

## **Appendix G      Noise Analysis**

## Appendices

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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 ( $L_{\text{eq}}$ ); 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  $L_{\text{eq}}$  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.”
- **Day-Night Sound Level ( $L_{\text{dn}}$  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       | Threshold of human perceptibility        |
| ± 5 dB       | Clearly noticeable change in noise level |
| ± 10 dB      | Half or twice as loud                    |
| ± 20 dB      | Much quieter or louder                   |

Source: Bies, David A. and Colin H. Hansen. 2009. *Engineering Noise Control: Theory and Practice*. 4th ed. New York: Spon Press.

### *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                | 80                | Food Blender at 3 feet<br>Garbage Disposal at 3 feet |
| Noisy Urban Area, Daytime                         | 70                | Vacuum Cleaner at 10 feet<br>Normal speech at 3 feet |
| Commercial Area<br>Heavy Traffic at 300 feet      | 60                | Large Business Office<br>Dishwasher Next Room        |
| Quiet Urban Daytime                               | 50                | Theater, Large Conference Room (background)          |
| Quiet Urban Nighttime<br>Quiet Suburban Nighttime | 40                | Library  |
| Quiet Rural Nighttime                             | 30                | 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). 2013, September. Transportation and Construction Vibration Guidance Manual.



**LOCAL REGULATIONS**

**Article 9.5: Noise Abatement and Control**

*(“Noise Abatement and Control”  
added 9–18–1973 by O–11122 N.S.)*

**Division 1: General**

*(“General” added 9–18–1973 by O–11122 N.S.)*

**§59.5.0101 Purpose and Intent**

The Council of The City of San Diego finds and declares that:

- (a) Inadequately controlled noise presents a growing danger to the health and welfare of the residents of the City of San Diego;
- (b) The making and creating of disturbing, excessive, or offensive noises within the jurisdictional limits of the City of San Diego is a condition which has persisted, and the level and frequency of occurrences of such noises continue to increase;
- (c) The making, creation, or continuance of such excessive noises, which are prolonged or unusual in their time, place, and use, affect and are a detriment to the public health, comfort, convenience, safety, welfare, and prosperity of the residents of the City of San Diego;
- (d) Every person is entitled to an environment in which the noise is not detrimental to his or her life, health, or enjoyment of property; and
- (e) The necessity, in the public interest, for the provisions and prohibitions hereinafter contained and enacted is declared to be a matter of legislative determination and public policy, and it is further declared that the provisions and prohibitions hereinafter contained and enacted are in pursuance of and for the purpose of securing and promoting the public health, comfort, convenience, safety, welfare, prosperity, peace, and quiet of the City of San Diego and its inhabitants.

*(Amended 9–22–1976 by O–11916 N.S.)*

**§59.5.0102 Definitions**

Whenever the following words and phrases are used in this article, they shall have the meaning ascribed to them in this section:

- (a) Average Sound Level — a sound level typical of the sound levels at a certain place during a given period of time, averaged by the general rule of combination for sound levels, said general rule being set forth in American National Standard Specifications for Sound Level Meters Sl. 4–1971. Average sound level is also called equivalent continuous sound level.
- (b) Community Noise Equivalent Level — an average sound level during a 24-hour day, obtained after addition of five (5) decibels to sound levels in the evening from 7:00 p.m. to 10:00 p.m., and after addition of ten (10) decibels to sound levels in the night before 7:00 a.m. and after 10:00 p.m.
- (c) Construction Equipment — any tools, machinery, or equipment used in connection with construction operations, including all types of “special construction” equipment as defined in the pertinent sections of the California Vehicle Code when used in the construction process on any construction site, regardless of whether such construction site be located on-highway or off-highway.
- (d) Decibel (dB) — a unit measure of sound (noise) level.
- (e) Emergency Work — work made necessary to restore property to a safe condition following a public calamity, or work required to protect persons or property from imminent exposure to danger of damage, or work by public or private utilities when restoring utility service.
- (f) Motor Vehicles — any and all self-propelled vehicles as defined in the California Vehicle Code, specifically including but not limited to “mini-bikes” and “go-carts.”
- (g) Noise Level — the same as “sound level.” The terms may be used interchangeably herein.
- (h) Person — a person, firm, association, copartnership, joint venture, corporation, or any entity, public or private.
- (i) Sound Level — in decibels, that quantity measured with a sound level meter as defined herein, by use of the “A” frequency weighting and “fast” time averaging unless some other time averaging is specified.
- (j) Sound Level Meter — an instrument for the measurement of sound, including a microphone, an amplifier, an attenuator, networks at least for the standardized frequency weighting A, and an indicating instrument having at

least the standardized dynamic characteristic “fast,” as specified in American National Standard Specifications for Sound Level Meters Sl. 4–1971 or its successor.

