characteristics, the City can use either the Community Noise Equivalent Level (CNEL), or (Ldn) Day-Night Average Level as acceptable standard metrics. [1] This General Plan uses CNEL as the standard.

CNEL is a 24-hour energy average metric that penalizes evening and nighttime noise and provides a uniform measure for time-varying noise environments. The CNEL system measures the average noise levels for the evening hours (7:00 P.M. to 10:00 P.M.) by increasing the levels 5dB and measures the average noise levels for nighttime hours (10:00 P.M. to 7:00 A.M.) by increasing them 10dB. The daytime noise levels are combined, and these measured weighted levels are averaged to obtain a CNEL value. Figure N-1 (Typical Noise Levels in the Environment) illustrates common indoor and outdoor sources at different levels and how they are perceived.

Sensitive Receptors

Some land uses are considered more sensitive to ambient noise levels than others due to noise exposure (in terms of both exposure time and "insulation" from noise) and the types of activities typically involved. Residences, hotels, schools, libraries, religious institutions, convalescent care homes, senior centers, natural areas, parks, and outdoor recreation areas are generally more sensitive to noise than commercial and industrial uses. Special considerations are typically applied to minimize noise impacts to new development as well as construction activity adjacent to these sensitive uses.

City Noise Regulations

The WMC addresses noise in Chapter 16B. Regulations outline what sounds are considered nuisances (and therefore, not permitted), limit hours of construction operations, regulate what land uses can be used in proximity of residential uses, and specify hours for the use of landscaping equipment (e.g. the leaf blower). The Noise Ordinance sets standards for maximum noise levels based on times of day and land uses, as indicated in Table N-1. These regulations reflect typical standards used by cities throughout California.

[1] California General Plan Guidelines, Ch. 4 Noise Element, pp. 131-137

Table N-1: Exterior Noise Standards

Receptor: Land Use	Time Interval	Noise Level
Residential	10:00 PM to 7:00 AM 7:00 AM to 10:00 PM	45 dB 50 dB
Commercial	10:00 PM to 7:00 AM 7:00 AM to 10:00 PM	55 dB 60 dB
Industrial	Anytime	70 dB

Source: City of Walnut, Municipal Code Chapter 16B-5 (Exterior Noise Standards)

Land use decisions and the development review process are key ways to minimize noise impacts on sensitive land uses. Noise compatibility may be achieved by not locating conflicting land uses adjacent to one another and by incorporating buffers and noise control techniques in the overall site design process. This can be achieved by integrating increased setbacks, dense landscaping, building transitions, walls, and building construction techniques.

Figure N-1: Typical Noise Levels in the Environment

Common Noise Source	Noise Level (dBA)		Effect
Thunderclap (near)	Uncomfortably Loud	120 dBA	Threshold of pain begins around 125 dB
Symphony Orchestra Power Saw (chainsaw)			
Stereos (over 100 watts)		110 dBA	Regular exposure to sound over 100 dB of more than one-minute risks permanent hearing loss.
Garbage Truck/Cement Mixer	Very Loud	100 dBA	No more than 15 minutes of unprotected exposure recommended for sounds between 90–100 dB
Motorcycle		90 dBA	Very annoying (88 dB)
Average City Traffic Garbage Disposal	Moderately Loud	80 dBA	85 dB is the level at which hearing damage (8 hrs.) begins
Vacuum Cleaner, Hair Dryer		70 dBA	Intrusive; interferes with telephone conversation
Normal Conversation		60 dBA	Comfortable hearing levels (Under 60 dB)
Quiet Office	Quiet	50 dBA	
Refrigerator		40 dBA	
Whisper		30 dBA	Very quiet (30 dB)
Rustling Leaves	Very Quiet	20 dBA	Just audible (20 dB)
Normal Breathing		10 dBA	
		0 dBA	

Source: U.S. Department of Health and Human Services, National Institute on Deafness and Other Communication Disorders 2010; American Medical Association and the Canadian Hearing Society of Ontario; and National Institute on Deafness and Other Communication Disorders, National Institutes of Health, 1990.

Vehicular traffic is a major source of noise in the City.

PRINCIPAL NOISE SOURCES IN WALNUT

Since 1960, the State of California has published well-defined criteria that cities can use to make land use decisions relative to ambient noise conditions. Development in Walnut has occurred mostly post-1960, so local land use patterns have been designed to limit exposure of residential neighborhoods to significant noise sources. Walnut's predominant residential land use pattern, with plenty of open spaces, helps create a relatively noise-free environment. A key exception are the pre-1960s residential neighborhoods north of Valley Boulevard. However, increased noise from nearby rail traffic and regional traffic growth can be anticipated over time.

Trains

Trains can be a significant noise concern in the form of low, rumbling sounds that vibrate from the ground, as well as noise from horns and street crossing safety devices at all hours of the day. The Union Pacific Railroad (UP) runs through the City of Industry parallel to Valley Boulevard along Walnut's southern border. The rail line largely accommodates freight traffic, and no passenger service stops within Walnut.

At-grade rail crossings at Brea Canyon Drive, Lemon Avenue, and Fairway Drive—all immediately south of the City limits—mean that neighborhoods near Valley Boulevard are exposed to train horns and crossing gate bells both day and night. However, this corridor is designated as a "Quiet Zone," where train crews will not

Train moving along the southern city border

regularly sound horns at street crossings along Valley Boulevard while passing by the City's limits. (Train engineers may sound horns as necessary for public safety.) This restriction became effective in 2013 for both Union Pacific freight trains and Amtrak passenger trains. Improvements were made to intersections in the form of extra gates and traffic signals which reduces the need to sound the horns. Such improvements minimize the chance of vehicles getting struck by trains when operations are occurring within the "Quiet Zone."

The UP rail tracks are part of a regional and national route for goods movement, known as the Alameda Corridor (ACE) Trade Corridor, extending from the downtown Los Angeles rail yards through the Cajon Pass in San Bernardino County and into central and eastern Riverside County. The City can expect increased train travel along the route, resulting in more frequent noise.

Roadways

Street noise is usually the most prevalent noise source in any community and one of the most difficult to mitigate. The City's major arterials—Grand Avenue, Valley Boulevard, Amar Road, and Temple Avenue—carry significant daily traffic loads that consistently generate noise. The intersections at the Snow Creek Village shopping centers (Valley Boulevard/Grand Avenue) and Mt. San Antonio College (Grand Avenue/Amar Road) also create a noise environment that extends into the nearby neighborhoods. Also, during the time in which local schools are in session, drop-off and pick-up activity brings many cars and associated noise into and through residential neighborhoods.

Other Sources

Other sources of noise include non-transportation sounds such as those caused by stationary equipment (e.g., air conditioning units, yard work, and construction activity). Regulations to minimize excessive noise from non-transportation sources includes compliance with the Municipal Code's noise standards which seeks to limit certain noise-generating activity during evenings and early mornings. Advancements in technology that assist in the muffling of sounds also reduce noise from construction and stationary equipment.

In residential neighborhoods, common noise complaints—other than leaf blowers—focus on mechanical equipment such as pool motors and air conditioning units.

Automobile noise

Other noise sources

BASELINE NOISE MEASUREMENTS

To understand and document baseline (year 2017) noise conditions throughout the community, the City measured ambient noise levels at seven sites around Walnut that represent a variety of environments. These locations are shown on Figure N-2. Noise level measurements were taken for long-term (24 hours) and short term (15 minutes) during the daytime periodically in December of 2017.

Noise measurements serve as a snapshot of noise levels at a particular time and location, offering a sense of how other similar locations might experience noise during comparable times of the day. Table N-2 summarizes the long-term measurement results of noise monitoring at 12 locations. Table N-3 summarizes the short-term measurement results of noise monitoring at 20 locations. Figure N-3 indicates noise conditions in 2017 based on traffic volumes and the noise measurements made. The Citywide noise conditions are shown in the form of a CNEL noise contour map, with each contour band illustrating the noise exposure zones and land uses exposed to ambient noise levels of 65, 70, 75, and 80 CNEL.

Table N-2: Long-Term (24 Hours) Measurement Results (2017)

Measurement	Location	Primary Noise Source	CNEL (dBA)
L-1	Nogales Street, Curbside	Roadway	75.7
L-2	Shadow Oak Drive, Curbside	Roadway	65.2
L-3	Meadow Pass Road, Curbside	Roadway	66.6
L-4	Lemon Avenue, Curbside	Roadway	74.8
L-5	La Puente Road, Curbside	Roadway	72.3
L-6	Grand Avenue, Curbside	Roadway	74.2
L-7	Creekside Drive, Curbside	Roadway	65.1
L-8	Amar Road, Curbside	Roadway	73.6
L-9	Grand Avenue, Curbside	Roadway	75.1
L-10	La Puente Road, Curbside	Roadway	74.2
L-11	Valley Boulevard, Curbside	Roadway and Train	81.0
L-12	Valley Boulevard, Curbside	Roadway and Train	78.4

Note: Long-term measurements conducted between December 19, 2017 to December 21, 2017. Measurements L-1 to L-6 conducted on December 19 and December 20. Measurements L-7 to L-12 conducted on December 20 and December 21.

