

## Appendix

# Appendix H    Noise

## Appendix

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# Fundamentals of Noise

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## 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  $\mu\text{Pa}$ ).
- **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, though 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.

# 9

## Noise

The purpose of the Noise Element is to identify the noise sources that exist within the City, and to establish policies and programs to mitigate their potential impacts through both preventative and responsive measures. The regulation of noise sources such as traffic, railroad operations and aircraft operations is overseen by State and federal agencies; therefore, this element has a direct correlation with the land use, circulation, and housing elements. It guides the location of industrial land uses and transportation facilities, since they are common sources of excessive noise levels. This element also guides the location of particularly noise-sensitive uses, such as residences, schools, churches, and hospitals, so that they may be less affected by noise.

### 9.1 NOISE CHARACTERISTICS & MEASUREMENT

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Noise is commonly defined as undesirable or unwanted sound. Noises vary widely in their scope, source, and volume, ranging from individual occurrences such as leaf blowers, to the intermittent disturbances of overhead aircraft, to the fairly constant noise generated by traffic on freeways.

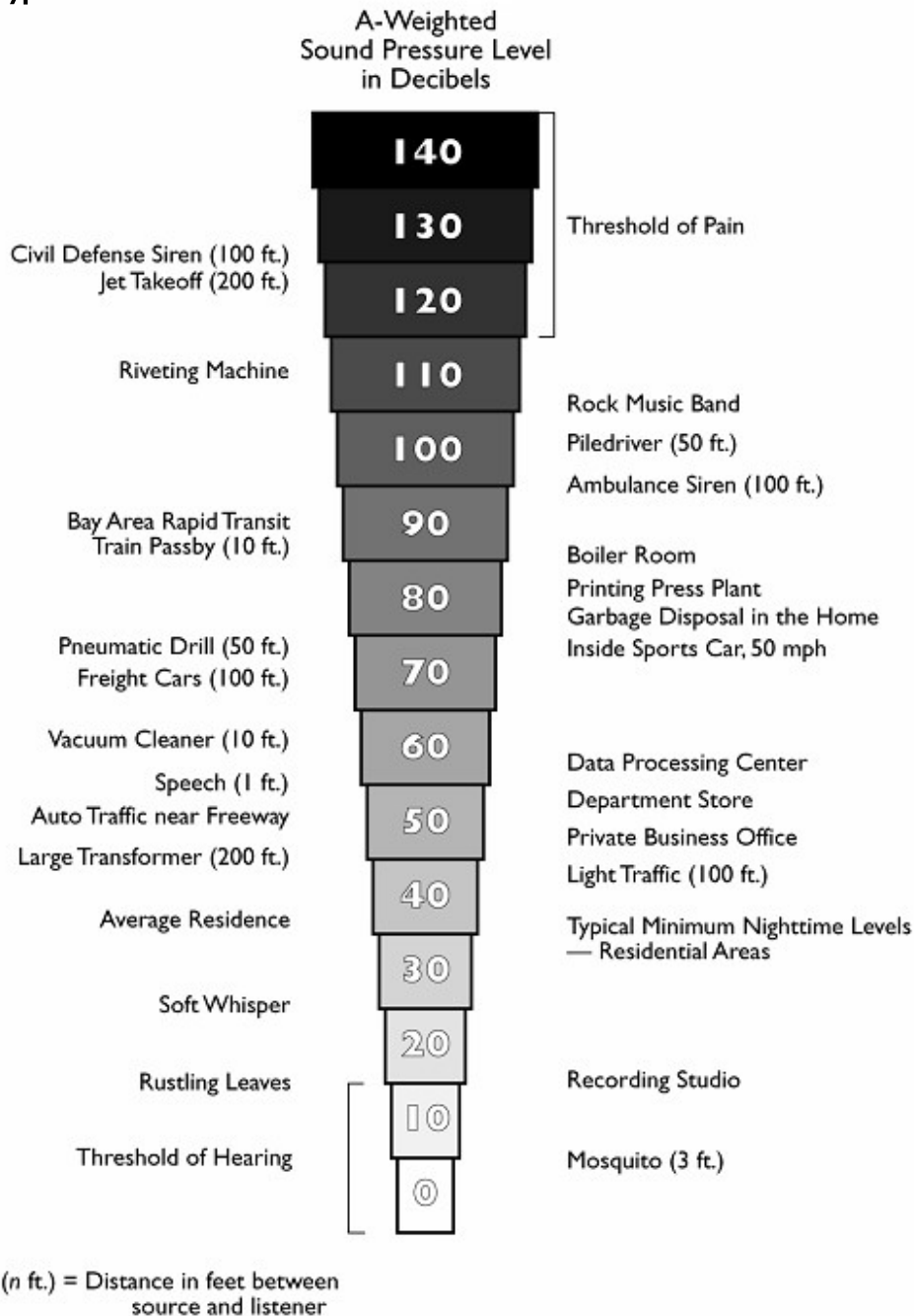
Three aspects of community noise are used in assessing the noise environment:

