Appendix C 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).

- **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

Chapter 6.28 NOISE CONTROL

6.28.010 Declaration of policy.

(a) In order to control unnecessary, excessive and annoying sounds emanating from incorporated areas of the city, it is declared to be the policy of the city to prohibit such sounds generated from all sources as specified in this chapter.

(b) It is determined that certain noise levels are detrimental to the public health, welfare and safety and contrary to public interest; therefore, the city council does ordain and declare that creating, maintaining, causing or allowing to create, maintain or cause any noise in a manner prohibited by or not in conformity with the provisions of this chapter, is a public nuisance and shall be punishable as such. (Ord. 806 § 2, 1976)

6.28.020 Definitions.

The following words, phrases and terms as used in this chapter shall have the meaning as indicated below:

(1) “Ambient noise level” means the all-encompassing noise level associated with a given environment, being a composite of sounds from all sources, excluding the alleged offensive noise, at the location and approximate time at which a comparison with the alleged offensive noise is to be made.

(2) “Cumulative period” means an additive period of time composed of individual time segments which may be continuous or interrupted.

(3) “Decibel” (dB) means a unit which denotes the ratio between two quantities which are proportional to power; the number of decibels corresponding to the ratio of two amounts of power is ten times the logarithm to the base ten of this ratio.

(4) “Dwelling unit” means a single unit providing complete, independent living facilities for one or more persons including permanent provisions for living, sleeping, eating, cooking and sanitation.

(5) “Emergency machinery, vehicle or work” means any machinery, vehicle or work used, employed or performed in an effort to protect. provide or restore safe conditions in the community or for the citizenry, or work by private or public utilities when restoring utility service.

(6) “Fixed noise source” means a stationary device which creates sounds while fixed or motionless including but not limited to industrial and commercial machinery and equipment, pumps, fans, compressors, generators, air conditioners and refrigerator equipment.

(7) “Grading” means any excavating or filling of earth material, or any combination thereof, conducted at a site to prepare said site for construction or other improvements thereon.

(8) “Impact noise” means the noise produced by the collision of one mass in motion with a second mass which may be either in motion or at rest.

(9) “Mobile noise source” means any noise source other than a fixed noise source.

(10) “Noise level” means the “A” weighted sound pressure level in decibels obtained by using a sound level meter at slow response with a reference pressure of twenty microNewtons per square meter. The unit of measurement shall be designated as dB(A).

(11) “Noise variance board” means an administrative board of five members appointed by the board of supervisors of the county, per Title 4, Division 6, Article 1 of the codified ordinances of the county.

(12) “Person” means a person, firm, association, copartnership, joint venture, corporation or any entity, public or private in nature.

(13) “Residential property” means a parcel of real property which is developed and used either in part or in whole for residential purposes, other than transient uses such as hotels and motels.

(14) "Simple tone noise" means a noise characterized by a predominant frequency or frequencies so that other frequencies cannot be readily distinguished.

(15) "Sound level meter" means an instrument meeting American National Standard Institute's 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.

(16) "Sound pressure level" of a sound, in decibels, means twenty times the logarithm to the base ten of the ratio of the pressure of the sound to a referenced pressure, which reference pressure shall be explicitly stated. (Ord. 806 § 2, 1976)

6.28.030 Noise level measurement criteria.

Any noise level measurements made pursuant to the provisions of this chapter shall be performed using a sound level meter as defined in Section 6.28.020. (Ord. 806 § 2, 1976)

6.28.040 Designated noise zone.

The residential properties hereinafter described are assigned to the following noise zones:

Noise Zone 1: All properties located in residential zone districts. (Ord. 806 § 2, 1976)

6.28.050 Exterior noise standards.

(a) The following noise standards, unless otherwise specifically indicated, shall apply to all residential property within a designated noise zone:

	Noise Standards	
Noise Zone	**Noise Level**	**Time Period**
1	55 dB(A)	7 a.m. — 10 p.m.
	50 dB(A)	10 p.m. — 7 a.m.

In the event the alleged offensive noise consists entirely of impact noise, simple tone noise, speech, music, or any combination thereof, each of the above noise levels shall be reduced by 5 dB(A).

(b) It is unlawful for any person at any location within 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, when the foregoing causes the noise level, when measured on any other residential property, either incorporated or unincorporated, to exceed:

(1) The noise standard for a cumulative period of more than thirty minutes in any hour; or

(2) The noise standard plus five dB(A) for a cumulative period of more than fifteen minutes in any hour; or

(3) The noise standard plus ten dB(A) for a cumulative period of more than five minutes in any hour; or

(4) The noise standard plus fifteen dB(A) for a cumulative period of more than one minute in any hour; or

(5) The noise standard plus twenty dB(A) for any period of time.