Source: Veneklausen Associates, 2017.

Table N-3: Short-Term Measurement Results (2017)

Measurement	Location	Date	Day	Time	Primary Road Source	Leq (dBA)
S-1	Grand Ave., Curbside	12/19/17	Tuesday	2:33pm – 2:46pm	Roadway	73.7
S-2	Grand Ave., Curbside	12/19/17	Tuesday	3:45pm – 3:56pm	Roadway	71.6
S-3	Pierre Rd., Curbside	12/19/17	Tuesday	4:20pm – 4:32pm	Roadway	65.5
S-4	Pierre Rd., Curbside	12/19/17	Tuesday	4:40pm – 4:52pm	Roadway	55.1
S-5	Meadow Pass Rd., Curbside	12/19/17	Tuesday	4:57pm – 5:09pm	Roadway	61.8
S-6	Lemon Ave., Curbside	12/19/17	Tuesday	5:14pm – 5:26pm	Roadway	65.9
S-7	Lemon Ave., Curbside	12/19/17	Tuesday	5:38pm – 5:39pm	Roadway	68.1
S-8	La Puente Rd., Curbside	12/19/17	Tuesday	5:57pm – 6:09pm	Roadway	71.5
S-9	Nogales St., Curbside	12/19/17	Tuesday	6:19pm – 6:30pm	Roadway	72.6
S-10	Valley Blvd., Curbside	12/21/17	Wednesday	2:38pm – 2:39pm	Roadway	73.3
S-11	Valley Blvd., Curbside	12/21/17	Wednesday	2:55pm – 3:06pm	Roadway	75.8
S-12	Valley Blvd., Curbside	12/21/17	Wednesday	3:12pm – 3:24pm	Roadway	75.3
S-13	Castlehill Dr., Curbside	12/21/17	Wednesday	3:30pm – 3:42pm	Roadway, Train	64.4
S-14	Carrey Rd., Curbside	12/21/17	Wednesday	3:49pm – 4:00pm	Roadway	68.2
S-15	Creekside Dr., Curbside	12/21/17	Wednesday	4:08pm – 4:19pm	Roadway	62.7
S-16	Amar Rd., Curbside	12/21/17	Wednesday	4:24pm – 4:35pm	Roadway	71.8
S-17	Amar Rd., Curbside	12/21/17	Wednesday	4:39pm – 4:50pm	Roadway	68.0
S-18	Temple Ave., Curbside	12/21/17	Wednesday	4:56pm – 5:07pm	Roadway	71.7
S-19	Grand Ave., Curbside	12/21/17	Wednesday	5:14pm – 5:25pm	Roadway	71.1
S-20	San Jose Hills Rd., Curbside	12/21/17	Wednesday	5:30pm – 5:42pm	Roadway	63.9

Source: Veneklasen Associates, 2017.

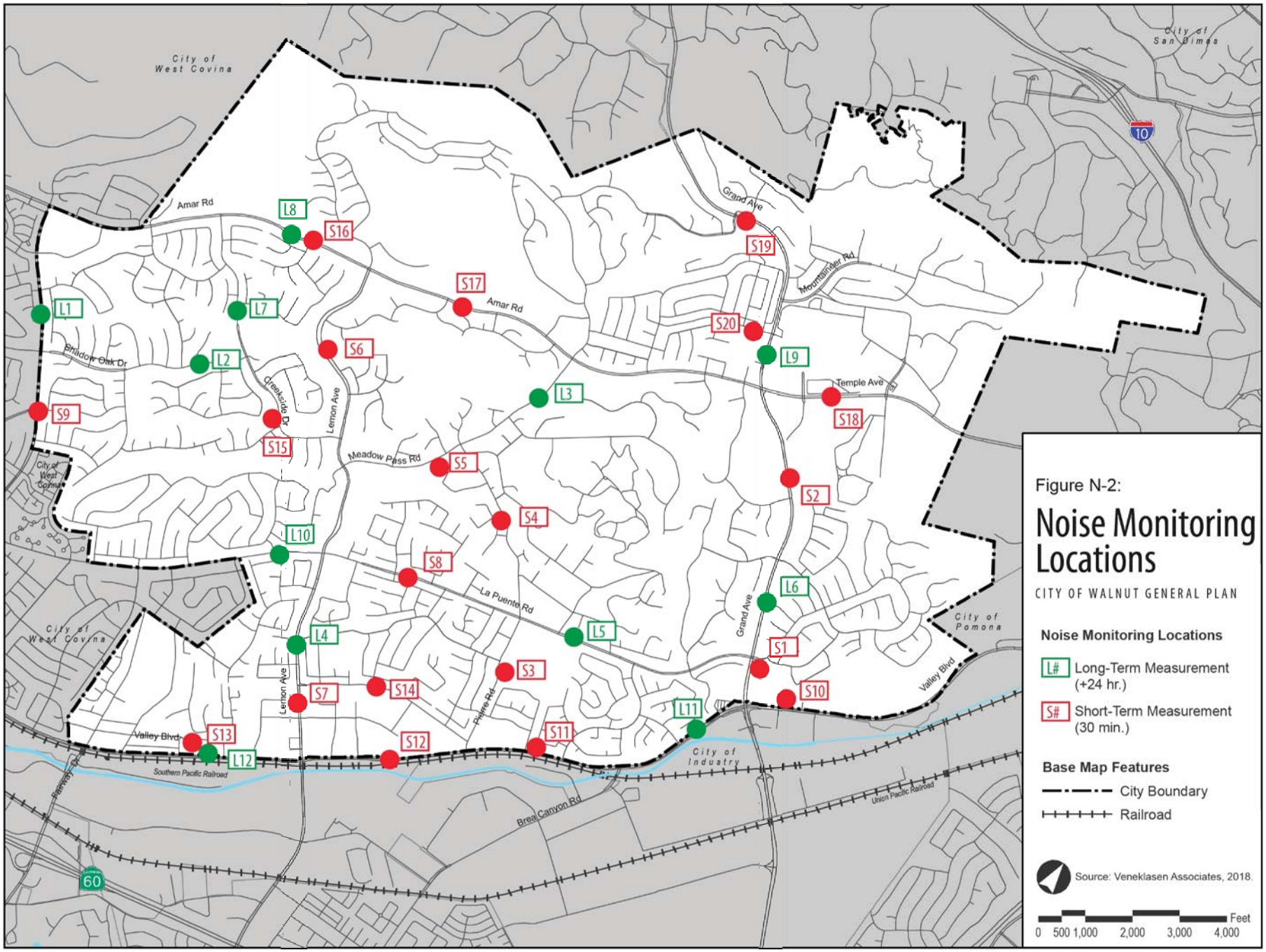


Figure N-2:

Noise Monitoring Locations

CITY OF WALNUT GENERAL PLAN

Noise Monitoring Locations

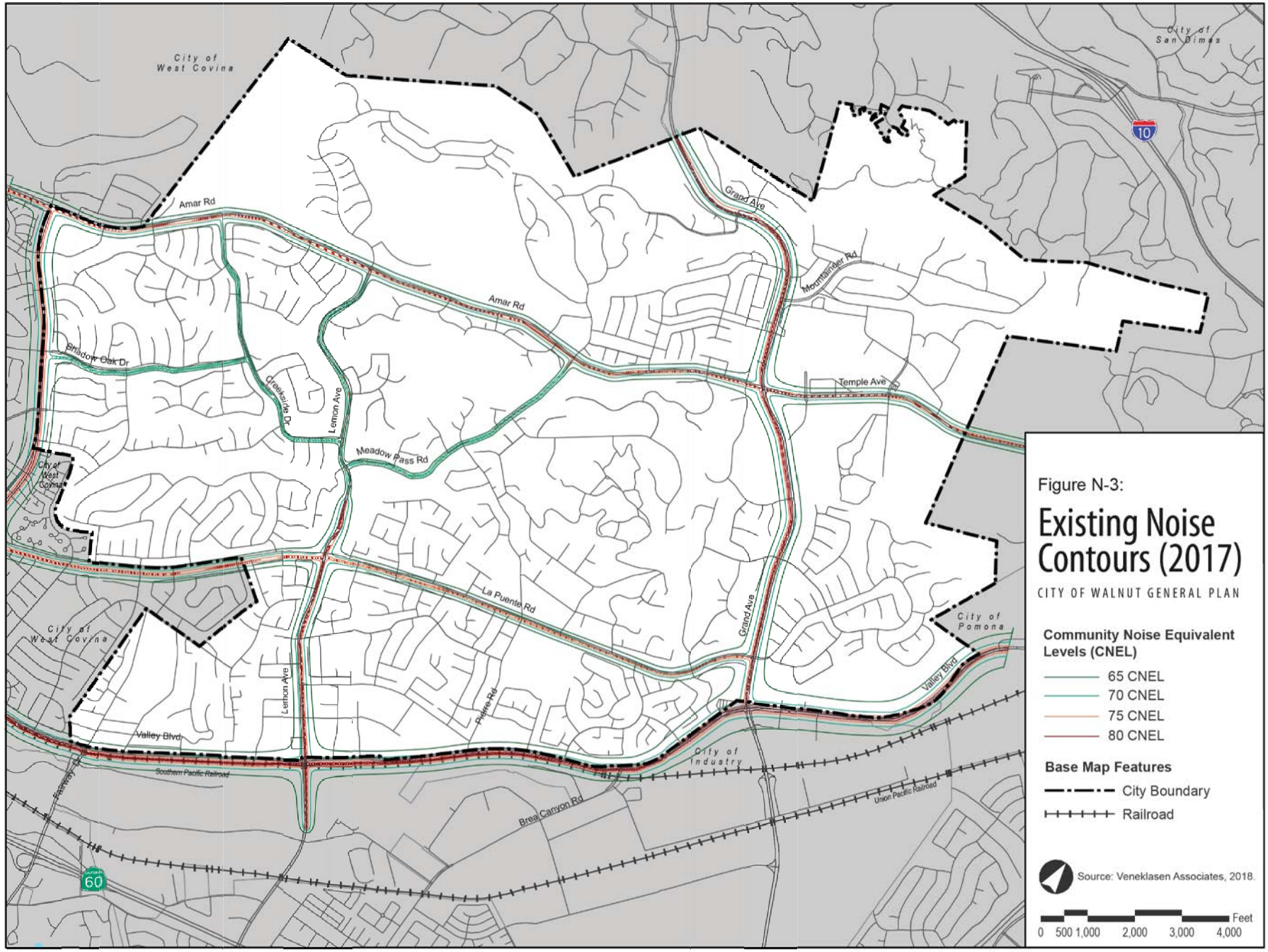
- L# Long-Term Measurement (+24 hr.)
- S# Short-Term Measurement (30 min.)