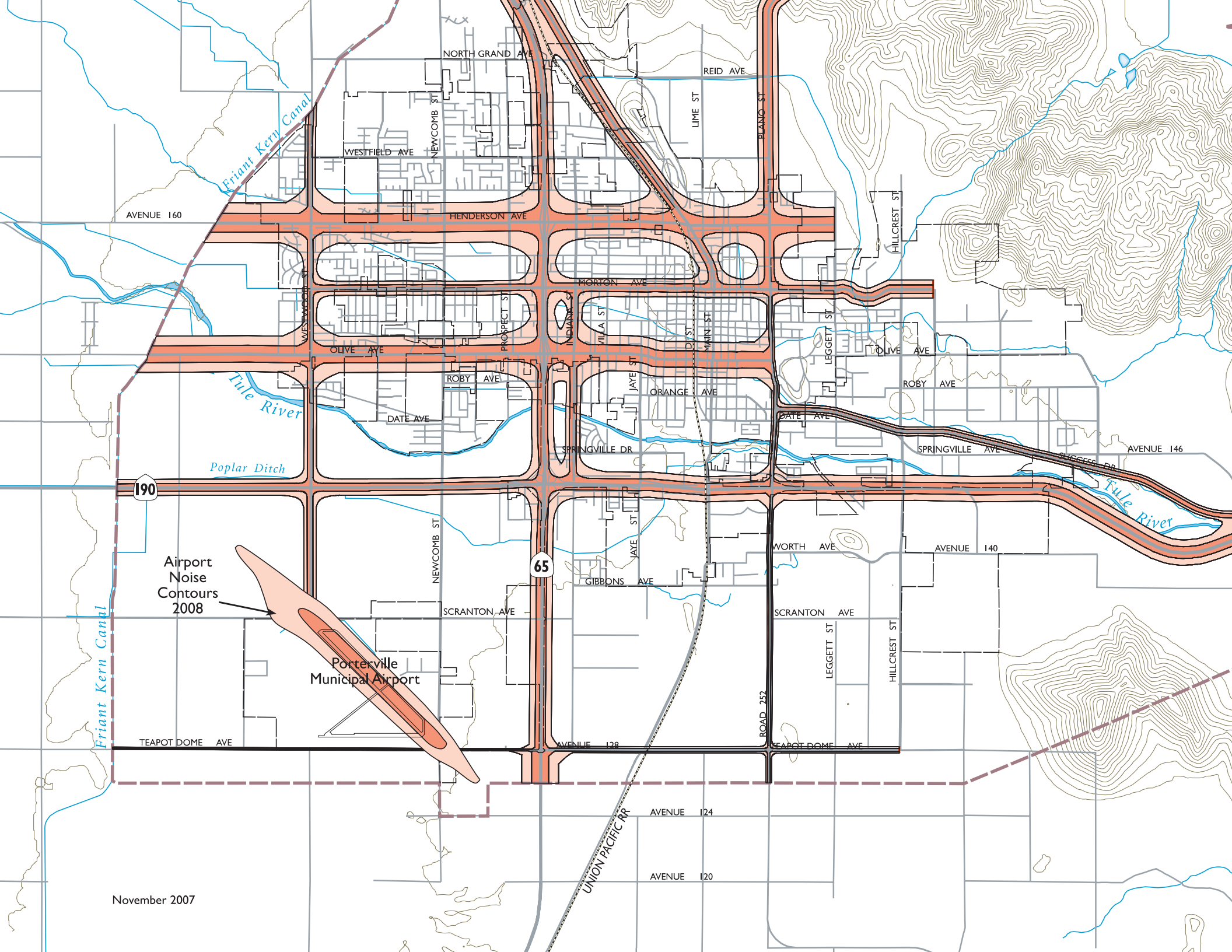
- *Level* (e.g., magnitude or loudness). Sound levels are measured and expressed in decibels (dB) with 10 dB roughly equal to the threshold of hearing. Figure 9-1 shows the decibel levels associated with different common sounds. Transient noise events may be described by their maximum A-weighted noise level (dBA).
- *Frequency* composition or spectrum. Frequency is a measure of the pressure fluctuations per second, measured in units of hertz (Hz). The characterization of sound level magnitude

with respect to frequency is the sound spectrum, often described in octave bands, which divide the audible human frequency range (e.g., from 20 to 20,000 Hz) into 10 segments.

- *Variation* in sound level with time, measured as noise exposure. Most community noise is produced by many distant noise sources that change gradually throughout the day and produce a relatively steady background noise having no identifiable source. Identifiable events of brief duration, such as aircraft flyovers, cause the community noise level to vary from instant to instant. A single number called the equivalent sound level or Leq describes the average noise exposure level over a period of time. Hourly Leq values are called Hourly Noise Levels.

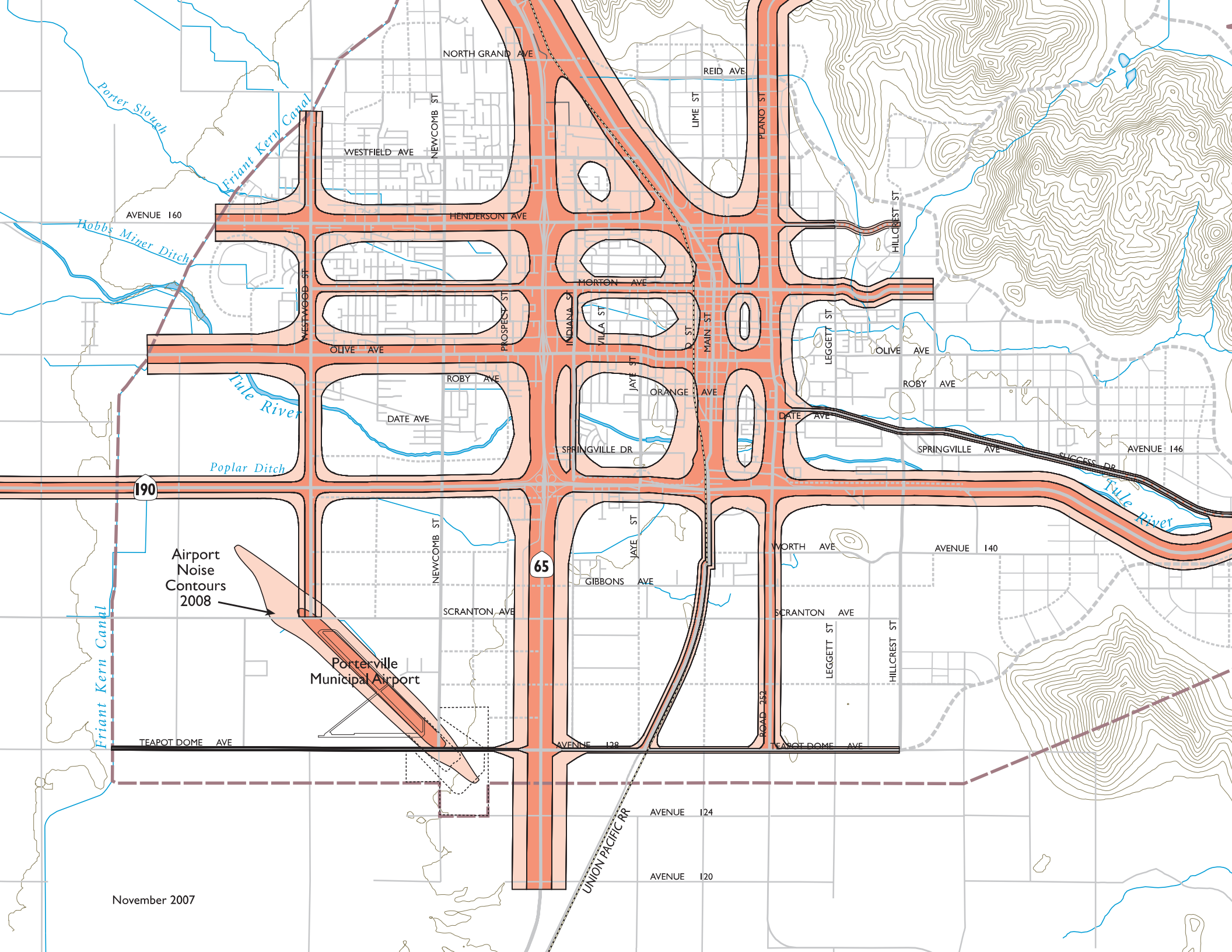
**Figure 9-1: Typical Sound Levels**





Airport  
Noise  
Contours  
2008

Porterville  
Municipal Airport



Airport  
Noise  
Contours  
2008

Porterville  
Municipal Airport

### ***Reporting Noise Levels***

Measuring and reporting noise levels involves accounting for variations in sensitivity to noise during the daytime versus nighttime hours. Noise descriptors used for analysis need to factor in human sensitivity to nighttime noise when background noise levels are generally lower than in the daytime and outside noise intrusions are more noticeable. Common descriptors include the Community Noise Equivalent Level (CNEL) and the Day-Night Average Level ( $L_{dn}$ ). Both reflect noise exposure over an average day with weighting to reflect the increased sensitivity to noise during the evening and night. The two descriptors are roughly equivalent. The CNEL descriptor is used in relation to major continuous noise sources, such as aircraft or traffic, and is the reference level for the Noise Element under State planning law.