- (k) Sound Amplifying Equipment — equipment as specified in Section 33.0203b of the San Diego Municipal Code.
- (l) Disturbing, Excessive or Offensive Noise — any sound or noise conflicting with the criteria or levels set forth in this article.
- (m) Supplementary Definitions of Technical Terms — definitions of technical terms not defined herein shall be obtained from American National Standard Acoustical Terminology, Sl.1–1960 (R– 1976).

*(Amended 9–22–1976 by O–11916 N.S.)*

**Article 9.5: Noise Abatement and Control**

**Division 2: Administration**

*(“Administration” added 9-18-1973 by O-11122 N.S.)*

**§59.5.0201 Establishment of Noise Abatement and Control Administrator**

There is hereby established within the Neighborhood Code Compliance Department of The City of San Diego the function of Noise Abatement and Control Administration which shall be administered by the Director of the Neighborhood Code Compliance Department (hereinafter referred to as the “Administrator”).  
*(Amended 7-25-1994 by O-18088 N.S.)*

**§59.5.0202 Duties and Responsibilities of the Noise Abatement Administrator**

- (a) The Administrator and his staff have the responsibility of regulating and controlling the emission of all excessive or offensive noises within the City of San Diego and shall take such action, subject to the provisions of this article, as is reasonable and necessary to abate noise. The Administrator shall coordinate the activities of all City departments relating to noise control and reduction in those activities carried out by the various departments, including the Environmental Impact Report review process relating to noise pollution. The Administrator may exercise or delegate any of the functions, powers and duties vested in his office or in the administration of his office.
- (b) The Administrator is expressly charged:
  - (1) To make any necessary investigations, inspections, or studies which, in his opinion, are necessary for the purpose of enforcing the provisions of this article or controlling or abating a disturbing, excessive or offensive noise. Information derived from noise studies shall be made available to the public upon request.
  - (2) To institute necessary proceedings to prosecute violations of this article and to compel the prevention and abatement of disturbing, excessive, or offensive noise, and as further set forth in Division 6 of this article.
  - (3) To allow exceptions to the requirements of this article, subject to conditions, when practical difficulties or unnecessary hardship involved in carrying out this article exist, if the exception will not be contrary to the purpose and intent of this article or detrimental to the public health, safety, and general welfare of the citizens of the City of San Diego.

- 4) To do any and all other acts which may be necessary for the successful prosecution of the purposes of this article and such other acts as may be specifically enumerated herein as duties.

*(“Duties and Responsibilities of the Administrator Noise Abatement” retitled and amended 11-18-1997 by O-18439 N.S.)*

*(Retitled to “Duties and Responsibilities of the Noise Abatement Administrator“ and amended 6-18-2013 by O-20261 N.S.; effective 7-19-2013.)*

**§59.5.0205 Inspection by Administrator**

- (a) The Administrator may inspect, at any reasonable time and in a reasonable manner, any device or mechanism (1) which is intended to, or which actually does produce sound and (2) which creates or may create any disturbing noise, including, but not limited to, the premises where such device or mechanism is used.
- (b) If entry to premises is denied or refused, the Administrator shall obtain an inspection warrant from a court of a competent jurisdiction.  
*(Amended 9-22-1976 by O-11916 N.S.)*

**Article 9.5: Noise Abatement and Control**

**Division 3: Noise Abatement Contract Compliance**  
*(“Noise Abatement Contract Compliance”  
added 9–18–1973 by O–11122 N.S.)*

**§59.5.0301 Contract Provisions**

(a) Contract

As used in this section, the term “contract” shall mean any written agreement or legal instrument whereby The City of San Diego is committed to expend, or does expend, public funds in consideration for work, labor, services, equipment, or any combination of the foregoing, except that the term “contract” shall not include:

- (1) Contracts for financial or other assistance entered into by The City of San Diego with any federal, state or other local governmental entity or agency.
- (2) Contracts, resolutions, indentures, declarations of trust, or other legal instruments authorizing or relating to (a) the purchase of insurance, (b) the authorization, issuance, award and sale of bonds, and (c) certificates of indebtedness, notes, or other fiscal obligations of the City.

(b) Contract Provisions

No contract shall be awarded or entered into by The City of San Diego unless such contract contains provisions requiring that:

Devices and activities which will be operated, conducted, or constructed pursuant to the contract and which are subject to the provisions of this Code, will be operated, conducted, or constructed without causing a violation of this article.