Base Map Features

- City Boundary
- Railroad

Source: Veneklasen Associates, 2018.

0 500 1,000 2,000 3,000 4,000 Feet


City of West Covina
City of San Dimas
Amar Rd
Grand Ave
Mountaineer Rd
Temple Ave
Shadow Oak Dr
Greenside Dr
Lemon Ave
Meadow Pass Rd
La Puente Rd
City of Pomona
Valley Blvd
Pierre Rd
City of Industry
Southern Pacific Railroad
Union Pacific Railroad
Brea Canyon Rd
Fairway Dr
60
10
Figure N-3:
Existing Noise Contours (2017)
CITY OF WALNUT GENERAL PLAN
Community Noise Equivalent Levels (CNEL)
65 CNEL
70 CNEL
75 CNEL
80 CNEL
Base Map Features
City Boundary
Railroad
Source: Veneklasen Associates, 2018.
0 500 1,000 2,000 3,000 4,000
Feet

Noise Modeling Results

Ambient and lowest noise levels, in terms of dBA, were measured for all major roadways. Long and short-term measurements throughout the City, in terms of the 24-hour CNEL descriptor, indicate that roadway traffic is the most significant source of noise. Based on the traffic-noise modeling, the roadways in the City with the greatest modeled traffic-noise levels include:

- Valley Boulevard
- Grand Avenue
- Lemon Avenue
- Amar Road
- Temple Avenue
- La Puente Road
- Nogales Street

Residential land uses closest to these road segments are currently exposed to noise levels at or below 70 dBA CNEL.

In addition to traffic noise on local roadways, freight trains traveling on the Union Pacific Railroad line that runs along Valley Boulevard in the City of Industry also contribute to community noise levels.

MAINTAINING A HEALTHY NOISE ENVIRONMENT: LOOKING FORWARD

The City will continue to make land use decisions with noise concerns as a high priority. The key concerns will continue to be roadway and railroad noise. Also, with the introduction of mixed-use development and allowances for residential use along West Valley Boulevard, considering new land use/noise compatibility standards are appropriate.

Land Use Compatibility

The California Office of Planning and Research (OPR) *General Plan Guidelines 2017* has established guidelines for land use/noise compatibility using four categories for judging the severity of noise intrusion on specified land uses. Consistent with these guidelines, Walnut has adopted the following criteria for exterior noise levels:

- normally acceptable
- conditionally acceptable
- normally unacceptable
- clearly unacceptable

A "conditionally acceptable" condition requires that detailed analysis of the noise reduction requirements be conducted for proposed new development, and that noise mitigation be incorporated into site and building design. By comparison, a "normally acceptable" condition indicates that standard construction can occur without a need for any special noise attenuation.

One of the most important considerations for Walnut is to protect existing and proposed residential neighborhoods from new noise intrusions. Careful review of site design and operational characteristics of proposed commercial uses will allow the City to address site-specific noise concerns through design and operational conditions applied to individual projects; including any development along Valley Boulevard.

Figure N-4 establishes the noise criteria adapted from the OPR's General Plan Guidelines to reflect Walnut's land uses to be used in the review of development proposals. Figure N-5 illustrates future noise contours Citywide based projected future traffic volumes along major roadways. The future noise contours are similar to the 2017 baseline contours (Figure N-3) because the City is largely built out and land use policy implementation will not lead to significant increases in local traffic volumes. The key areas where noise exposure zones can be expected to expand are to be completed when future noise contour mapping is complete.

The noise model used to create the future contours does not account for a future in which electric vehicles may be the norm rather than the exception. Electric vehicles do generate road noise from tires, but the contribution of engine noise can be expected to be substantially reduced.

Mixed-use designations apply to two areas that historically have supported only commercial and industrial uses: West Valley Boulevard and Walnut Hills Plaza (see Figure LCD-8 in the Land Use and Community Design Element). Noise control to address the residential/commercial interface in mixed-use projects relies upon building code standards and the careful selection of appropriate and compatible commercial uses via zoning regulations. For commercial uses, the City may require limited delivery hours and/or hours of operation to minimize impacts to adjacent residential uses.

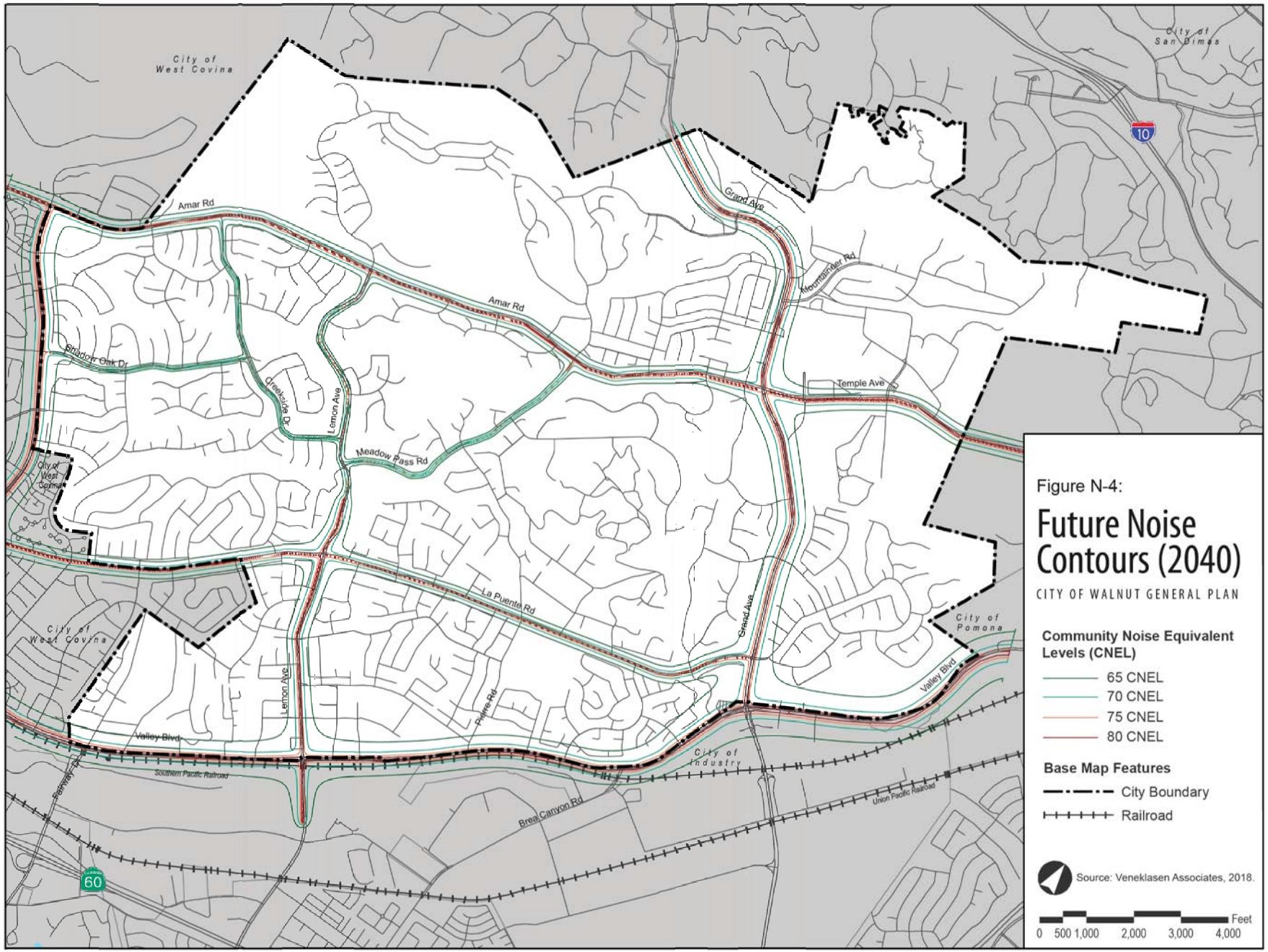
Noise associated with special one-time or regularly occurring special events—particularly outdoors and/or at City parks—are easily addressed through the City's Noise Ordinance. In addition, all City departments must comply with State and Federal Occupational Safety and Health Administration (OSHA) standards. Any new equipment or vehicles purchased by the City will comply with local, State, and Federal noise standards.