Knowledge of the following relationships is helpful in understanding how changes in noise and noise exposure are perceived:

- Except under special conditions, a change in sound level of 1 dB cannot be perceived;
- A 3 dB change is considered a just-noticeable difference;
- A 5 dB change is required before any noticeable change in community response would be expected. A 5 dB increase is often considered a significant impact; and
- A 10 dB increase is subjectively heard as an approximate doubling in loudness and almost always causes an adverse community response.

## **9.2 NOISE GENERATION IN PORTERVILLE**

The major noise sources in Porterville are related to roadways and vehicle traffic. Other noise sources include aircraft and rail transportation. Noise produced by industry has a negligible effect on the City's residential noise environment. Figure 9-2 maps existing noise contours.

According to common practice, maximum noise levels of 60 dB are considered "normally acceptable" for unshielded residential development. Noise levels from 60 dB to 70 dB fall within the "conditionally unacceptable" range, and those in the 70 to 75 dB range are considered "normally unacceptable."



*The General Plan will improve streetscape character while continuing to reduce traffic noise levels in residential neighborhoods.*

### **TRAFFIC NOISE**

The level of highway traffic noise depends on three factors: (1) the volume of the traffic, (2) the speed of the traffic, and (3) the number of trucks in the flow of traffic. Vehicle noise is a combination of the noises produced by the engine, exhaust, tires, and wind generated by taller vehicles. Other factors that affect the perception of traffic noise include: distance from the highway, terrain, vegetation, and natural and structural obstacles. While tire noise from autos is generally located at ground level, truck noise sources can be located as high as 10 to 15 feet above the roadbed due to tall exhaust stacks and higher engines.

Noise exposure contours for Porterville's major roadways were modeled by applying the Federal Highway Administration's noise modeling procedure. These noise contours are conservative, meaning that the contours are modeled with minimal noise attenuation by natural barriers, buildings, etc. The noise level measured at a specific location may be lower than what is shown on the noise contour map.

The existing noise conditions for the roadways were measured at 10 locations for 10 minutes between August 16 and 17, 2005. Three of these locations were monitored for 24 hours. In 2005, about 1,800 acres (5 percent) of the Planning Area were in areas with noise levels greater than 60 dB. Approximately 16 percent of single-family housing and 23 percent of multi-family housing is in areas with noise levels greater than 55 dB.

Future development within the City's Planning Area will result in increased traffic volumes, thus increasing noise levels somewhat in some areas. Future noise contours are illustrated in Figure 9-3. In 2030, approximately 3,600 acres (10 percent) will be within areas with noises levels greater than 60 dB. Approximately 11 percent of the single-family housing 45 percent of the multi-family housing, and 16 percent of the educational uses will be within the 60 dB contours. Approximately 15 percent of the single-family residential, 40 percent of the multi-family residential, and 23 percent of the educational uses will be within the 55 dB contours. Increases in traffic levels can be counteracted by the implementation of alternate forms of transportation and land use design that factor in noise concerns. Locating noise-sensitive uses away from high-noise areas (e.g., major transportation routes) and buffering noise levels through design and landscaping features will help minimize future noise-related land use conflicts. Policies in this element establish review criteria for certain land uses to ensure that future noise levels will not exceed acceptable levels near noise-sensitive land uses.

## **PORTERVILLE MUNICIPAL AIRPORT NOISE**





The City recognizes the importance of Porterville Municipal Airport to the community and region. The Tulare County Airport Land Use Commission (ALUC), the agency that has jurisdictional authority over the airport, assesses adjacent land use. The Tulare County Comprehensive Airport Land Use Plan (CALUP) guides the ALUC in determining appropriate compatible land uses with detailed findings and policies. This includes minimizing the effects of aircraft noise on communities adjacent to airports. In 2003, the Porterville Municipal Airport hosted approximately 51,200 total aircraft operations (140 flights per day).

By 2025, the 2006 *Airport Layout Plan* estimates the Porterville Municipal Airport will host approximately 93,900 total aircraft operations (257 flights per day). Currently the ALUC is working to update the Tulare County CALUP, which will include updated noise contours for the airport's proposed expansion.

## **RAILROAD OPERATIONS NOISE**

At this time, no trains are operating on the rail right-of-way within Porterville. If the San Joaquin Valley Railroad service were to resume, one low-speed train would travel to and from Porterville twice weekly. No information is available on potential cumulative noise exposure, although the train could have significant short-term impacts near grade crossings.

**Table 9-1: Land Use Compatibility For Community Noise Environments**

Land Use Category	Community Noise Exposure						
	Ldn or CNEL, dB						
	55	60	65	70	75	80	>80
Residential – Low Density Single Family, Duplex, Mobile Homes							
Residential – Multi Family							
Mixed-Use & High Density Residential							
Transient Lodging – Motels, Hotels							
Schools, Libraries, Churches, Hospitals, Nursing Homes							
Auditoriums, Concerts, Halls, Amphitheaters							
Sports Area, Outdoor Spectator Sports							
Playgrounds, Neighborhood Parks							
Golf Courses, Riding Stables, Water Recreation, Cemeteries							
Office Buildings, Businesses Commercial and Professional							
Industrial, Manufacturing Utilities, Agriculture							
<p>Interpretation:</p> <p>  Normally Acceptable   Conditionally Acceptable   Normally Unacceptable   Clearly Unacceptable </p> <p> Specified land use is satisfactory, based upon the assumption that any building involved is of normal conventional construction, without any special noise insulation requirements.  New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning will normally suffice.  New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.  New construction or development should not be undertaken. </p>							

Source: City of Porterville, 2006.