(c) Regulations

The Administrator may, from time to time, recommend to the City’s Purchasing Agent and/or other City departments such specifications for the operation or construction of devices and activities pursuant to City contracts.

The Administrator shall make the recommendations necessary to achieve compliance with the provisions of this section.

- (d) No person shall cause or permit the operations of a device or conducting of an activity in such a way as to violate any provisions of a contract required by this action.
- (e) The provisions of this section shall not apply to those contracts awarded prior to three (3) months from the effective date (October 19, 1973) of this article.  
*(Amended 9-22-1976 by O-11916 N.S.)*



**Article 9.5: Noise Abatement and Control**

**Division 4: Limits**

*(“Noise Level Limits, Standards and Control”  
added 9–18–1973 by O–11122 N.S.)*

*(Retitled to “Limits” on 9–22–1976 by O–11916 N.S.)*

**§59.5.0401 Sound Level Limits**

- (a) It shall be unlawful for any person to cause noise by any means to the extent that the one-hour average sound level exceeds the applicable limit given in the following table, at any location in the City of San Diego on or beyond the boundaries of the property on which the noise is produced. The noise subject to these limits is that part of the total noise at the specified location that is due solely to the action of said person.

**TABLE OF APPLICABLE LIMITS**

| <b>Land Use</b>   | <b>Time of Day</b> | <b>One-Hour Average Sound Level (decibels)</b> |
|---|--------------------|--|
| 1. Single Family Residential                                    | 7 a.m. to 7 p.m.   | 50   |
|   | 7 p.m. to 10 p.m.  | 45   |
|   | 10 p.m. to 7 a.m.  | 40   |
| 2. Multi-Family Residential (Up to a maximum density of 1/2000) | 7 a.m. to 7 p.m.   | 55   |
|   | 7 p.m. to 10 p.m.  | 50   |
|   | 10 p.m. to 7 a.m.  | 45   |
| 3. All other Residential  | 7 a.m. to 7 p.m.   | 60   |
|   | 7 p.m. to 10 p.m.  | 55   |
|   | 10 p.m. to 7 a.m.  | 50   |
| 4. Commercial   | 7 a.m. to 7 p.m.   | 65   |
|   | 7 p.m. to 10 p.m.  | 60   |
|   | 10 p.m. to 7 a.m.  | 60   |
| 5. Industrial or Agricultural                                   | any time           | 75   |

- (b) The sound level limit at a location on a boundary between two zoning districts is the arithmetic mean of the respective limits for the two districts. Permissible construction noise level limits shall be governed by Sections 59.5.0404 of this article.

- (c) Fixed-location public utility distribution or transmission facilities located on or adjacent to a property line shall be subject to the noise level limits of Part A. of this section, measured at or beyond six feet from the boundary of the easement upon which the equipment is located.
- (d) This section does not apply to firework displays authorized by permit from the Fire Department.
- (e) This section does not apply to noise generated by helicopters at heliports or helistops authorized by a conditional use permit, nor to any roller coaster operated on City-owned parkland.

*(Amended 9-11-1989 by O-17337 N.S.)*

*(Amended 11-28-2005 by O-19446 N.S.; effective 2-9-2006.)*

**§59.5.0402 Motor Vehicles**

- (a) Off-Highway
  - (1) Except as otherwise provided for in this article, it shall be unlawful to operate any motor vehicle of any type on any site, other than on a public street or highway as defined in the California Vehicle Code, in any manner so as to cause noise in excess of those noise levels permitted for on-highway motor vehicles as specified in the table for “45 mile-per-hour or less speed limits” contained in Section 23130 of the California Vehicle Code, and as corrected for distances set forth in subsection A.2. below.
  - (2) Corrections

The maximum noise level as the off-highway vehicle passes may be measured at a distance of other than fifty (50) feet from the center line of travel, provided the measurement is further adjusted by adding algebraically the applicable correction as follows:

| Distance (Feet)            | Correction (decibels) |
|----------------------------|-----------------------|
| 25                         | -6                    |
| 28                         | -5                    |
| 32                         | -4                    |
| 35                         | -3                    |
| 40                         | -2                    |
| 45                         | -1                    |
| 50<br>(preferred distance) | 0                     |
| 56                         | +1                    |
| 63                         | +2                    |
| 70                         | +3                    |
| 80                         | +4                    |
| 90                         | +5                    |
| 100                        | +6                    |

(3) A measured noise level thus corrected shall be deemed in violation of this section if it exceeds the applicable noise-level limit as specified above.

(b) Nothing in this section shall apply to authorized emergency vehicles when being used in emergency situations, including the blowing of sirens and/or horns.