Table N-4: Land Use Compatibility for Community Noise Environments

Land Use Category	Community Noise Equivalent (CNEL), dB						
	55	60	65	70	75	80	85
Very Low-and Low-Density Residential							
Low Medium-Density Residential							
Medium-Density Residential							
Mixed Use							
Commercial							
Industrial							
Schools and Public Institutional							
Parks and Open Space							

Key			
Normally Acceptable	Conditionally Acceptable	Normally Unacceptable	Clearly Unacceptable
Specified land use is satisfactory, assuming buildings are of conventional construction	New development should be undertaken only after detailed analysis of noise reduction requirements are made.	New development should be generally discouraged, if not, a detailed analysis of noise reduction requirements must be made.	New development should generally not be undertaken

Source: Governor's Office of Planning and Research. 2017. *State of California General Plan Guidelines*. Appendix D, Noise Element Guidelines, Figure 2. Sacramento, CA.


City of West Covina
City of San Dimas
Amar Rd
Grand Ave
Bloomfield Rd
Temple Ave
Shadow Oak Dr
Creekside Dr
Lemon Ave
Meadow Pass Rd
La Puente Rd
Valley Blvd
Fairway Dr
Southern Pacific Railroad
Brea Canyon Rd
Union Pacific Railroad
City of Industry
City of Pomona
10
60
Figure N-4:
Future Noise Contours (2040)
CITY OF WALNUT GENERAL PLAN
Community Noise Equivalent Levels (CNEL)
65 CNEL
70 CNEL
75 CNEL
80 CNEL
Base Map Features
City Boundary
Railroad
Source: Veneklasen Associates, 2018.
Feet
0 500 1,000 2,000 3,000 4,000

Transportation Noise Mitigation

Since mobile noise sources (cars, trucks, and trains) are not under the City's control, the most common ways to reduce transportation-related noise impacts are through the following but not limited to:

- Site planning
- Landscaping
- The use of natural topography as a barrier
- The design and construction of noise barriers
- Compliance with State standards for interior noise environments for existing and new residential development

GOALS AND POLICIES

The City of Walnut aims to protect residents' quality of life by maintaining an environment with little excessive or harmful noise. This includes minimizing point-source and ambient noise as well as transportation-related noise. Walnut will identify current and future sources of noise so that future land uses can be organized, and new development can be adequately designed in a manner that minimizes noise impacts on residents and businesses.

GOAL N-1: Quiet neighborhoods

Coordinate the City's land use policies promoting a small-town ambience with the appropriate measures to control, and to measure noise impacts.

Policy N-1.1: Land Use/Project Evaluation

Use the Land Use Compatibility for Community Noise Environments scale (Figure N-4), the Future Noise Contour Map (Figure N-5,) and the WMC to evaluate land use decisions to mitigate unnecessary noise impacts or discourage further unmitigated noise-inducing developments.

Policy N-1.2: Dynamic Noise Evaluation

Continue to refine noise standards responsive to seasonal variations in noise source levels, existing outdoor ambient levels (i.e., relative intrusiveness of the source), general societal attitudes towards the noise source, prior history of the source, tonal characteristics of the source, and qualitative community-equivalent standards.

Policy N-1.3: Minimize Noise Impacts

Minimize noise impacts in the community to ensure that noise does not detract from Walnut's quality of life.

Policy N-1.4: Code Tools to Minimize Noise

Continue to use established code regulations that help minimize noise. Encourage continued use of zoning regulations, design review, and environmental assessment to implement and develop further effective noise policies.

Policy N-1.5: Commercial Delivery Areas

Locate delivery areas for new commercial and industrial development away from existing or planned homes.

Policy N-1.6: Stationary Noise Sources

Minimize stationary noise impacts on sensitive receptors, and require control of noise from construction activities, private developments/ residences, landscaping activities, and special events.

Policy N-1.7: Noise Mitigation

Require development projects to implement mitigation measures, where necessary, to reduce noise levels to meet adopted standards and criteria. Such measures may include, but are not limited to, berms, walls, and sound-attenuating architectural design and construction methods.

Policy N-1.8: Mixed Use

Require that mixed-use structures and areas be designed to minimize the transfer of noise from commercial uses to residential uses.

Policy N-1.9: Industrial Uses and Equipment

Require analysis and implementation of techniques to control the effects of noise from industrial sources, utilities, and mechanical equipment.

GOAL N-2: Minimize transportation noise and vibration

Monitor and regulate impact of transportation-related sources of noise located within and adjacent to the City's boundaries.

Policy N-2.1: Quiet Zones

Continue to support and lobby for programs that establish limitations on train horns via "Quiet Zones" for neighborhoods within the vicinity of a railroad track.

Policy N-2.2: Traffic-calming Solutions to Street Noise

Evaluate solutions to discourage through traffic in neighborhoods through noise-attenuating roadway materials and modifications to street design.

Policy N-2.3: Trucks

Designate a system of truck routes on specified arterial streets to minimize the negative impacts of trucking through the City.

Policy N-2.4: Urban Freight

Continue to review developments for noise-minimizing loading and logistics site planning and delivery

Policy N-2.5: Regional Railroad Projects

Continue to support projects that minimize impacts on residents, improve traffic conditions, and reduce train horns and noise.

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CONSTRUCTION NOISE MODELING

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 08/16/2023
Case Description: COW-05

**** Receptor #1 ****

Baselines (dBA)

Description	Land Use	Daytime	Evening	Night
Architectural Coating	Residential	60.0	55.0	50.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Compressor (air)	No	40		77.7	50.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA) Day		Evening		Night		Noise Limit Exceedance (dBA) Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Compressor (air)	77.7	73.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	77.7	73.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 08/16/2023
Case Description: COW-05

**** Receptor #1 ****

Baselines (dBA)

Description	Land Use	Daytime	Evening	Night
Building and Demolition	Residential	60.0	55.0	50.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Concrete Saw	No	20		89.6	50.0	0.0
Excavator	No	40		80.7	50.0	0.0
Front End Loader	No	40		79.1	50.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA)				Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Concrete Saw	89.6	82.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	80.7	76.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	79.1	75.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	89.6	84.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 08/16/2023
Case Description: COW-05

**** Receptor #1 ****

Baselines (dBA)

Description	Land Use	Daytime	Evening	Night
Building Construction	Residential	60.0	55.0	50.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Crane	No	16	80.6	50.0	0.0	
Front End Loader	No	40	79.1	50.0	0.0	
Tractor	No	40	84.0	50.0	0.0	

Results

	Calculated (dBA)		Noise Limits (dBA)				Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Crane	80.6	72.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	79.1	75.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	84.0	80.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	84.0	81.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 08/16/2023
Case Description: COW-05

**** Receptor #1 ****

Baselines (dBA)

Description	Land Use	Daytime	Evening	Night
Fine Grading	Residential	60.0	55.0	50.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Front End Loader	No	40		79.1	50.0	0.0
Dozer	No	40		81.7	50.0	0.0
Tractor	No	40		84.0	50.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA)				Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Front End Loader	79.1	75.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	81.7	77.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	84.0	80.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	84.0	82.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 08/16/2023
Case Description: COW-05

**** Receptor #1 ****

Baselines (dBA)

Description	Land Use	Daytime	Evening	Night
Finishing/Landscaping	Residential	60.0	55.0	50.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Excavator	No	40		80.7	50.0	0.0
Tractor	No	40		84.0	50.0	0.0
Front End Loader	No	40		79.1	50.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA)				Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Excavator	80.7	76.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	84.0	80.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	79.1	75.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	84.0	82.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 08/16/2023
Case Description: COW-05

**** Receptor #1 ****

Baselines (dBA)

Description	Land Use	Daytime	Evening	Night
Paving	Residential	60.0	55.0	50.0

Equipment

Description	Impact Device	Spec Usage (%)	Actual Lmax (dBA)	Receptor Lmax (dBA)	Estimated Distance (feet)	Shielding (dBA)
Roller	No	20	80.0	50.0		0.0
Pavement Scarafier	No	20	89.5	50.0		0.0
Front End Loader	No	40	79.1	50.0		0.0

Results

	Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
	Calculated (dBA)		Day		Evening		Night		Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Roller	80.0	73.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pavement Scarafier	89.5	82.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	79.1	75.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	89.5	83.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 08/16/2023
Case Description: COW-05

**** Receptor #1 ****

Baselines (dBA)

Description	Land Use	Daytime	Evening	Night
Rough Grading	Residential	60.0	55.0	50.0