## **GUIDING POLICIES**

- N-G-1        *Minimize vehicular and stationary noise levels and noise from temporary activities.*
- N-G-2        *Ensure that new development is compatible with the noise environment.*

## **IMPLEMENTATION POLICIES**

- N-I-1        Use the community noise exposure level standards, shown in Table 9-1, as review criteria for new land uses and require a noise study and mitigation measures for all projects that have noise exposure greater than “normally acceptable” levels.

*These measures will include, but are not limited to, the following actions:*

- *Screen and control noise sources, such as parking and loading facilities, outdoor activities and mechanical equipment;*
- *Increase setbacks for noise sources from adjacent dwellings;*
- *Retain fences, walls, and landscaping that serve as noise buffers;*
- *Use soundproofing materials and double-glazed windows; and*
- *Control hours of operation, including deliveries and trash pickup, to minimize noise impacts.*

*The need for mitigation of exterior noise exposure for other development will be evaluated on a case-by-case basis. Within urban residential neighborhoods where medium and high density residential development and mixed-use development is planned, the City will balance the need for noise mitigation with urban design considerations, and may not require exterior walls along streets where an attractive pedestrian-oriented environment with porches and front stoops is desired.*

- N-I-2        Require that all new residential development achieve interior noise level reductions through sound insulation and other measures to meet the land use compatibility standards by acoustical design and construction of the structure and building elements.

- N-I-3 Establish standards for the basic elements of noise reduction design for a new dwelling unit exposed to DNL above 65 dB, including the following:
- All façades must be constructed with substantial weight and insulation;
  - Sound-rated windows providing noise reduction performance similar to that of the façade must be included for habitable rooms;
  - Sound-rated doors or storm doors providing noise reduction performance similar to that of the façade must be included for all exterior entries;
  - Acoustic baffling of vents is required for chimneys, fans and gable ends; and
  - Installation of a mechanical ventilation system affording comfort under closed window conditions is required.
- Alternative acoustical designs that achieve the prescribed noise level reduction in Policy N-I-3 may be approved if a Board-Certified Acoustical Engineer submits information demonstrating that the required reductions can be achieved and maintained.*
- N-I-4 Require sound walls or other attenuation measures designed to reduce noise by a minimum of 10 dB in residential areas adjacent to State highways when additional lanes are added or when new residential development or sensitive receptors would be exposed to noise above 65 dB.
- N-I-5 Reduce noise intrusion generated by miscellaneous noise sources through conditions of approval to control noise-generating activities.
- N-I-6 Require new noise sources to use best available control technology (BACT) to minimize noise emissions.
- N-I-7 Require noise from existing mechanical equipment to be reduced by soundproofing materials and sound-deadening installation.
- N-I-8 Work with the Tulare County Airport Land Use Commission (ALUC) to prepare an Airport Land Use Compatibility Plan and updated airport noise contours, consistent with the new airport layout plan.
- N-I-9 Require the disclosure of the noise environment to prospective homebuyers where noise levels exceed “normally acceptable” standards.

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## ARTICLE IX. NOISE

### SECTION:

#### **18-90.1: Purpose**

#### **18-90.2: Definitions**

#### **18-90.3: Noise Standards; General Provisions**

#### **18-90.4: Exterior Noise Standards**

#### **18-90.5: Residential Interior Noise Standards**

#### **18-90.6: Noise Source Exemptions**

#### **18-90.7: Residential Air Conditioning And Refrigeration Systems**

#### **18-90.8: Waste And Garbage Collection Equipment**

#### **18-90.9: Electrical Substations**

#### **18-90.10: Warning Signs In Places Of Public Entertainment**

#### **18-90.11: Permit For Relief**

#### **18-90.12: Violations**

#### **18-90.1: PURPOSE:**

A. The city council declares and finds that excessive noise levels are detrimental to the public health, safety and welfare and contrary to the public interest as follows:

1. By interfering with sleep, communication, relaxation and the full use of one's property; and
2. By contributing to hearing impairment and a wide range of adverse physiological and psychological stress conditions; and
3. By adversely affecting the value of real property.

B. It is the intent of this article to protect persons from excessive levels of noise within or near a residence, school, church, hospital or public library and to warn persons of the hazards of excessive noise in places of public entertainment. (Ord. 1757, 8-18-2009)

#### **18-90.2: DEFINITIONS:**

The following words, phrases and terms as used in this article shall have the following meanings:

**A-WEIGHTED SOUND LEVEL:** The sound level in decibels as measured with a sound level meter using the "A" weighted network (scale) at slow meter response. The unit of measurement is referred to herein as dBA.

**AMBIENT NOISE LEVEL:** The composite of noise from all sources excluding the alleged offensive noise. In this context it represents the normal or existing level of environmental noise at a given location for a specific time of the day or night.

**CONSTRUCTION:** Construction, enlargement, alteration, conversion or movement of any building, structures or land together with any scientific surveys associated therewith.

**CUMULATIVE PERIOD:** An additive period of time composed of individual time segments, which may be continuous or interrupted.

**DECIBEL:** A unit for measuring the amplitude of a sound, equal to twenty (20) times the logarithm to the base ten of the ratio of the pressure of the sound measured to the reference pressure, which is twenty (20) micropascals (20 micronewtons per square meter).

**EMERGENCY WORK:** The use of any machinery, equipment, vehicle, manpower or other activity in a short term effort to protect, or restore safe conditions in the community, or work by private or public utilities when restoring utility service.

**FIXED NOISE SOURCE:** A device, machine or combination thereof which creates sounds while fixed or stationary, including, but not limited to, residential, agricultural, industrial and commercial machinery and equipment, pumps, fans, compressors, air conditioners and refrigeration equipment.

**HOSPITAL:** Any building or portion thereof used for the accommodation and medical care of sick, injured or infirm persons including rest homes and nursing homes.

**IMPULSIVE NOISE:** A noise of short duration, usually less than one second, with an abrupt onset and rapid decay.

**INTRUDING NOISE LEVEL:** The sound level created, caused, maintained or originating from an alleged offensive source, measured in decibels, at a specified location while the alleged offensive source is in operation.

**$L_{eq}$ :** The equivalent sound level. The sound level containing the same total energy as a time varying signal over a given sample period. For purposes of this article, the  $L_{eq}$  is measured over a one hour sample period.

**MOBILE NOISE SOURCE:** Any source other than a fixed noise source.

**NOISE DISTURBANCE:** Any sound which violates the quantitative standards set forth in this article.

**PURE TONE NOISE:** Any noise which is distinctly audible as a single pitch (frequency) or set of pitches. For the purposes of this article, a pure tone shall exist if the one-third octave band sound pressure level in the band with the tone exceeds the arithmetic average of the sound pressure levels of the two (2) contiguous one-third octave bands by 5 dB for center frequencies of 500 Hz and above and by 8 dB for center frequencies between 160 and 400 Hz and by 15 dB for center frequencies less than or equal to 125 Hz.