*(“Motor Vehicles” renumbered from Sec. 59.5.0403 on 9-22-1976 by O-11916 N.S.)*

**§59.5.0403 Watercraft**

Violations for excessive noise of watercraft operating in waters under the jurisdiction of The City of San Diego shall be prosecuted under applicable provisions of the California Harbors and Navigation Code. Permits issued by The City of San Diego for the operation of watercraft not in compliance with noise criteria of the Harbors and Navigation Code shall be reviewed and approved by the Administrator prior to issuance.

*(“Watercraft” renumbered from Sec. 59.5.0407 and amended 9-22-1976 by O-11916 N.S.)*

§59.5.0404 Construction Noise

- (a) It shall be unlawful for any person, between the hours of 7:00 p.m. of any day and 7:00 a.m. of the following day, or on legal holidays as specified in Section 21.0104 of the San Diego Municipal Code, with exception of Columbus Day and Washington’s Birthday, or on Sundays, to erect, construct, demolish, excavate for, alter or repair any building or structure in such a manner as to create disturbing, excessive or offensive noise unless a permit has been applied for and granted beforehand by the Noise Abatement and Control Administrator. In granting such permit, the Administrator shall consider whether the construction noise in the vicinity of the proposed work site would be less objectionable at night than during the daytime because of different population densities or different neighboring activities; whether obstruction and interference with traffic particularly on streets of major importance, would be less objectionable at night than during the daytime; whether the type of work to be performed emits noises at such a low level as to not cause significant disturbances in the vicinity of the work site; the character and nature of the neighborhood of the proposed work site; whether great economic hardship would occur if the work were spread over a longer time; whether proposed night work is in the general public interest; and he shall prescribe such conditions, working times, types of construction equipment to be used, and permissible noise levels as he deems to be required in the public interest.
- (b) Except as provided in subsection C. hereof, it shall be unlawful for any person, including The City of San Diego, to conduct any construction activity so as to cause, at or beyond the property lines of any property zoned residential, an average sound level greater than 75 decibels during the 12-hour period from 7:00 a.m. to 7:00 p.m.
- (c) The provisions of subsection B. of this section shall not apply to construction equipment used in connection with emergency work, provided the Administrator is notified within 48 hours after commencement of work.

*(Amended 1-3-1984 by O-16100 N.S.)*

*(Amended 8-9-2019 by O-21114 N.S.; effective 9-8-2019.)*

**[Editors Note:** Amendments as adopted by O-21114 N.S. will not apply within the Coastal Overlay Zone until the California Coastal Commission certifies it as a Local Coastal Program Amendment.

Click the link to view the Strikeout Ordinance highlighting changes to prior language [http://docs.sandiego.gov/municode\\_strikeout\\_ord/O-21114-SO.pdf](http://docs.sandiego.gov/municode_strikeout_ord/O-21114-SO.pdf) ]

**§59.5.0406 Refuse Vehicles and Parking Lot Sweepers**

No person shall operate or permit to be operated a refuse compacting, processing, or collection vehicle between the hours of 7:00 p.m. to 6:00 a.m. or a parking lot sweeper between the hours of 7:00 p.m. to 7:00 a.m. in any residential area unless a permit has been applied for and granted by the Administrator.

*(“Refuse Vehicles” added 9-18-1973 by O-11122 N.S.; amended 9-22-1976 by O-11916 N.S.)*

*(Amended 6-9-2010 by O-19960 N.S.; effective 7-9-2010.)*

**Article 9.5: Noise Abatement and Control**

**Division 5: Public Nuisance Noise**  
*(“General Noise Regulations”  
added 9-18-1973 by O-11122 N.S.)  
(Retitled to “Public Nuisance Noise”  
on 9-22-1976 by O-11916 N.S.)*

**§59.5.0501 General Prohibitions**

- (a) It shall be unlawful for any person to make, continue, or cause to be made or continued, within the limits of said City, any disturbing, excessive, or offensive noise which causes discomfort or annoyance to any reasonable person of normal sensitiveness residing in the area.
- (b) The characteristics and conditions which should be considered in determining whether a violation of the provisions of this section exists should include, but not be limited to the following:
  - (1) The level of the noise;
  - (2) Whether the nature of the noise is usual or unusual;
  - (3) Whether the origin of the noise is natural or unnatural;
  - (4) The level of the ambient noise;
  - (5) The proximity of the noise to sleeping facilities;
  - (6) The nature and zoning of the area from which the noise emanates and the area where it is received;
  - (7) The time of day or night the noise occurs;
  - (8) The duration of the noise; and
  - (9) Whether the noise is recurrent, intermittent, or constant.