Equipment

Description	Impact Device	Spec Usage (%)	Actual Lmax (dBA)	Receptor Lmax (dBA)	Estimated Distance (feet)	Shielding (dBA)
Excavator	No	40	80.7	50.0		0.0
Dozer	No	40	81.7	50.0		0.0
Scraper	No	40	83.6	50.0		0.0

Results

	Calculated (dBA)		Noise Limits (dBA)				Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Excavator	80.7	76.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	81.7	77.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Scraper	83.6	79.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	83.6	82.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 08/16/2023
Case Description: COW-05

**** Receptor #1 ****

Baselines (dBA)

Description	Land Use	Daytime	Evening	Night
Site Preparation	Residential	60.0	55.0	50.0

Equipment

Description	Impact Device	Spec Usage (%)	Actual Lmax (dBA)	Receptor Lmax (dBA)	Estimated Distance (feet)	Shielding (dBA)
Dozer	No	40	81.7	50.0	0.0	
Tractor	No	40	84.0	50.0	0.0	
Front End Loader	No	40	79.1	50.0	0.0	

Results

	Calculated (dBA)		Noise Limits (dBA)				Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Dozer	81.7	77.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	84.0	80.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	79.1	75.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	84.0	82.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 08/16/2023
Case Description: COW-05

**** Receptor #1 ****

Baselines (dBA)

Description	Land Use	Daytime	Evening	Night
Utility Trenching	Residential	60.0	55.0	50.0

Equipment

Description	Impact Device	Spec Usage (%)	Actual Lmax (dBA)	Receptor Lmax (dBA)	Estimated Distance (feet)	Shielding (dBA)
Excavator	No	40	80.7	50.0	0.0	
Front End Loader	No	40	79.1	50.0	0.0	
Tractor	No	40	84.0	50.0	0.0	

Results

	Calculated (dBA)		Noise Limits (dBA)				Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Excavator	80.7	76.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	79.1	75.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	84.0	80.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	84.0	82.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

COW-05 - Construction Noise Modeling Attenuation Calculations

Levels in dBA Leq

Phase	RCNM Reference Noise Level	Single-Family Residence to the North at 20600 Fuero Drive	Animal Hospital of Walnut to the East at 20670 E, Carrey Road	Single-Family Residence to the Southeast at 476 S Lemon Avenue	Single-Family Residence to the Northwest at 20332 Carrey Road
Distance in feet	*50*	*1575*	*1580*	*1370*	*920*
Building and Asphalt Demolition	84.0	54.0	54.0	55.2	58.7
Site Prep	83.0	53.0	53.0	54.2	57.7
Rough and Fine Grading	83.0	53.0	53.0	54.2	57.7
Distance in feet	*50*	*960*	*870*	*990*	*545*
Building Construction	82.0	56.3	57.2	56.1	61.3
Architectural Coating	74.0	48.3	49.2	48.1	53.3
Rock Crushing	83.0	57.3	58.2	57.1	62.3
Distance in feet	*50*	*900*	*815*	*900*	*600*
Paving	84.0	58.9	59.8	58.9	62.4
Distance in feet	*50*	*840*	*720*	*780*	*515*
Finish/Landscaping	83.0	58.5	59.8	59.1	62.7
Utility Trenching	83.0	58.5	59.8	59.1	62.7

Attenuation calculated through Inverse Square Law: Lp(R2) = Lp(R1) - 20Log(R2/R1)

COW-05 - Construction Noise Modeling Attenuation Calculations

	Reference Noise Level	Receptor to North
Distance in feet	*3*	*515*
HVAC	72.0	27.0

Attenuation calculated through Inverse Square Law: Lp(R2) = Lp(R1)

COW-05 - Vibration Damage Attenuation Calculations

Levels, PPV (in/sec)

Distance in feet	**Vibration Reference Level at *25 feet***	**Commercial Building to the North at 20301 Paseo Del Prado** *80*	**Commercial Building to the East at 20513 Valley Boulevard** *60*	**Commercial Building to the South at 20401 Valley Boulevard** *75*	**Commercial Building to the West at 353 South Lemon Avenue** *190*
Vibratory Roller	0.21	0.037	0.056	0.040	0.010
Clam shovel	0.202	0.035	0.054	0.039	0.010
Hoe Ram	0.089	0.016	0.024	0.017	0.004
Large Bulldozer	0.089	0.016	0.024	0.017	0.004
Caisson Drilling	0.089	0.016	0.024	0.017	0.004
Loaded Trucks	0.076	0.013	0.020	0.015	0.004
Jackhammer	0.035	0.006	0.009	0.007	0.002
Small Bulldozer	0.003	0.001	0.001	0.001	0.000

COW-05 - Vibration Annoyance Attenuation Calculations

Levels in VdB

Equipment *Distance in feet*	Vibration @ 25 ft	Single-Family Residence to the North at 20600 Fuero Drive *840*	Animal Hospital of Walnut to the East at 20670 E, Carrey Road *720*	Single-Family Residence to the Southeast at 476 S Lemon Avenue *780*	Single-Family Residence to the Northwest at 20332 Carrey Road *515*
Vibratory Roller	94.0	48.2	50.2	49.2	54.6
Clam Shovel	94.0	48.2	50.2	49.2	54.6
Hoe Ram	87.0	41.2	43.2	42.2	47.6
Large Bulldozer	87.0	41.2	43.2	42.2	47.6
Caisson Drilling	87.0	41.2	43.2	42.2	47.6
Loaded Trucks	86.0	40.2	42.2	41.2	46.6
Jackhammer	79.0	33.2	35.2	34.2	39.6
Small Bulldozer	58.0	12.2	14.2	13.2	18.6

TRAFFIC NOISE MODELING

Traffic Noise Calculator: FHWA 77-108 **Walnut Creek Business Park Project (COW-05.0) Existing**

	Output						Inputs													Auto Inputs	
	dBA at 50 feet			Distance to CNEL Contour																	
ID	$L_{eq\text{-}24hr}$	L_{dn}	CNEL	70 dBA	65 dBA	60 dBA	Roadway	Segment From	Segment To	ADT	Posted Speed Limit	Grade	% Autos	% Med Trucks	% Heavy Trucks	% Daytime	% Evening	% Night	Number of Lanes	Site Condition	Distance to Reciever	Ground Absorption	Lane Distance
1	66.4	70	70.5	109	234	504	Valley Blvd	from the West	Camino De Teodoro/Fairway Dr	24,710	50	0.0%	95.0%	2.0%	3.0%	75.0%	10.0%	15.0%	5	Soft	100	0.5	56
2	66.4	70	70.5	109	234	504	Valley Blvd	Camino De Teodoro/Fairway Dr	Lemon Ave	24,690	50	0.0%	95.0%	2.0%	3.0%	75.0%	10.0%	15.0%	5	Soft	100	0.5	56
3	67.7	71	71.8	132	283	610	Valley Blvd	Lemon Ave	Paseo Sonrisa	32,900	50	0.0%	95.0%	2.0%	3.0%	75.0%	10.0%	15.0%	5	Soft	100	0.5	56
4	66.0	70	70.0	101	217	467	Valley Blvd	Paseo Sonrisa	Paseo Tesoro	22,040	50	0.0%	95.0%	2.0%	3.0%	75.0%	10.0%	15.0%	5	Soft	100	0.5	56
5	66.1	70	70.2	103	221	477	Valley Blvd	Paseo Tesoro	Pierre Rd	22,720	50	0.0%	95.0%	2.0%	3.0%	75.0%	10.0%	15.0%	5	Soft	100	0.5	56
6	66.7	70	70.8	114	245	527	Valley Blvd	Pierre Rd	S Brea Canyon Rd	26,410	50	0.0%	95.0%	2.0%	3.0%	75.0%	10.0%	15.0%	5	Soft	100	0.5	56
7	68.0	72	72.1	137	296	637	Valley Blvd	S Brea Canyon Rd	to the East	35,090	50	0.0%	95.0%	2.0%	3.0%	75.0%	10.0%	15.0%	5	Soft	100	0.5	56
8	61.5	65	65.6	51	109	235	Lemon Ave	from the North	Paseo Del Prado	12,810	40	0.0%	95.0%	2.0%	3.0%	75.0%	10.0%	15.0%	4	Soft	100	0.5	44
9	61.4	65	65.5	50	108	232	Lemon Ave	Paseo Del Prado	Valley Blvd	12,570	40	0.0%	95.0%	2.0%	3.0%	75.0%	10.0%	15.0%	4	Soft	100	0.5	44
10	64.6	68	68.7	82	178	383	Lemon Ave	Valley Blvd	to the South	26,670	40	0.0%	95.0%	2.0%	3.0%	75.0%	10.0%	15.0%	4	Soft	100	0.5	44
11	50.4	54	54.4	9	20	43	Paseo Del Prado	Lemon Ave	Paseo Sonrisa	2,370	25	0.0%	95.0%	2.0%	3.0%	75.0%	10.0%	15.0%	2	Soft	100	0.5	20
12	45.0	49	49.1	4	9	19	Paseo Del Prado	Paseo Sonrisa	Paseo Tesoro	690	25	0.0%	95.0%	2.0%	3.0%	75.0%	10.0%	15.0%	2	Soft	100	0.5	20
13	44.9	49	49.0	4	9	19	Paseo Sonrisa	Valley Blvd	Paseo Del Prado	680	25	0.0%	95.0%	2.0%	3.0%	75.0%	10.0%	15.0%	2	Soft	100	0.5	20
14	45.4	49	49.5	4	9	20	Paseo Tesoro	Valley Blvd	Paseo Del Prado	750	25	0.0%	95.0%	2.0%	3.0%	75.0%	10.0%	15.0%	2	Soft	100	0.5	20
15	62.2	66	66.3	57	122	263	Fairway Dr	Valley Blvd	to the South	15,200	40	0.0%	95.0%	2.0%	3.0%	75.0%	10.0%	15.0%	4	Soft	100	0.5	44