(c) In the event the ambient noise level exceeds any of the first four noise limit categories set forth in subsection (b) of this section, the cumulative period applicable to said category shall be increased to reflect said ambient noise level. In the event the ambient noise level exceeds the fifth noise limit category, the maximum allowable noise level under said category shall be increased to reflect the maximum ambient noise level. (Ord. 806 § 2, 1976)

6.28.060 Interior noise standards.

(a) The following interior noise standards, unless otherwise specifically indicated, shall apply to all residential property within a designated noise zone:

Interior Noise Standards

Noise Zone	Noise Level	Time Period
1	55 dB(A)	7 a.m. — 10 p.m.
	45 dB(A)	10 p.m. — 7 a.m.

In the event the alleged offensive noise consists entirely of impact noise, simple tone noise, speech, music, or any combination thereof, each of the above noise levels shall be reduced by five dB(A).

(b) It is unlawful for any person at any location within 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, when the foregoing causes the noise level when measured within any other dwelling unit on any residential property, either incorporated or unincorporated, to exceed:

(1) The interior noise standard for a cumulative period of more than five minutes in any hour; or

(2) The interior noise standard plus five dB(A) for a cumulative period of more than one minute in any hour; or

(3) The interior noise standard plus ten dB(A) for any period of time.

(c) In the event the ambient noise level exceeds either of the first two noise limit categories set forth in subsection (b) of this section, the cumulative period applicable to said category shall be increased to reflect said ambient noise level. In the event the ambient noise level exceeds the third noise limit category, the maximum allowable noise level under said category shall be increased to reflect the maximum ambient noise level. (Ord. 806 § 2, 1976)

6.28.070 Special provisions.

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

(1) Activities conducted on the grounds of any public or private nursery, elementary, intermediate or secondary school or college;

(2) Public dances, provided said events are conducted pursuant to a permit issued by the city pursuant to Chapter 5.24 relative to the staging of said events;

(3) Activities conducted on any park or playground, provided such park or playground is owned and operated by a public entity;

(4) Any mechanical device, apparatus or equipment used, related to or connected with emergency machinery, vehicle or work;

(5) Noise sources associated with the construction, repair, remodeling or grading of any real property, provided said activities take place between the hours of seven a.m. and eight p.m. Monday through Friday, nine a.m. through eight p.m. on Saturday and at no time on Sunday or any legal holiday. For purposes of this exception the use of saws, buffers, sanders, drills, and sprayers shall be included, as shall similar activity;

(6) All mechanical devices, apparatus or equipment which are utilized for the protection or salvage of agricultural crops during periods of potential or actual frost damage or other adverse weather conditions;

(7) Mobile noise sources associated with agricultural operations, provided such operations do not take place between the hours of eight p.m. and seven a.m. on weekdays, including Saturday, or at any time on Sunday or a legal holiday;

(8) Mobile noise sources associated with agricultural pest control through pesticide application, provided that the application is made in accordance with the restricted material permits issued by or regulations enforced by the agricultural commissioner;

(9) Noise sources associated with the landscape maintenance of real property, provided said activities take place between the hours of seven a.m. and eight p.m. Monday through Friday, nine a.m. through eight p.m. on Saturday, or nine a.m. through six p.m. on Sunday or legal holidays. For purposes of this exception, the phrase “landscape maintenance of real

property" shall include, but not be limited to, the use of power mowers, edgers, chain saws, trimmers, hedgecutters, and other devices that are not hand-powered. Leaf blowers shall not be included in said exception and shall be regulated as provided in Chapter 6.10 of this code;

(10) Any activity to the extent regulation thereof has been preempted by state or federal law. (Ord. 1282 § 1, 1998; Ord. 806 § 2, 1976)

6.28.080 Schools, hospitals and churches—Special provisions.

It is unlawful for any person to create any noise which causes the noise level at any school, hospital or church while the same is in use to exceed the noise limits as specified in Section 6.28.050 prescribed for the assigned noise zone in which the school, hospital or church is located, or which noise level unreasonably interferes with the use of such institutions or which unreasonably disturbs or annoys patients in the hospital, provided conspicuous signs are displayed in three separate locations within one-tenth of a mile of the institution indicating the presence of a school, church or hospital. (Ord. 806 § 2, 1976)

6.28.090 Air conditioning and refrigeration—Special provisions.

Until January 19, 1979, the noise standards enumerated in Sections 6.28.050 and 6.28.060 shall be increased eight dB(A) where the alleged offensive noise source is an air conditioning or refrigeration system or associated equipment which was installed prior to November 26, 1976. (Ord. 806 § 2, 1976)

6.28.100 Noise level measurement.

The location selected for measuring exterior noise levels shall be at any point on the affected property. Interior noise measurements shall be made within the affected dwelling unit. The measurement shall be made at a point at least four feet from the wall, ceiling, or floor nearest the alleged offensive noise source and may be made with the windows of the affected unit open. (Ord. 806 § 2, 1976)

6.28.110 Manner of enforcement.

The county health officer and his duly authorized representatives are directed to enforce the provisions of this chapter. The county health officer and his duly authorized representatives are authorized, pursuant to Penal Code Section 836.5, to arrest any person without a warrant when they have reasonable cause to believe that such person has committed a misdemeanor in their presence.