*(Amended 1-3-1984 by O-16100 N.S.)*

**§59.5.0502 Disturbing, Excessive, Offensive Noises — Declaration of Certain Acts Constituting**

The following activities, among others, are declared to cause disturbing, excessive or offensive noises in violation of this section and are unlawful, namely:

- (a) Horns, Signaling Devices, etc.

Unnecessary use or operation of horns, signaling devices, or other similar devices, on automobiles, motorcycles, or any other vehicle.

- (b) Radios, Television Sets, Phonographs, Loud Speaking Amplifiers and Similar Devices.

- (1) Uses Restricted

The use or operation of any sound production or reproduction device, radio receiving set, musical instrument, drums, phonograph, television set, loud speakers and sound amplifier or other similar machine or device for the producing or reproducing of sound in such a manner as to disturb the peace, quiet, or comfort of any reasonable person of normal sensitivity in any area of the City is prohibited. This provision shall not apply to any participant in a licensed parade, or to any person who has been otherwise duly authorized by The City of San Diego to engage in such conduct.

- (2) Prima Facie Violations

Any of the following shall constitute evidence of a prima facie violation of this section:

- (A) The operation of any such sound production or reproduction device, radio receiving set, musical instrument, drum, phonograph, television set, machine, loud speaker and sound amplifier or similar machine or device between the hours of 10:00 p.m. and 8:00 a.m. in such a manner as to be plainly audible at a distance of fifty feet from the building, structure, or vehicle in which it is located.
- (B) The operation of any sound amplifier, which is part of, or connected to, any radio, stereo receiver, compact disc player, cassette tape player, or other similar device when operated in

such a manner as to be plainly audible at a distance of fifty (50) feet and when operated in such a manner as to cause a person to be aware of vibration accompanying the sound at a distance of fifty (50) feet from the source.

(3) Enforcement of Prima Facie Violations

(A) Any person who is authorized to enforce the provisions of this Article and who encounters evidence of a prima facie violation of this section is empowered to confiscate and impound as evidence, any or all of the components amplifying or transmitting the sound.

(B) Any peace officer, as defined in Chapter 4.5 (commencing with Section 830) of the Penal Code, who encounters evidence of a prima facie violation of this section whereby the component(s) amplifying or transmitting the sound are attached to a vehicle may, in accordance with the provisions of California Vehicle Code section 22655.5, impound the vehicle, as containing evidence of a criminal offense, when the amplifying and/or transmitting component(s) cannot be readily removed from the vehicle without damaging the component(s) or vehicle.

(c) Animals

(1) The keeping or maintenance, or the permitting to be kept or maintained upon any premises owned, occupied, or controlled by any person of any animal or animals which by any frequent or long-continued noise, shall cause annoyance or discomfort to a reasonable person of normal sensitiveness in the vicinity.

(2) The noise from any such animal or animals that disturbs two or more residents residing in separate residences adjacent to any part of the property on which the subject animal or animals are kept or maintained, or three or more residents residing in separate residences in close proximity to the property on which the subject animal or animals are kept or maintained shall be prima facie evidence of a violation of this section.



- (d) Hospitals, Schools, Libraries, Rest Homes, Long–Term Medical or Mental Care Facilities

To make noise adjacent to a hospital, school, library, rest home, or long–term medical or mental care facility, which noise unreasonably interferes with the workings of such institutions or which disturbs or unduly annoys occupants in said institutions.

- (e) Playing of Radios on Buses and Trolleys

The operation of any radio, phonograph, or tape player on an urban transit bus or trolley so as to emit noise that is audible to any other person in the vehicle is prohibited.

- (f) Playing of Radios, Phonographs, and Other Sound Production or Reproduction Devices in Public Parks and Beach Areas and Public Parking Lots and Streets Adjacent Thereto.

The operation of any radio, phonograph, television set, or any other sound production or reproduction device in any public park or on any public beach or any public parking lot or street adjacent to such park or beach, without the prior written approval of the City Manager or the Administrator, in such a manner that such radio, phonograph, television set or sound production or reproduction device emits a sound level exceeding those found in the following table at any point ten (10) feet or more from the noise source is prohibited:

**TABLE OF APPLICABLE LIMITS**

| Time of Day.....            | Sound Level Limit |
|-----------------------------|-------------------|
| 7 a.m. to 7 p.m. ....       | 65 decibels       |
| 7:01 p.m. to 6:59 a.m. .... | 55 decibels       |

- (g) Leaf Blowers

- (1) A “leaf blower” means any portable, hand–held or back pack, engine powered device with a nozzle that creates a directable airstream which is capable of and intended for moving leaves and light materials.
- (2) No person shall operate a leaf blower in any residential zoned area between the hours of 7 p.m. and 8 a.m. on weekdays and 5 p.m. and 9

a.m. on weekends or on legal holidays specified in section 21.04 of this Code.