Traffic Noise Calculator: FHWA 77-108 **Walnut Creek Business Park Project (COW-05.0) Opening Year (2026) No Project**

	Output						Inputs														Auto Inputs	
	dBA at 50 feet			Distance to CNEL Contour				Segment														
ID	$L_{eq\text{-}24hr}$	L_{dn}	CNEL	70 dBA	65 dBA	60 dBA	Roadway	From - To		ADT	Posted Speed Limit	Grade	% Autos	% Med Trucks	% Heavy Trucks	% Daytime	% Evening	% Night	Number of Lanes	Site Condition	Distance to Reciever	Ground Absorption	Lane Distance
1	66.5	70.2	70.6	109	236	508	Valley Blvd	from the West	Camino De Teodoro/Fairway Dr	24,950	50	0	0.95	0.02	0.03	0.75	0.1	0.15	5	Soft	100	0.5	56
2	66.4	70.1	70.5	108	232	501	Valley Blvd	Camino De Teodoro/Fairway Dr	Lemon Ave	24,450	50	0	0.95	0.02	0.03	0.75	0.1	0.15	5	Soft	100	0.5	56
3	66.3	70.0	70.4	106	228	492	Valley Blvd	Lemon Ave	Paseo Sonrisa	23,820	50	0	0.95	0.02	0.03	0.75	0.1	0.15	5	Soft	100	0.5	56
4	66.0	69.7	70.1	101	218	471	Valley Blvd	Paseo Sonrisa	Paseo Tesoro	22,270	50	0	0.95	0.02	0.03	0.75	0.1	0.15	5	Soft	100	0.5	56
5	66.1	69.8	70.2	103	223	480	Valley Blvd	Paseo Tesoro	Pierre Rd	22,960	50	0	0.95	0.02	0.03	0.75	0.1	0.15	5	Soft	100	0.5	56
6	66.9	70.6	70.9	116	249	537	Valley Blvd	Pierre Rd	S Brea Canyon Rd	27,130	50	0	0.95	0.02	0.03	0.75	0.1	0.15	5	Soft	100	0.5	56
7	68.1	71.8	72.2	140	302	651	Valley Blvd	S Brea Canyon Rd	to the East	36,260	50	0	0.95	0.02	0.03	0.75	0.1	0.15	5	Soft	100	0.5	56
8	61.5	65.2	65.6	51	110	236	Lemon Ave	from the North	Paseo Del Prado	12,920	40	0	0.95	0.02	0.03	0.75	0.1	0.15	4	Soft	100	0.5	44
9	61.4	65.1	65.5	50	108	233	Lemon Ave	Paseo Del Prado	Valley Blvd	12,680	40	0	0.95	0.02	0.03	0.75	0.1	0.15	4	Soft	100	0.5	44
10	62.7	66.4	66.7	61	131	282	Lemon Ave	Valley Blvd	to the South	16,830	40	0	0.95	0.02	0.03	0.75	0.1	0.15	4	Soft	100	0.5	44
11	50.4	54.1	54.4	9	20	43	Paseo Del Prado	Lemon Ave	Paseo Sonrisa	2,370	25	0	0.95	0.02	0.03	0.75	0.1	0.15	2	Soft	100	0.5	20
12	45.0	48.7	49.1	4	9	19	Paseo Del Prado	Paseo Sonrisa	Paseo Tesoro	690	25	0	0.95	0.02	0.03	0.75	0.1	0.15	2	Soft	100	0.5	20
13	44.9	48.6	49.0	4	9	19	Paseo Sonrisa	Valley Blvd	Paseo Del Prado	680	25	0	0.95	0.02	0.03	0.75	0.1	0.15	2	Soft	100	0.5	20
14	45.4	49.1	49.5	4	9	20	Paseo Tesoro	Valley Blvd	Paseo Del Prado	750	25	0	0.95	0.02	0.03	0.75	0.1	0.15	2	Soft	100	0.5	20
15	62.2	65.9	66.3	57	123	264	Fairway Dr	Valley Blvd	to the South	15,290	40	0	0.95	0.02	0.03	0.75	0.1	0.15	4	Soft	100	0.5	44

Traffic Noise Calculator: FHWA 77-108 **Walnut Creek Business Park Project (COW-05.0) Opening Year (2026) With Project**

	Output						Inputs														Auto Inputs	
	dBA at 50 feet			Distance to CNEL Contour				Segment														
ID	$L_{eq\text{-}24hr}$	L_{dn}	CNEL	70 dBA	65 dBA	60 dBA	Roadway	From - To		ADT	Posted Speed Limit	Grade	% Autos	% Med Trucks	% Heavy Trucks	% Daytime	% Evening	% Night	Number of Lanes	Site Condition	Distance to Reciever	Ground Absorption	Lane Distance
1	66.5	70.2	70.6	110	237	510	Valley Blvd	from the West	Camino De Teodoro/Fairway Dr	25,130	50	0	0.95	0.02	0.03	0.75	0.1	0.15	5	Soft	100	0.5	56
2	66.5	70.2	70.6	109	235	507	Valley Blvd	Camino De Teodoro/Fairway Dr	Lemon Ave	24,930	50	0	0.95	0.02	0.03	0.75	0.1	0.15	5	Soft	100	0.5	56
3	66.4	70.1	70.5	107	232	499	Valley Blvd	Lemon Ave	Paseo Sonrisa	24,300	50	0	0.95	0.02	0.03	0.75	0.1	0.15	5	Soft	100	0.5	56
4	66.1	69.8	70.2	103	221	477	Valley Blvd	Paseo Sonrisa	Paseo Tesoro	22,710	50	0	0.95	0.02	0.03	0.75	0.1	0.15	5	Soft	100	0.5	56
5	66.2	69.9	70.3	105	225	485	Valley Blvd	Paseo Tesoro	Pierre Rd	23,330	50	0	0.95	0.02	0.03	0.75	0.1	0.15	5	Soft	100	0.5	56
6	67.0	70.7	71.1	118	255	549	Valley Blvd	Pierre Rd	S Brea Canyon Rd	28,070	50	0	0.95	0.02	0.03	0.75	0.1	0.15	5	Soft	100	0.5	56
7	68.3	72.0	72.3	143	309	666	Valley Blvd	S Brea Canyon Rd	to the East	37,470	50	0	0.95	0.02	0.03	0.75	0.1	0.15	5	Soft	100	0.5	56
8	61.8	65.5	65.9	53	115	248	Lemon Ave	from the North	Paseo Del Prado	13,900	40	0	0.95	0.02	0.03	0.75	0.1	0.15	4	Soft	100	0.5	44
9	61.5	65.2	65.5	50	109	234	Lemon Ave	Paseo Del Prado	Valley Blvd	12,770	40	0	0.95	0.02	0.03	0.75	0.1	0.15	4	Soft	100	0.5	44
10	62.6	66.3	66.7	60	130	280	Lemon Ave	Valley Blvd	to the South	16,680	40	0	0.95	0.02	0.03	0.75	0.1	0.15	4	Soft	100	0.5	44
11	50.6	54.3	54.7	10	21	44	Paseo Del Prado	Lemon Ave	Paseo Sonrisa	2,520	25	0	0.95	0.02	0.03	0.75	0.1	0.15	2	Soft	100	0.5	20
12	45.5	49.2	49.6	4	9	20	Paseo Del Prado	Paseo Sonrisa	Paseo Tesoro	780	25	0	0.95	0.02	0.03	0.75	0.1	0.15	2	Soft	100	0.5	20
13	47.1	50.8	51.2	6	12	26	Paseo Sonrisa	Valley Blvd	Paseo Del Prado	1,120	25	0	0.95	0.02	0.03	0.75	0.1	0.15	2	Soft	100	0.5	20
14	47.1	50.8	51.2	6	12	26	Paseo Tesoro	Valley Blvd	Paseo Del Prado	1,120	25	0	0.95	0.02	0.03	0.75	0.1	0.15	2	Soft	100	0.5	20
15	62.3	66.0	66.4	57	124	267	Fairway Dr	Valley Blvd	to the South	15,520	40	0	0.95	0.02	0.03	0.75	0.1	0.15	4	Soft	100	0.5	44

Traffic Noise Calculator: FHWA 77-108 **Walnut Creek Business Park Project (COW-05.0) Opening Year (2026) With Project - Mixed Use Scenario**