No person shall interfere. with, oppose or resist any authorized person charged with enforcement of this chapter while such person is engaged in the performance of his duty. (Ord. 806 § 2, 1976)

6.28.120 Variance procedure.

The owner or operator of a noise source which violates any of the provisions of this chapter may file an application with the health officer for a variance from the provisions thereof wherein said owner or operator shall set forth all actions taken to comply with said provisions, the reasons why immediate compliance cannot be achieved, a proposed method of achieving compliance, and a proposed time schedule for its accomplishment. Said application shall be accompanied by a fee in the amount of seventy-five dollars. A separate application shall be filed for each noise source; provided, however, that several mobile sources under common ownership, or several fixed sources on a single property may be combined into one application. Upon receipt of said application and fee, the health officer shall refer it with his recommendation thereon within thirty days to the noise variance board of the county for action thereon in accordance with the provisions of this chapter.

An applicant for a variance shall remain subject to prosecution under the terms of this chapter until a variance is granted. (Ord. 806 § 2, 1976)

6.28.130 Noise variance board.

The noise variance board shall evaluate all applications for variance from the requirements of this chapter and may grant said variances with respect to time for compliance, subject to such terms, conditions and requirements as it may deem reasonable to achieve maximum compliance with the provisions of this chapter. Said terms, conditions and requirements may include, but shall not be limited to, limitation on noise levels and operating hours. Each such variance shall set forth in detail the approved method of achieving maximum compliance and a time schedule for its accomplishment. In its determinations said board shall consider the magnitude of nuisance caused by the offensive noise, the uses of property within the area of impingement by the noise, the time factors related to study, design, financing and construction of remedial work, the economic factors related to age and useful life of equipment, and the general public interest and welfare. Any variance granted by said board shall be by resolution and shall be transmitted to the health officer for enforcement. Any violation of the terms of said variance shall be unlawful. (Ord. 806 § 2, 1976)

6.28.140 Appeals.

(a) Within fifteen days following the decision of the variance board on an application the applicant, the health officer, or any member of the city council may appeal the decision to the city council by filing a notice of appeal with the secretary of the variance board. In the case of an appeal by the applicant for a variance, the notice of appeal shall be accompanied by a fee to be computed by the secretary on the basis of the estimated cost of preparing the materials required to be forwarded to the city council as discussed hereafter. If the actual cost of such preparation differs from the estimated cost appropriate payments shall be made either to or by the secretary.

(b) Within fifteen days following receipt of a notice of appeal and the appeal fee, the secretary of the variance board shall forward to the city council copies of the application for variance, the recommendation of the health officer, the notice of appeal, all evidence concerning said application received by the variance board and its decision thereon. In addition, any person may file with the city council written arguments supporting or attacking said decision and the city council may in its discretion hear oral arguments thereon. The city clerk shall mail to the applicant a notice of the date set for hearing of the appeal. The notice shall be mailed at least ten days prior to the hearing date.

(c) Within sixty days following its receipt of the notice of the appeal, the city council shall either affirm, modify or reverse the decision of the variance board. Such decision shall be based upon the city council's evaluation of the matters submitted to the city council in light of the powers conferred on the variance board and the factors to be considered, both as enumerated in Sections 6.28.120 and 6.28.130.

(d) As part of its decision the council may direct the variance board to conduct further proceedings on said application. Failure of the city council to affirm, modify or reverse the decision of the variance board within said sixty-day period shall constitute an affirmation of the decision. (Ord. 806 § 2, 1976)

6.28.145 Alternative noise prohibition.

Notwithstanding any other provisions of this chapter and in addition thereto, it is unlawful for any person to wilfully make, continue, maintain, permit, or cause to be made, continued, maintained, or permitted, any loud, unnecessary and unusual noise which disturbs the peace or quiet of any residential neighborhood or which causes discomfort or annoyance to any reasonable person of normal sensitivity residing in the area. It shall be a prima facie violation of this section if any radio, receiving set, television, musical instrument or similar device is played, used or permitted to be played or used between the hours of nine p.m. and seven a.m. when audible from a distance of fifty feet from the property line of the noise source or from a distance of one hundred feet from any nonstationary noise source. The determination may be made by a peace officer or may be proven by the testimony of any other person. (Ord. 1018 § 1, 1985)