- (3) After October 9, 1991 and through June 30, 1993, no person may operate any leaf blower at a sound level in excess of 70 decibels measured at a distance of 50 feet or greater from the point of noise origin. Beginning on July 1, 1993, no person may operate any leaf blower at a sound level in excess of 65 decibels measured at a distance of 50 feet or greater from the point of noise origin.
- (4) Beginning on July 1, 1993, leaf blowers shall be equipped with functional mufflers and an approved sound limiting device required to ensure that the leaf blower is not capable of generating a sound level exceeding any limit prescribed in this section.
- (5) All litter and debris generated by leaf blower operation shall be cleaned up and disposed of in accordance with Chapter 9, Article 4, of this Code.

*(Amended 9-9-1991 by O-17676 N.S.)*

**§59.5.0503 Burglar Alarms**

- (a) Audible burglar alarms for structures or motor vehicles are prohibited unless the operation of such burglar alarms can be terminated within 20 minutes of being activated.
- (b) Notwithstanding the requirements of this provision, any member of the Police Department of The City of San Diego shall have the right to take such steps as may be reasonable and necessary to disconnect any such alarm installed in any building, dwelling, or motor vehicle at any time during the period of its activation. On or after thirty (30) days from the effective date of this article, any building, dwelling or motor vehicle upon which a burglar alarm has been installed shall prominently display the telephone number at which communication may be made with the owner of such building, dwelling, or motor vehicle.

*(Amended 1-3-1984 by O-16100 N.S.)*

**Article 9.5: Noise Abatement and Control**

**Division 6: Violations And Enforcement**

*(“Violations And Enforcement”  
added 9-18-1973 by O-11122 N.S.)*

**§59.5.0601 Violations: Misdemeanors**

Any person violating any of the provisions of this article shall be deemed guilty of a misdemeanor and upon conviction thereof shall be fined in an amount not exceeding one thousand dollars (\$1000.00) or be imprisoned in the City or County jail for a period not exceeding six (6) months, or by both such fine and imprisonment. Each day such violation is committed or permitted to continue shall constitute a separate offense and shall be punishable as such.

Notwithstanding the above described penalties, following the conviction of a defendant for any prima facie violations of this article, the prosecutor may bring a motion requesting the court to order the destruction of any or all of the components amplifying or transmitting the sound.

*(Amended 10-30-1989 by O-17380 N.S.)*

**§59.5.0602 Violations: Additional Remedies: Injunctions**

As an additional remedy, the operation or maintenance of any activity, device, instrument, vehicle or machinery in violation of any provision of this article, which operation or maintenance causes discomfort or annoyance to reasonable persons of normal sensitiveness or which endangers the comfort, repose, health, or peace of residents in the area, shall be deemed, and is declared to be, a public nuisance, and may be subject to abatement summarily by a restraining order or injunction issued by a court of competent jurisdiction.

*(Amended 9-22-1976 by O-11916 N.S.)*

**§59.5.0604 Manner of Enforcement**

Violations of this article shall be prosecuted in the same manner as other misdemeanor violations of the San Diego Municipal Code; however, nothing in this article shall prevent the Administrator, in his enforcement of the provisions of this article for which he is responsible, from making efforts to obtain voluntary compliance by way of warning, notice, or educational means.

*(“Manner of Enforcement” added 9-18-1973 by O-11122 N.S.)*

**§59.5.0605 Display of Permits and Other Notices**

Any permit or certificate required herein shall be displayed or maintained on the premises designated on the permit.

*(“Display of Permits and Other Notices” added 9-18-1973 by O-11122 N.S.)*

**§59.5.0606 False and Misleading Statement: Unlawful Reproduction or Alteration of Documents**

(a) No person shall knowingly make a false or misleading statement or submit a false or misleading document to the Administrator as to any matter within his jurisdiction.

(b) No person shall make, reproduce, alter, or cause to be made, reproduced, or altered, a permit, certificate, or other document issued by the Administrator or required by this article.

*(Amended 9-22-1976 by O-11916 N.S.)*

**§59.5.0607 Severability**

If any provision, clause, sentence, or paragraph of this article or the application thereof to any person or circumstances shall be held invalid, such invalidity shall not affect the other provisions or applications of the provisions of this article which can be given effect without the invalid provision or application, and to this end the provisions of this article are hereby declared to be severable.