	Output						Inputs														Auto Inputs	
	dBA at 50 feet			Distance to CNEL Contour				Segment														
ID	$L_{eq\text{-}24hr}$	L_{dn}	CNEL	70 dBA	65 dBA	60 dBA	Roadway	From - To		ADT	Posted Speed Limit	Grade	% Autos	% Med Trucks	% Heavy Trucks	% Daytime	% Evening	% Night	Number of Lanes	Site Condition	Distance to Reciever	Ground Absorption	Lane Distance
1	66.6	70.3	70.7	111	238	514	Valley Blvd	from the West	Camino De Teodoro/Fairway Dr	25,401	50	0	0.95	0.02	0.03	0.75	0.1	0.15	5	Soft	100	0.5	56
2	66.6	70.3	70.7	111	239	515	Valley Blvd	Camino De Teodoro/Fairway Dr	Lemon Ave	25,503	50	0	0.95	0.02	0.03	0.75	0.1	0.15	5	Soft	100	0.5	56
3	66.5	70.2	70.6	109	236	508	Valley Blvd	Lemon Ave	Paseo Sonrisa	24,948	50	0	0.95	0.02	0.03	0.75	0.1	0.15	5	Soft	100	0.5	56
4	66.2	69.9	70.3	105	226	486	Valley Blvd	Paseo Sonrisa	Paseo Tesoro	23,398	50	0	0.95	0.02	0.03	0.75	0.1	0.15	5	Soft	100	0.5	56
5	66.1	69.9	70.2	104	223	481	Valley Blvd	Paseo Tesoro	Pierre Rd	23,035	50	0	0.95	0.02	0.03	0.75	0.1	0.15	5	Soft	100	0.5	56
6	67.0	70.7	71.1	118	255	549	Valley Blvd	Pierre Rd	S Brea Canyon Rd	28,070	50	0	0.95	0.02	0.03	0.75	0.1	0.15	5	Soft	100	0.5	56
7	68.2	71.9	72.3	143	308	663	Valley Blvd	S Brea Canyon Rd	to the East	37,238	50	0	0.95	0.02	0.03	0.75	0.1	0.15	5	Soft	100	0.5	56
8	61.7	65.4	65.8	52	113	242	Lemon Ave	from the North	Paseo Del Prado	13,447	40	0	0.95	0.02	0.03	0.75	0.1	0.15	4	Soft	100	0.5	44
9	61.6	65.4	65.7	52	112	241	Lemon Ave	Paseo Del Prado	Valley Blvd	13,357	40	0	0.95	0.02	0.03	0.75	0.1	0.15	4	Soft	100	0.5	44
10	62.8	66.5	66.9	62	134	288	Lemon Ave	Valley Blvd	to the South	17,432	40	0	0.95	0.02	0.03	0.75	0.1	0.15	4	Soft	100	0.5	44
11	51.0	54.7	55.1	10	22	47	Paseo Del Prado	Lemon Ave	Paseo Sonrisa	2,746	25	0	0.95	0.02	0.03	0.75	0.1	0.15	2	Soft	100	0.5	20
12	46.2	49.9	50.3	5	11	23	Paseo Del Prado	Paseo Sonrisa	Paseo Tesoro	916	25	0	0.95	0.02	0.03	0.75	0.1	0.15	2	Soft	100	0.5	20
13	50.3	54.0	54.4	9	20	42	Paseo Sonrisa	Valley Blvd	Paseo Del Prado	2,335	25	0	0.95	0.02	0.03	0.75	0.1	0.15	2	Soft	100	0.5	20
14	49.4	53.1	53.5	8	17	37	Paseo Tesoro	Valley Blvd	Paseo Del Prado	1,916	25	0	0.95	0.02	0.03	0.75	0.1	0.15	2	Soft	100	0.5	20
15	62.4	66.1	66.5	58	126	271	Fairway Dr	Valley Blvd	to the South	15,892	40	0	0.95	0.02	0.03	0.75	0.1	0.15	4	Soft	100	0.5	44

Traffic Noise Calculator: FHWA 77-108 **Walnut Creek Business Park Project (COW-05.0) Buildout Year (2040) No Project**

	Output						Inputs														Auto Inputs	
	dBA at 50 feet			Distance to CNEL Contour				Segment														
ID	$L_{eq\text{-}24hr}$	L_{dn}	CNEL	70 dBA	65 dBA	60 dBA	Roadway	From - To		ADT	Posted Speed Limit	Grade	% Autos	% Med Trucks	% Heavy Trucks	% Daytime	% Evening	% Night	Number of Lanes	Site Condition	Distance to Reciever	Ground Absorption	Lane Distance
1	66.7	70.4	70.8	112	242	522	Valley Blvd	from the West	Camino De Teodoro/Fairway Dr	26,030	50	0	0.95	0.02	0.03	0.75	0.1	0.15	5	Soft	100	0.5	56
2	66.6	70.3	70.7	111	238	513	Valley Blvd	Camino De Teodoro/Fairway Dr	Lemon Ave	25,350	50	0	0.95	0.02	0.03	0.75	0.1	0.15	5	Soft	100	0.5	56
3	66.5	70.2	70.5	109	234	505	Valley Blvd	Lemon Ave	Paseo Sonrisa	24,720	50	0	0.95	0.02	0.03	0.75	0.1	0.15	5	Soft	100	0.5	56
4	66.2	69.9	70.3	105	225	486	Valley Blvd	Paseo Sonrisa	Paseo Tesoro	23,340	50	0	0.95	0.02	0.03	0.75	0.1	0.15	5	Soft	100	0.5	56
5	66.3	70.0	70.4	107	230	495	Valley Blvd	Paseo Tesoro	Pierre Rd	24,060	50	0	0.95	0.02	0.03	0.75	0.1	0.15	5	Soft	100	0.5	56
6	67.0	70.7	71.1	119	255	550	Valley Blvd	Pierre Rd	S Brea Canyon Rd	28,160	50	0	0.95	0.02	0.03	0.75	0.1	0.15	5	Soft	100	0.5	56
7	68.3	72.0	72.4	144	311	670	Valley Blvd	S Brea Canyon Rd	to the East	37,800	50	0	0.95	0.02	0.03	0.75	0.1	0.15	5	Soft	100	0.5	56
8	61.7	65.4	65.8	52	113	242	Lemon Ave	from the North	Paseo Del Prado	13,450	40	0	0.95	0.02	0.03	0.75	0.1	0.15	4	Soft	100	0.5	44
9	61.6	65.3	65.7	52	111	240	Lemon Ave	Paseo Del Prado	Valley Blvd	13,210	40	0	0.95	0.02	0.03	0.75	0.1	0.15	4	Soft	100	0.5	44
10	62.8	66.5	66.9	62	133	287	Lemon Ave	Valley Blvd	to the South	17,280	40	0	0.95	0.02	0.03	0.75	0.1	0.15	4	Soft	100	0.5	44
11	50.4	54.1	54.4	9	20	43	Paseo Del Prado	Lemon Ave	Paseo Sonrisa	2,370	25	0	0.95	0.02	0.03	0.75	0.1	0.15	2	Soft	100	0.5	20
12	45.0	48.7	49.1	4	9	19	Paseo Del Prado	Paseo Sonrisa	Paseo Tesoro	690	25	0	0.95	0.02	0.03	0.75	0.1	0.15	2	Soft	100	0.5	20
13	44.9	48.6	49.0	4	9	19	Paseo Sonrisa	Valley Blvd	Paseo Del Prado	680	25	0	0.95	0.02	0.03	0.75	0.1	0.15	2	Soft	100	0.5	20
14	45.4	49.1	49.5	4	9	20	Paseo Tesoro	Valley Blvd	Paseo Del Prado	750	25	0	0.95	0.02	0.03	0.75	0.1	0.15	2	Soft	100	0.5	20
15	62.4	66.1	66.5	58	125	269	Fairway Dr	Valley Blvd	to the South	15,740	40	0	0.95	0.02	0.03	0.75	0.1	0.15	4	Soft	100	0.5	44

Traffic Noise Calculator: FHWA 77-108 **Walnut Creek Business Park Project (COW-05.0) Buildout Year (2040) With Project**