**RESIDENTIAL PROPERTY:** A parcel of real property which is developed and used either in whole or in part for residential purposes.

**SCHOOL:** Public or private institutions conducting regular academic instruction at preschool, kindergarten, elementary, secondary or collegiate levels.

**SOUND AMPLIFYING EQUIPMENT:** Any machine or device for the amplification of the human voice, music, or any other sound. Sound amplifying equipment shall not include standard automobile radios or tape players when heard only by the occupants of the vehicle in which the automobile radio is installed. Sound amplifying equipment as used in this article shall not include warning devices in authorized emergency vehicles, or horns or other warning devices in any vehicle, which are used only for traffic safety purposes.

**SOUND LEVEL METER:** An instrument meeting American National Standard Institute (ANSI) standard S1.4-1971 for type 1 or type 2 sound level meters or an instrument and the associated recording and analyzing equipment, which will provide equivalent data.

**SOUND TRUCK:** Any motor vehicle, or any other vehicle regardless of motive power, whether in motion or stationary, having mounted thereon any sound amplifying equipment. (Ord. 1757, 8-18-2009)

### **18-90.3: NOISE STANDARDS; GENERAL PROVISIONS:**

A. Standards: The standards which shall be considered in determining whether a violation of section 18-90.4 or 18-90.5 of this article exists shall include, but not be limited to, the following:

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

B. Public Nuisance: It is unlawful for any person to make, continue, allow, or cause to be made or emanate any excessively, unnecessarily, unnaturally, or unusually loud noise or sound from any radio, compact disc player, stereo, television or other mechanical, electrical, or electronic sound amplification device or instrument which annoys, disturbs, injures, or endangers the comfort, repose, quiet, health, peace, or safety of other persons in the city; such acts are hereby being declared a public nuisance. In interpreting and applying this section, the following shall apply:

1. Emanating Noise Or Sound: Emanating noise or sound shall be defined for these purposes as it is described in subsections 18-90.4 and/or 18-90.5 of this article.
2. Prima Facie Evidence: Prima facie evidence exists when such noise or sound annoys, disturbs, injures, or endangers the comfort, repose, quiet, health, peace, business, or safety of other persons and is shown by proof of noncompliance with subsection A of this section, or by a complaint by a person or persons regarding such noise or sound. A complainant must have standing to file a complaint.
3. Measuring Of Distance: The distance from the source of such noise or sound shall be measured from the actual source itself, or where the source is located on private property not adjacent to residential property, in which case the distance shall be measured from the property line.
4. Alternative Prima Facie Evidence: Alternative prima facie evidence that such noise or sound is excessively, unnecessarily, unnaturally, or unusually loud is shown by a sound level exceeding the ambient sound level by more than five (5) decibels measured at the property line, or in the

case of common wall construction such as condominiums, apartments, or business facilities, measured within the adjoining occupied units.

5. Exemptions: Nothing in this section prohibits or declares unlawful or a nuisance:

- a. The operation of warning or amplification devices by emergency, fire, or law enforcement vehicles or personnel;
- b. Lawful use of vehicle horns or backup warning devices;
- c. Private or public warning equipment or systems;
- d. The conduct of previously authorized and otherwise lawful public activity such as parades, speeches, lectures, ceremonies, entertainment, sports, music, or recreation events;
- e. The usual and customary operations of bells, gongs, buzzers, or similar mechanical, electrical or electronic sound amplification devices to mark time or call to attendance for an otherwise lawful use or purpose, except within public rights of way pursuant to section 20-6 of this code.

6. Sound Amplification Devices (Refer To Advertising And Signs Code, Section 3-15 Of This Code): The use of sound trucks or any other vehicle in the city with sound amplifying equipment in operation shall comply with the provisions of section 3-15 of this code.

C. Public Park/City Facilities:

1. Sound or noise produced by amplification equipment used at all city parks and other city facilities shall not exceed seventy five (75) dBA when measured at a distance of one hundred feet (100') from the sound source or the closest residential property line, whichever is closest to the noise source.

2. It should be the event sponsor's responsibility to ensure that sound levels are below the specified noise level standard. The sponsor shall provide a sound level meter to accomplish this task.

3. Failure of the event sponsor to enforce the sound limits may result in any or all of the following:

- a. The forced curtailment of activities as ordered by the police department.
- b. Citation issued by the police department under the city's nuisance abatement ordinance.
- c. Forfeiture of deposits placed with city by the sponsor for use of the facility.

D. Noise Measurement: Any noise measurement made pursuant to the provisions of this chapter shall be made with a sound level meter using the "A" weighted network (scale) at slow meter response. Fast meter response shall be used for impulsive type sounds. Calibration of the measurement equipment utilizing an acoustical calibrator certified by its manufacturer to be in compliance with National Institute of Standards and Technology (NIST) reference calibration levels shall be performed immediately prior to recording noise level data.

E. Exterior Noise Levels: Exterior noise levels shall be measured from the nearest residential, school, hospital, church or public library property line to the noise source. Where practical, the noise testing microphone shall be positioned three (3) to five feet (5') above the ground and away from reflective surfaces.

F. Interior Noise Levels: Interior noise levels shall be measured within the affected dwelling unit, at points at least four feet (4') from the wall, ceiling or floor nearest the noise source, with windows in the normal seasonal configuration. Reported interior noise levels shall be determined by taking the arithmetic average of the readings taken at the various microphone locations. (Ord. 1757, 8-18-2009)

**18-90.4: EXTERIOR NOISE STANDARDS:**

A. It is unlawful for any person at any location within the incorporated areas of the city to create any noise, or to allow the creation of any noise, on property owned, leased, occupied or otherwise controlled by such person which causes the exterior noise level when measured at any affected residence, school, hospital, church or public library to exceed the noise level standards as set forth in the following table:

EXTERIOR NOISE LEVEL STANDARDS, dBA

Category	Daytime	Nighttime
	7:00 A.M. To 10:00 P.M.	10:00 P.M. To 7:00 A.M.
Hourly $L_{eq}$	50	45
Maximum sound level ( $L_{MAX}$ )	70	65

B. In the event the measured ambient noise level without the alleged offensive source in operation exceeds the applicable noise level standard in either category above, the applicable standard or standards shall be adjusted so as to equal the ambient noise level.

C. Each of the noise level standards specified above shall be reduced by five (5) dB for pure tone noises, noises consisting primarily of speech or music, or for recurring impulsive noises.