*(“Severability” added 9-22-1976 by O-11916 N.S.)*

**Article 9.5: Noise Abatement and Control**

**Division 8: Sound Trucks — Loud Speakers — Sound Amplifiers**

*(“Sound Trucks — Loud Speakers — Sound Amplifiers”  
added 2–23–1987 by O–16813 N.S.)*

**§59.5.0801 Sound Trucks — Loud Speakers — Sound Amplifiers Defined**

- (a) “Sound Truck” — shall mean any motor vehicle, or any other vehicle regardless of motive power, whether in motion or stationary, having mounted thereon or attached thereto, any sound amplifying equipment.
- (b) “Sound Amplifying Equipment” — the words, “sound amplifying equipment” as used herein shall mean any machine or device for the amplification of the human voice, music or any other sound. “Sound amplifying equipment” as used herein shall not be construed as including standard automobile radios when used and heard only by occupants of the vehicle in which installed or warning devices on authorized emergency vehicles or horns or other warning devices on other vehicles used only for traffic safety purposes.

*(“Sound Trucks — Loud Speakers — Sound Amplifiers Defined” added 2–23–1987 by O–16813 N.S.)*

**§59.5.0802 Noncommercial Use of Sound Trucks — Registration Required**

It shall be unlawful for any person to use or cause to be used a sound truck with its sound amplifying equipment in operation for noncommercial purposes in the City of San Diego before filing a registration statement with the Director of the Communications Division of the General Services Department. This registration statement shall be filed in duplicate and shall state the following:

- (a) Name and home address of the applicant;
- (b) Address of place of business of applicant;
- (c) License number and body style, make and year of the sound truck to be used by applicant;
- (d) Name and address of person who owns the sound truck;
- (e) Name and address of person having direct charge of the sound truck;

- (f) Names and addresses of all persons who will use or operate the sound truck;
- (g) The purpose for which the sound truck will be used;
- (h) A general statement as to the section or sections of the City in which the sound truck will be used;
- (i) The proposed hours of operation of the sound truck;
- (j) The number of days of proposed operation of the sound truck;
- (k) A general description of the sound amplifier and of each accessory unit to be used with it.

*(“Noncommercial Use of Sound Trucks — Registration Required” added 2–23–1987 by O–16813 N.S.)*

**§59.5.0803 Endorsement of Registration Statement of Noncommercial Sound Trucks**

All persons using or causing to be used sound trucks for noncommercial purposes shall submit their sound trucks together with the sound amplifying and sound reproducing equipment which they intend to use to an inspection to be given by or under the direction of the Director of the Communication Division of the General Services Department of the City of San Diego. The Deputy Director shall test said equipment in the course of his inspection and shall endorse the original registration statement of the person applying for a permit, together with the copies of said statement, if said equipment may be calibrated and/or controlled so as to comply with the regulations provided in this Division. Said endorsement shall designate the calibration or points at which the controls of the sound amplifying and reproducing equipment may be set in order to maintain the maximum sound level permissible under the regulatory provisions of this Division.

*(“Endorsement of Registration Statement of Noncommercial Sound Trucks” added 2–23–1987 by O–16813 N.S.)*

**§59.5.0804 Registration Statement Amendment**

Any person using, or causing to be used, sound trucks for noncommercial purposes shall amend any registration statement filed pursuant to Section 59.5.0802 within forty-eight (48) hours after any change in the information therein furnished.

*(“Registration Statement Amendment” added 2–23–1987 by O–16813 N.S.)*

**§59.5.0805 Registration and Identification**

The Director of the Communications Division of the General Services Department shall return to each applicant under Section 59.5.0802 one copy of said registration statement duly certified by the Director of the Communications Division of the General Services Department as a correct copy of said application. Said certified copy of the application, as endorsed, shall be in the possession of any person operating the sound truck at all times while the sound truck's sound amplifying equipment is in operation and said copy shall be promptly displayed and shown to any officer of the City of San Diego, upon request.