	Output						Inputs														Auto Inputs	
	dBA at 50 feet			Distance to CNEL Contour																		
ID	$L_{eq\text{-}24hr}$	L_{dn}	CNEL	70 dBA	65 dBA	60 dBA	Roadway	Segment From	Segment To	ADT	Posted Speed Limit	Grade	% Autos	% Med Trucks	% Heavy Trucks	% Daytime	% Evening	% Night	Number of Lanes	Site Condition	Distance to Reciever	Ground Absorption	Lane Distance
1	66.7	70.4	70.8	113	243	525	Valley Blvd	from the West	Camino De Teodoro/Fairway Dr	26,210	50	0	0.95	0.02	0.03	0.75	0.1	0.15	5	Soft	100	0.5	56
2	67.1	70.8	71.2	120	257	555	Valley Blvd	Camino De Teodoro/Fairway Dr	Lemon Ave	28,500	50	0	0.95	0.02	0.03	0.75	0.1	0.15	5	Soft	100	0.5	56
3	66.5	70.2	70.6	110	237	511	Valley Blvd	Lemon Ave	Paseo Sonrisa	25,200	50	0	0.95	0.02	0.03	0.75	0.1	0.15	5	Soft	100	0.5	56
4	66.3	70.0	70.4	106	228	491	Valley Blvd	Paseo Sonrisa	Paseo Tesoro	23,770	50	0	0.95	0.02	0.03	0.75	0.1	0.15	5	Soft	100	0.5	56
5	66.4	70.1	70.5	108	232	501	Valley Blvd	Paseo Tesoro	Pierre Rd	24,430	50	0	0.95	0.02	0.03	0.75	0.1	0.15	5	Soft	100	0.5	56
6	67.2	70.9	71.3	121	261	562	Valley Blvd	Pierre Rd	S Brea Canyon Rd	29,100	50	0	0.95	0.02	0.03	0.75	0.1	0.15	5	Soft	100	0.5	56
7	68.4	72.1	72.5	147	317	684	Valley Blvd	S Brea Canyon Rd	to the East	39,010	50	0	0.95	0.02	0.03	0.75	0.1	0.15	5	Soft	100	0.5	56
8	61.8	65.5	65.8	53	114	245	Lemon Ave	from the North	Paseo Del Prado	13,690	40	0	0.95	0.02	0.03	0.75	0.1	0.15	4	Soft	100	0.5	44
9	61.6	65.3	65.7	52	112	241	Lemon Ave	Paseo Del Prado	Valley Blvd	13,300	40	0	0.95	0.02	0.03	0.75	0.1	0.15	4	Soft	100	0.5	44
10	62.8	66.6	66.9	62	135	290	Lemon Ave	Valley Blvd	to the South	17,590	40	0	0.95	0.02	0.03	0.75	0.1	0.15	4	Soft	100	0.5	44
11	50.6	54.3	54.7	10	21	44	Paseo Del Prado	Lemon Ave	Paseo Sonrisa	2,520	25	0	0.95	0.02	0.03	0.75	0.1	0.15	2	Soft	100	0.5	20
12	45.5	49.2	49.6	4	9	20	Paseo Del Prado	Paseo Sonrisa	Paseo Tesoro	780	25	0	0.95	0.02	0.03	0.75	0.1	0.15	2	Soft	100	0.5	20
13	47.1	50.8	51.2	6	12	26	Paseo Sonrisa	Valley Blvd	Paseo Del Prado	1,120	25	0	0.95	0.02	0.03	0.75	0.1	0.15	2	Soft	100	0.5	20
14	47.1	50.8	51.2	6	12	26	Paseo Tesoro	Valley Blvd	Paseo Del Prado	1,120	25	0	0.95	0.02	0.03	0.75	0.1	0.15	2	Soft	100	0.5	20
15	62.4	66.1	66.5	59	126	272	Fairway Dr	Valley Blvd	to the South	15,970	40	0	0.95	0.02	0.03	0.75	0.1	0.15	4	Soft	100	0.5	44

Traffic Noise Calculator: FHWA 77-108 **Walnut Creek Business Park Project (COW-05.0) Buildout Year (2040) With Project- Mixed Use Scenario**

	Output						Inputs														Auto Inputs	
	dBA at 50 feet			Distance to CNEL Contour				Segment														
ID	$L_{eq\text{-}24hr}$	L_{dn}	CNEL	70 dBA	65 dBA	60 dBA	Roadway	From - To		ADT	Posted Speed Limit	Grade	% Autos	% Med Trucks	% Heavy Trucks	% Daytime	% Evening	% Night	Number of Lanes	Site Condition	Distance to Reciever	Ground Absorption	Lane Distance
1	66.7	70.5	70.8	114	245	528	Valley Blvd	from the West	Camino De Teodoro/Fairway Dr	26,481	50	0	0.95	0.02	0.03	0.75	0.1	0.15	5	Soft	100	0.5	56
2	66.7	70.4	70.8	114	245	527	Valley Blvd	Camino De Teodoro/Fairway Dr	Lemon Ave	26,403	50	0	0.95	0.02	0.03	0.75	0.1	0.15	5	Soft	100	0.5	56
3	66.6	70.4	70.7	112	241	520	Valley Blvd	Lemon Ave	Paseo Sonrisa	25,848	50	0	0.95	0.02	0.03	0.75	0.1	0.15	5	Soft	100	0.5	56
4	66.4	70.1	70.5	108	233	501	Valley Blvd	Paseo Sonrisa	Paseo Tesoro	24,468	50	0	0.95	0.02	0.03	0.75	0.1	0.15	5	Soft	100	0.5	56
5	66.3	70.1	70.4	107	230	497	Valley Blvd	Paseo Tesoro	Pierre Rd	24,135	50	0	0.95	0.02	0.03	0.75	0.1	0.15	5	Soft	100	0.5	56
6	67.2	70.9	71.3	121	261	562	Valley Blvd	Pierre Rd	S Brea Canyon Rd	29,100	50	0	0.95	0.02	0.03	0.75	0.1	0.15	5	Soft	100	0.5	56
7	68.4	72.1	72.5	147	316	681	Valley Blvd	S Brea Canyon Rd	to the East	38,778	50	0	0.95	0.02	0.03	0.75	0.1	0.15	5	Soft	100	0.5	56
8	61.8	65.6	65.9	54	115	249	Lemon Ave	from the North	Paseo Del Prado	13,977	40	0	0.95	0.02	0.03	0.75	0.1	0.15	4	Soft	100	0.5	44
9	61.8	65.5	65.9	53	115	248	Lemon Ave	Paseo Del Prado	Valley Blvd	13,887	40	0	0.95	0.02	0.03	0.75	0.1	0.15	4	Soft	100	0.5	44
10	62.9	66.6	67.0	63	136	293	Lemon Ave	Valley Blvd	to the South	17,882	40	0	0.95	0.02	0.03	0.75	0.1	0.15	4	Soft	100	0.5	44
11	51.0	54.7	55.1	10	22	47	Paseo Del Prado	Lemon Ave	Paseo Sonrisa	2,746	25	0	0.95	0.02	0.03	0.75	0.1	0.15	2	Soft	100	0.5	20
12	46.2	49.9	50.3	5	11	23	Paseo Del Prado	Paseo Sonrisa	Paseo Tesoro	916	25	0	0.95	0.02	0.03	0.75	0.1	0.15	2	Soft	100	0.5	20
13	50.3	54.0	54.4	9	20	42	Paseo Sonrisa	Valley Blvd	Paseo Del Prado	2,335	25	0	0.95	0.02	0.03	0.75	0.1	0.15	2	Soft	100	0.5	20
14	49.4	53.1	53.5	8	17	37	Paseo Tesoro	Valley Blvd	Paseo Del Prado	1,916	25	0	0.95	0.02	0.03	0.75	0.1	0.15	2	Soft	100	0.5	20
15	62.5	66.2	66.6	59	128	276	Fairway Dr	Valley Blvd	to the South	16,342	40	0	0.95	0.02	0.03	0.75	0.1	0.15	4	Soft	100	0.5	44

COW-05.0 Walnut Business Park Mixed Use Alternative

Mixed Use ADT = 3761

Trip Distribution	ID	Roadway	Segment From	Segment To	ADT	2026 No Project CNEL at 50 feet	2026 With Mixed Use CNEL at 50 feet	Increase	2040 No Project CNEL	2040 With Mixed Use CNEL at 50	Increase
12%	1	Valley Blvd	from the West	Camino De Teodoro/Fairway Dr	451	71	71	0	71	71	0
28%	2	Valley Blvd	Camino De Teodoro/Fairway Dr	Lemon Ave	1053	70	71	0	71	71	0
30%	3	Valley Blvd	Lemon Ave	Paseo Sonrisa	1128	70	71	0	71	71	0
30%	4	Valley Blvd	Paseo Sonrisa	Paseo Tesoro	1128	70	70	0	70	70	0
2%	5	Valley Blvd	Paseo Tesoro	Pierre Rd	75	70	70	0	70	70	0
25%	6	Valley Blvd	Pierre Rd	S Brea Canyon Rd	940	71	71	0	71	71	0
26%	7	Valley Blvd	S Brea Canyon Rd	to the East	978	72	72	0	72	72	0
14%	8	Lemon Ave	from the North	Paseo Del Prado	527	66	66	0	66	66	0
18%	9	Lemon Ave	Paseo Del Prado	Valley Blvd	677	66	66	0	66	66	0
16%	10	Lemon Ave	Valley Blvd	to the South	602	67	67	0	67	67	0
10%	11	Paseo Del Prado	Lemon Ave	Paseo Sonrisa	376	54	55	1	54	55	1
6%	12	Paseo Del Prado	Paseo Sonrisa	Paseo Tesoro	226	49	50	1	49	50	1
44%	13	Paseo Sonrisa	Valley Blvd	Paseo Del Prado	1655	49	54	5	49	54	5
31%	14	Paseo Tesoro	Valley Blvd	Paseo Del Prado	1166	49	54	4	49	54	4
16%	15	Fairway Dr	Valley Blvd	to the South	602	66	66	0	66	67	0