D. If the intruding noise source is continuous and cannot reasonably be discontinued or stopped for a time period whereby the ambient noise level without the source can be measured, the noise level measured while the source is in operation shall be compared directly to the noise level standards. (Ord. 1757, 8-18-2009)

**18-90.5: RESIDENTIAL INTERIOR NOISE STANDARDS:**

A. It is unlawful for any person at any location within the incorporated areas of the city, to operate or cause to be operated within a dwelling unit or on property occupied by a nonresidential use, any source of sound or to allow the creation of any noise which causes the noise level when measured inside another dwelling unit to exceed the noise level standards as set forth in the following table:

INTERIOR NOISE LEVEL STANDARDS, dBA

Category	Daytime	Nighttime
	7:00 A.M. To 10:00 P.M.	10:00 P.M. To 7:00 A.M.
Maximum sound level ( $L_{MAX}$ )	55	45

B. The noise level standards specified above shall be reduced by five (5) dB for pure tone noises, noises consisting primarily of speech or music, or for recurring impulsive noises.

C. If the intruding noise source is continuous and cannot reasonably be discontinued or stopped for a time period whereby the ambient noise level without the source can be measured, the noise level measured while the source is in operation shall be compared directly to the noise level standards. (Ord. 1757, 8-18-2009)

**18-90.6: NOISE SOURCE EXEMPTIONS:**

The following activities shall be exempted from the provisions of this article:

- A. Noises from safety signals, warning devices, and emergency pressure relief valves.
- B. Noises resulting from any authorized emergency vehicle, when responding to an emergency call or acting in time of emergency.
- C. Noises resulting from emergency work, including repair of public utilities.
- D. Activities conducted in public parks, public playgrounds and public or private school grounds, including, but not limited to, school athletic and school entertainment events, except as otherwise noted in this article.
- E. Any mechanical device, apparatus or equipment used, related to, or connected with emergency activities or emergency work.
- F. Noise sources associated with construction, whether private or public, within five hundred feet (500') of the uses mentioned in subsection 18-90.4 of this article, provided such activities do not take place before six o'clock (6:00) A.M. or after nine o'clock (9:00) P.M. on any day except Saturday or Sunday, or before seven o'clock (7:00) A.M. or after five o'clock (5:00) P.M. on Saturday or Sunday.
- G. Noise sources associated with the maintenance of residential property provided such activities take place between the hours of six o'clock (6:00) A.M. and nine o'clock (9:00) P.M. on any day except Saturday or Sunday, or between the hours of seven o'clock (7:00) A.M. and nine o'clock (9:00) P.M. on Saturday or Sunday.
- H. Noise sources associated with a lawful commercial or industrial property caused by mechanical devices or equipment, including air conditioning or refrigeration systems, installed prior to the effective date of this chapter; provided that this exemption shall expire twelve (12) months after the effective date of this chapter.
- I. Noise sources associated with the collection of waste or garbage.
- J. Noise sources associated with seasonal agricultural packing operations provided that noise levels produced by such operations do not exceed the exterior noise level standards set forth in section 18-90.3 of this article when measured as provided in section 18-90.4 of this article for a cumulative period of more than ninety (90) days out of the year.
- K. Any activity to the extent regulation thereof has been preempted by state or federal law. (Ord. 1757, 8-18-2009)

**18-90.7: RESIDENTIAL AIR CONDITIONING AND REFRIGERATION SYSTEMS:**

Notwithstanding the provisions of section 18-90.3 of this article where the intruding noise source when measured as provided in section 18-90.4 of this article is an existing residential air conditioning or refrigeration system or associated equipment, the exterior noise level shall not exceed fifty five (55) dBA. For residential air conditioning or refrigeration systems or associated equipment installed after the effective date of this chapter, the exterior noise level when measured as provided in section 18-90.4 of this article shall not exceed fifty (50) dBA. (Ord. 1757, 8-18-2009)

**18-90.8: WASTE AND GARBAGE COLLECTION EQUIPMENT:**

Notwithstanding the provisions of section 18-90.3 of this article, the collection of waste or garbage from residential property by persons authorized to engage in such activity, and who are operating truck mounted loading or compacting equipment, shall not take place before six o'clock (6:00) A.M. or after seven o'clock (7:00) P.M. The noise level created by such activities when measured at a distance of fifty feet (50') in an open area shall not exceed the following standards:

- A. Eighty five (85) dBA for equipment in use, purchased or leased prior to the effective date of this chapter;
- B. Eighty (80) dBA for new equipment purchased or leased after the effective date of this chapter. (Ord. 1757, 8-18-2009)

**18-90.9: ELECTRICAL SUBSTATIONS:**

Notwithstanding the provisions of section 18-90.3 of this article, noise sources associated with the operation of electrical substations shall not exceed fifty (50) dBA when measured as provided in section 18-90.4 of this article. (Ord. 1757, 8-18-2009)

**18-90.10: WARNING SIGNS IN PLACES OF PUBLIC ENTERTAINMENT:**

It is unlawful for any person to operate or permit the operation or playing of any loudspeaker, musical instrument, motorized racing vehicle, or other source of sound for public entertainment within a building or structure wherein the noise level exceeds ninety five (95) dBA as determined by using the slow response of a sound level meter at any point normally occupied by a customer, without a conspicuous and legible sign stating:

*WARNING! SOUND LEVELS WITHIN MAY CAUSE HEARING IMPAIRMENT.*

(Ord. 1757, 8-18-2009)

**18-90.11: PERMIT FOR RELIEF:**

Applications for a permit for relief from the noise level designated in this chapter on the basis of undue hardship and special events may be made to the city manager or his duly authorized representative for recommendation to the city council. Any permit granted by the city council under this section shall contain all conditions upon which the permit has been granted and shall specify a reasonable time that the permit shall be effective. The city council may grant the relief as applied for if the council finds:

- A. That additional time is necessary for the applicant to alter or modify his/her activity or operation to comply with this chapter; or
- B. The activity, operation, or noise source will be of temporary duration. The noise source cannot be done in a manner that would comply with this chapter; and
- C. That no other reasonable alternative is available to the applicant.

The city council may prescribe any conditions or requirements deemed necessary to minimize adverse effects upon the community or surrounding neighborhood. (Ord. 1757, 8-18-2009)

**18-90.12: VIOLATIONS:**

A. Penalty: Each violation of the provisions of this article shall be deemed a misdemeanor punishable by imprisonment in the county jail not exceeding six (6) months, or by fine not exceeding one thousand dollars (\$1,000.00), or both. Upon recommendation of the prosecuting attorney, the court may reduce the charged offense from misdemeanor to an infraction, punishable under section 1-9 of this code.