*("Registration and Identification" added 2-23-1987 by O-16813 N.S.)*

**§59.5.0806 Regulations for Use**

Noncommercial use of sound trucks in the City of San Diego with sound amplifying equipment in operation shall be subject to the following regulations:

- (a) The only sounds permitted are music or human speech.
- (b) Operations are permitted between the hours of 8:00 a.m. and 9:00 p.m. at and during public events and affairs of interest to the general public.
- (c) Sound amplifying equipment shall not be operated unless the sound truck upon which such equipment is mounted is operated at a speed of at least ten (10) miles per hour except when said truck is stopped or impeded by traffic. Where stopped by traffic the said sound amplifying equipment shall not be operated for longer than one minute at each stop.
- (d) Sound shall not be issued within one hundred (100) yards of hospitals, schools, churches, or courthouses.
- (e) No sound truck with its amplifying device in operation shall be operated within the Central Traffic District of the City of San Diego as said Central Traffic District is defined in Chapter 8.
- (f) The human speech and music amplified shall not be obscene, lewd, indecent or slanderous.
- (g) The volume of sound shall be controlled so that said volume is not unreasonably loud, raucous, jarring, disturbing or a nuisance to persons within the area of audibility and so that the volume of sound shall not exceed an "A"

weighted sound level of 65 decibels on the “slow” scale at a distance of 50 feet from the sound amplifying equipment as measured by a sound level meter which meets “American National Standard” ANSI S1.4–1983 or its successor.

- (h) No sound amplifying equipment shall be operated unless the axis of the center of any sound reproducing equipment used shall be parallel to the direction of travel of the sound truck; provided, however, that any sound reproducing equipment may be so placed upon said sound truck as to not vary more than 15 (degrees) either side of the axis of the center of the direction of travel.
- (i) No sound truck with its amplifying device in operation shall be driven on the same street past the same point more than twice in a period of one hour.
- (j) It shall be unlawful to operate a noncommercial sound truck in violation of these regulations.

*(“Regulations for Use” added 2–23–1987 by O–16813 N.S.)*

**§59.5.0807 Commercial Use Sound Truck Regulated — License Required**

It shall be unlawful for any person to operate or cause to be operated any sound truck in the City of San Diego for commercial advertising purposes with sound amplifying equipment in operation unless an application has been made to the Director of the Communications Division of the General Services Department and said application has been approved and endorsed. The Director shall inspect and test said sound truck together with its sound amplifying and sound reproducing equipment to operate and conform to the regulatory provisions provided in Section 59.5.0806.

Said sound trucks shall be inspected on an annual basis to insure that their operation remains in conformity to the regulatory provisions contained in Section 59.5.0806. In the event said sound truck is found in violation of any regulatory provision contained in Section 59.5.0806, said violation shall be cause for revocation of such license.

*(“Commercial Use Sound Truck Regulated — License Required” added 2–23–1987 by O–16813 N.S.)*

**§59.5.0808 Application for License**

Persons applying for the license required under Section 59.5.0807, shall file with the Director of the Communications Division of the General Services Department an application in writing, giving in said application the information required in the registration statement required in Section 59.5.0802 and deposit the fee prescribed therefor in the City Composite Rate Schedule.

*(“Application for License” added 2–23–1987 by O–16813 N.S.)*



**§59.5.0809 Issuance of License**

A license shall be issued under Section 59.5.0807 upon payment of the required permit fee, unless the application required in Section 59.5.0808 hereof has been denied by the Director of the Communications Division of the General Services Department as indicated by writing or stamping with his signature “DENIED” on a copy of the license application.

*(“Issuance of License” added 2-23-1987 by O-16813 N.S.)*

**§59.5.0810 Possession and Display of License**

A licensee shall keep such license in his possession in the sound truck during the time the sound truck’s sound amplifying equipment is in operation. The license shall be promptly displayed and shown to any officer of the City of San Diego, upon request.

*(“Possession and Display of License” added 2-23-1987 by O-16813 N.S.)*

**§59.5.0811 Regulations for Use**

It shall be unlawful for any person to operate or cause to be operated any sound truck for commercial sound advertising purposes in violation of the regulations set forth in Section 59.5.0806.

*(“Regulations for Use” added 2-23-1987 by O-16813 N.S.)*

# CONSTRUCTION NOISE MODELING

















| Attenuation Calculation |                        |               |                                |               |
|-------------------------|------------------------|---------------|--------------------------------|---------------|
| Activity Phase          | Mira Montana Residence |               | Torrey Pines Extention (Trail) |               |
|                         | dBA Leq                | distance (ft) | dBA Leq                        | distance (ft) |
| Demo/Haul               | 70                     |               | 69.5                           |               |
| Site Prep               | 70                     |               | 69.5                           |               |
| Grading                 | 70                     |               | 69.5                           |               |
| Utility Trenchin        | 60                     | 330           | 59.5                           | 350           |
| Building Construction   | 69                     |               | 68.5                           |               |
| Paving                  | 70                     |               | 69.5                           |               |
| Architectural Coating   | 57                     |               | 56.5                           |               |

Attenuation calculated through Inverse Square Law:  $L_n = 20\text{Log}(R1/R2)^2$