6.28.147 Idling motor vehicles.

No person shall leave standing any motor vehicle, including refrigeration trailers, with engine idling or auxiliary motor running for in excess of ten minutes between the hours of ten p.m. and seven a.m. if the engine or motor noise disturbs the peace or quiet of any residential neighborhood or causes discomfort or annoyance to any reasonable person of normal sensitivity residing in the area. The driver, owner, registered owner and legal owner of the motor vehicle or refrigeration trailer shall each be guilty of the offense described herein. (Ord. 1156 § 1, 1990)

6.28.148 Commercial delivery prohibition.

No person shall make, cause, accept or permit a delivery of goods, merchandise, material, equipment, meat, poultry, fish, groceries, dairy products, foodstuffs, food, or beverage within one hundred feet of a residentially zoned property between the hours of ten p.m. and seven a.m. or at any time on a Sunday or legal holiday so as to disturb the peace and quiet of any reasonable person of normal sensitivity residing in the area. Proof of such a violation may be established by the testimony of a peace officer, code enforcement officer, or any other person. For purposes of this section "delivery" shall not only mean the completed act of a delivery, but all preparatory and related steps taken within the one hundred-foot distance including, but not limited to, driving, stopping, idling or parking a vehicle, the opening or shutting of doors, or the movement of pallets, dolleys, floor jacks, or lifts. (Ord. 1173 § 1, 1992)

6.28.149 Parking lot sweepers.

No person shall operate a parking lot sweeper or similar device for cleaning or maintaining commercial property within one hundred feet of a residential area except during the hours of eight a.m. and six p.m., Monday through Friday, between nine a.m. and six p.m. on Saturday, and at no time on Sunday. (Ord. 1324 § 1, 2002)

6.28.150 Violation—Penalty.

Any person violating any of the provisions of this chapter shall be deemed guilty of a misdemeanor. Each day such violation is committed or permitted to continue shall constitute a separate offense and shall be punishable as such. The provisions of this chapter shall not be construed as permitting conduct not prescribed herein and shall not affect the enforceability of any other applicable provisions of law. (Ord. 806 § 2, 1976)

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STATIONARY NOISE DATA & MODELING

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 03/31/2022
Case Description: GGSD Los Amigos

**** Receptor #1 ****

Baselines (dBA)

Description	Land Use	Daytime	Evening	Night
Light Pole Installation	Residential	65.0	60.0	55.0

Equipment

Description	Impact Device	Spec Usage (%)	Actual Lmax (dBA)	Receptor Lmax (dBA)	Estimated Distance (feet)	Shielding (dBA)
Crane	No	16	80.6	50.0	0.0	
Backhoe	No	40	77.6	50.0	0.0	
Auger Drill Rig	No	20	84.4	50.0	0.0	
Concrete Saw	No	20	89.6	50.0	0.0	

Results

Equipment	Calculated (dBA) Lmax	Calculated (dBA) Leq	Day Lmax	Day Leq	Evening Lmax	Evening Leq	Night Lmax	Night Leq	Noise Limit Exceedance (dBA) Day Lmax	Day Leq	Evening Lmax	Evening Leq	Night Lmax	Night 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
Backhoe	77.6	73.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Auger Drill Rig	84.4	77.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
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
Total	89.6	84.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

GGSD Los Amigos - Construction Noise Attenuation

Levels in dBA Leq

Phase	RCNM Reference Noise Level	Residences to South	Residecnes to East	Residecnes to West
Distance in feet	*50*	*65*	*75*	*85*
Drill Rig	77.0	75	73	72
Concrete Saw	82.6	NA	79	78

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

GGSD Los Amigos- Vibration Annoyance Attenuation Calculations

Levels in in/sec PPV

Distance in feet	**Vibration Reference Level at *25 feet***	**Residential to west** *90*
Large Bulldozer	0.089	0.013
Caisson Drilling	0.089	0.013
Loaded Trucks	0.076	0.011
Jackhammer	0.035	0.005
Small Bulldozer	0.003	0.000

CONSTRUCTION NOISE MODELING

GGSD Los Amigos - Stationary Noise Attenuation Calculations

Reference Levels, Distances, and Receptor (residences) Distances

Reference Distance in feet	**Softball/Baseball** *72*	**Tennis Courts** *20*	**Soccer Fields** *15*	**Football** *72*
Reference Levels, dBA Leq	57	60	60	57
Distance and Direction to	90 to E	120 to W	115 to S	115 to S
Distance Only	90	120	115	115

Levels in dBA Leq

	Softball/Baseball	**Tennis Courts**	**Soccer Fields**	**Football**
	Attenuated Noise Levels			
Attenuated Levels at Receptors	55	44	42	53

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

Normalized Levels and Distances

	Softball/Baseball *56.9*	**Tennis Court** *59.5*	**Soccer** *59.8*
Reference Distance	**72**	**20**	**15**
Normalized Distance	*50*	*50*	*50*
Normalized Level dBA Leq	60	52	*49*