B. Prosecution: Violations of this article shall be prosecuted in the same manner as other misdemeanor violations of this code; provided, however, that in the event of violation, a written notice of intention to prosecute will be given to the alleged violator not less than five (5) calendar days prior to the issuance of a misdemeanor complaint. No complaint shall be issued in the event the cause of violation is removed, the condition abated or fully corrected within the five (5) day period. In the event the alleged violator cannot be located in order to serve the notice of intention to prosecute, the notice as required in this section shall be deemed to be given upon mailing the notice by registered or certified mail to the alleged violator at his/her last known address or at the place where the violation occurred, in which event the five (5) day period shall commence at the date of the day following the mailing of the notice. (Ord. 1757, 8-18-2009)



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## Heating and Cooling Outdoor Units

Compact and efficient, HVAC packaged systems contain both traditional indoor units and outdoor air conditioning units in one self-contained cabinet that's located outside. It contains all the necessary equipment for heating and cooling commercial and residential buildings, from evaporative condensers and heat pumps to air cooled condensers and cooling systems.

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### Advantages of Packaged Equipment

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#### CONSISTENT

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#### LOWER COST OF OWNERSHIP

Our ENERGY STAR® -rated, 15.2 SEER2 models can save energy while lowering utility bills. Plus, our advanced fan motors on YORK® air conditioning units last longer with fewer repairs.



#### QUIET OPERATION

Advanced fan design and vibration-reducing technologies minimize operating sound levels to maintain a better environment.

## YORK® HVAC: 15.2 SEER2 Packaged Units

It's the little things that make big things happen — and big things are happening again at YORK®. With insights gathered from contractors, YORK® created a revolutionary 15.2 SEER2 packaged unit with a smaller footprint, superior efficiency and improved serviceability, all at a competitive price point. Because when it comes to your success, details make big things happen.

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## PCG4 14 SEER Electric/Gas Packaged Unit

Efficiency Range : 13.4 SEER2/11 EER/81% AFUE

Sound Levels : as low as 72 dBA

Price Range : \$\$

Compressor Type : Single-stage Scroll Compressor

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## PCG6 16 SEER Electric/Gas Packaged Unit

**1 REBATE UP TO \$600**

Efficiency Range : 15.2 SEER2/12.5 EER/81% AFUE

Sound Levels : as low as 74 dBA

Price Range : \$\$\$

Compressor Type : Two-stage Scroll Compressor

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## PACKAGED EQUIPMENT

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Efficiency Range : 15.2 SEER2

Sound Levels : as low as 74 dBA

Price Range : \$\$\$

Compressor Type : Two-stage Scroll Compressor

[COMPARE](#)**PHE4 14 SEER Packaged Heat Pump**

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Efficiency Range : 13.4 SEER2/7.0 HSPF2

Sound Levels : as low as 69 dBA

Price Range : \$\$

Compressor Type : Single-stage Scroll Compressor

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### PCG4 14 SEER Ultra Low Nox Packaged Unit

Efficiency Range : 13.4 SEER/11 EER/81% AFUE

PACKAGED EQUIPMENT

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Compressor Type : Single-stage Scroll Compressor

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## Resources and Education

### Inflation Reduction Act

Learn about how to save on system replacements through the Inflation Reduction Act.

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Since rooftop units are exposed to outdoor elements, standards have been developed to help provide peace of mind during a variety of naturally occurring weather phenomena.

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Our dedicated outside air systems provide not just product that conditions up to 100% of outside air but is a supplier of air management systems that address the needs of building owners and consulting engineers.

## PVSD-01 - Construction Noise Modeling Attenuation Calculations

Levels in dBA Leq					
Phase	RCNM Reference Noise Level	Receptor to South along Orange Avenue	Receptors to East along Howard Street	Receptors to North along Eastridge Circle	Receptors to West along A Street
<i>Distance in feet</i>	<i>50</i>	<i>250</i>	<i>290</i>	<i>700</i>	<i>760</i>
Demolition	85	71	70	62	61
Site Prep	85	71	70	62	61
Grading	85	71	70	62	61
<i>Distance in feet</i>	<i>50</i>	<i>240</i>	<i>230</i>	<i>240</i>	<i>310</i>
Building Construction	80	66	67	66	64
Architectural Coating	74	60	61	60	58
<i>Distance in feet</i>	<i>50</i>	<i>130</i>	<i>100</i>	<i>400</i>	<i>670</i>
Paving	80	72	74	62	57
Other					
Attenuation calculated through Inverse Square Law: $L_p(R2) = L_p(R1) - 20\text{Log}(R2/R1)$					

## Roadway Construction Noise Model (RCNM), Version 1.1

Report date: 06/12/2024  
Case Description: PVSD-01.0 Asphalt Demolition

\*\*\*\* Receptor #1 \*\*\*\*

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
Residential Use	Residential	65.0	55.0	50.0

Description	Impact Device	Usage (%)	Equipment		Receptor Distance (feet)	Estimated Shielding (dBA)
			Spec	Actual		
			Lmax (dBA)	Lmax (dBA)		
Tractor	No	40	84.0		50.0	0.0
Dozer	No	40		81.7	50.0	0.0
Concrete Saw	No	20		89.6	50.0	0.0

## Results

Noise Limits (dBA)

Noise Limit Exceedance (dBA)

[illegible]

# Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 06/12/2024  
Case Description: PVSD-01.0 Site Preparation

## \*\*\*\* Receptor #1 \*\*\*\*

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
Residential Use	Residential	65.0	55.0	50.0

Description	Impact Device	Usage (%)	Equipment			
			Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Grader	No	40	85.0		50.0	0.0
Dozer	No	40		81.7	50.0	0.0
Tractor	No	40	84.0		50.0	0.0

## Results

### Noise Limit Exceedance (dBA)

### Noise Limits (dBA)

Night		Day	Calculated (dBA)		Day		Evening		
			Evening		Night				
Equipment			Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax
Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq			
Grader			85.0	81.0	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A			
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			85.0	84.6	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: 06/12/2024  
Case Description: PVSD-01.0 Rough Grading

\*\*\*\* Receptor #1 \*\*\*\*

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
Residential Use	Residential	65.0	55.0	50.0

Description	Impact Device	Usage (%)	Equipment		Receptor Distance (feet)	Estimated Shielding (dBA)
			Spec Lmax (dBA)	Actual Lmax (dBA)		
			-----	-----		
Grader	No	40	85.0		50.0	0.0
Dozer	No	40		81.7	50.0	0.0
Tractor	No	40	84.0		50.0	0.0

## Results

Noise Limits (dBA)

Noise Limit Exceedance (dBA)

[illegible]

## Roadway Construction Noise Model (RCNM), Version 1.1

Report date: 06/12/2024  
Case Description: PVSD-01.0 Building Construction

\*\*\*\* Receptor #1 \*\*\*\*

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
Residential Use	Residential	65.0	55.0	50.0

Description	Impact Device	Usage (%)	Equipment			Estimated Shielding (dBA)
			Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	
Crane	No	16		80.6	50.0	0.0
Tractor	No	40	84.0		50.0	0.0
Generator	No	50		80.6	50.0	0.0

## Results

Noise Limits (dBA)

Noise Limit Exceedance (dBA)

[illegible]

## Roadway Construction Noise Model (RCNM), Version 1.1

Report date: 06/12/2024  
Case Description: PVSD-01.0 Paving

\*\*\*\* Receptor #1 \*\*\*\*

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
Residential Use	Residential	65.0	55.0	50.0

Description	Impact Device	Usage (%)	Equipment		Receptor Distance (feet)	Estimated Shielding (dBA)
			Spec Lmax (dBA)	Actual Lmax (dBA)		
Paver	No	50		77.2	50.0	0.0
Tractor	No	40	84.0		50.0	0.0
Roller	No	20		80.0	50.0	0.0

## Results

Noise Limits (dBA)

Noise Limit Exceedance (dBA)

Night		Day	Calculated (dBA)		Day Night	Evening		Lmax
			Evening			Lmax	Leq	
Equipment	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax
Paver	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Roller	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		Total	84.0	81.7	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: 06/12/2024  
Case Description: PVSD-01.0 Architectural Coating

## \*\*\*\* Receptor #1 \*\*\*\*

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
Residential Use	Residential	65.0	55.0	50.0

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

## Results

Noise Limit Exceedance (dBA)					Noise Limits (dBA)				
-----									
-----									
Night	Day		Calculated (dBA)		Day	Evening			
			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			

## PVSD-01.0 - Vibration Damage Attenuation Calculations

Levels, PPV (in/sec)					
<i>Distance in feet</i>	Vibration	Receptor to South	Receptors to East	Receptors to North	Receptors to West
	Reference Level	along Orange	along Howard Street	along Eastridge	along A Street
	at 25 feet	Avenue	300	Circle	75
		100		250	
Vibratory Roller	0.21	0.026	0.005	0.007	0.040
Large Bulldozer	0.089	0.011	0.002	0.003	0.017
Loaded Trucks	0.076	0.010	0.002	0.002	0.015
Small Bulldozer	0.003	0.000	0.000	0.000	0.001

Traffic Noise Calculator: FHWA 77-108

Santa Fe Elementary School Expansion (PVSD-01.0 ) Existing Traffic Noise Traffic Conditions

	Output						Inputs																Auto Inputs				
	dBA at 50 feet			Distance to CNEL Contour																							
ID	L <sub>eq-24hr</sub>	L <sub>dn</sub>	CNEL	70 dBA	65 dBA	60 dBA	Roadway			Segment From - To			ADT	Posted Speed Limit	Grade	% Autos	% Med Trucks	% Heavy Trucks	% Daytime	% Evening	% Night	Number of Lanes	Site Condition	Distance to Receiver	Ground Absorption	Lane Distance	
1	56.5	59.3	60.0	11	23	50	Orange Avenue			School Site			West of	4,600	25	0.0%	96.0%	2.5%	1.5%	75.0%	15.0%	10.0%	4	Soft	50	0.5	44
2	56.5	59.3	60.0	11	23	50	Orange Avenue			School Site			East of	4,600	25	0.0%	96.0%	2.5%	1.5%	75.0%	15.0%	10.0%	4	Soft	50	0.5	44

Traffic Noise Calculator: FHWA 77-108

Santa Fe Elementary School Expansion (PVSD-01.0 ) Existing Plus Project Traffic Noise Traffic Conditions

		Output					Inputs															Auto Inputs		
		dBA at 50 feet			Distance to CNEL Contour																			
ID	L <sub>eq-24hr</sub>	L <sub>dn</sub>	CNEL	70 dBA	65 dBA	60 dBA	Roadway			Segment From - To	ADT	Posted Speed Limit	Grade	% Autos	% Med Trucks	% Heavy Trucks	% Daytime	% Evening	% Night	Number of Lanes	Site Condition	Distance to Receiver	Ground Absorption	Lane Distance
1	56.9	59.6	60.3	11	24	53	Orange Avenue		School Site	West of	4,970	25	0.0%	96.0%	2.5%	1.5%	75.0%	15.0%	10.0%	4	Soft	50	0.5	44
2	56.7	59.5	60.2	11	24	52	Orange Avenue		School Site	East of	4,840	25	0.0%	96.0%	2.5%	1.5%	75.0%	15.0%	10.0%	4	Soft	50	0.5	44

Traffic Noise Calculator: FHWA 77-108

Santa Fe Elementary School Expansion (PVSD-01.0 ) Baseline 2027 Traffic Noise Traffic Conditions

	Output						Inputs														Auto Inputs			
	dBA at 50 feet			Distance to CNEL Contour																				
ID	L <sub>eq-24hr</sub>	L <sub>dn</sub>	CNEL	70 dBA	65 dBA	60 dBA	Roadway			Segment From - To	ADT	Posted Speed Limit	Grade	% Autos	% Med Trucks	% Heavy Trucks	% Daytime	% Evening	% Night	Number of Lanes	Site Condition	Distance to Receiver	Ground Absorption	Lane Distance
1	56.6	59.4	60.1	11	24	51	Orange Avenue		School Site	West of East of	4,740	25	0.0%	96.0%	2.5%	1.5%	75.0%	15.0%	10.0%	4	Soft	50	0.5	44
2	56.6	59.4	60.1	11	24	51	Orange Avenue		School Site		4,740	25	0.0%	96.0%	2.5%	1.5%	75.0%	15.0%	10.0%	4	Soft	50	0.5	44

Traffic Noise Calculator: FHWA 77-108

Santa Fe Elementary School Expansion (PVSD-01.0 ) Baseline 2027 With Project Traffic Noise Traffic Conditions

	Output						Inputs															Auto Inputs				
	dBA at 50 feet			Distance to CNEL Contour																						
ID	L <sub>eq-24hr</sub>	L <sub>dn</sub>	CNEL	70 dBA	65 dBA	60 dBA	Roadway			Segment From - To			ADT	Posted Speed Limit	Grade	% Autos	% Med Trucks	% Heavy Trucks	% Daytime	% Evening	% Night	Number of Lanes	Site Condition	Distance to Receiver	Ground Absorption	Lane Distance
1	57.0	59.8	60.4	12	25	54	Orange Avenue			School Site		West of	5,110	25	0.0%	96.0%	2.5%	1.5%	75.0%	15.0%	10.0%	4	Soft	50	0.5	44
2	56.9	59.7	60.3	11	24	53	Orange Avenue			School Site		East of	4,980	25	0.0%	96.0%	2.5%	1.5%	75.0%	15.0%	10.0%	4	Soft	50	0.5	44