

A P P E N D I X K

N O I S E D A T A



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

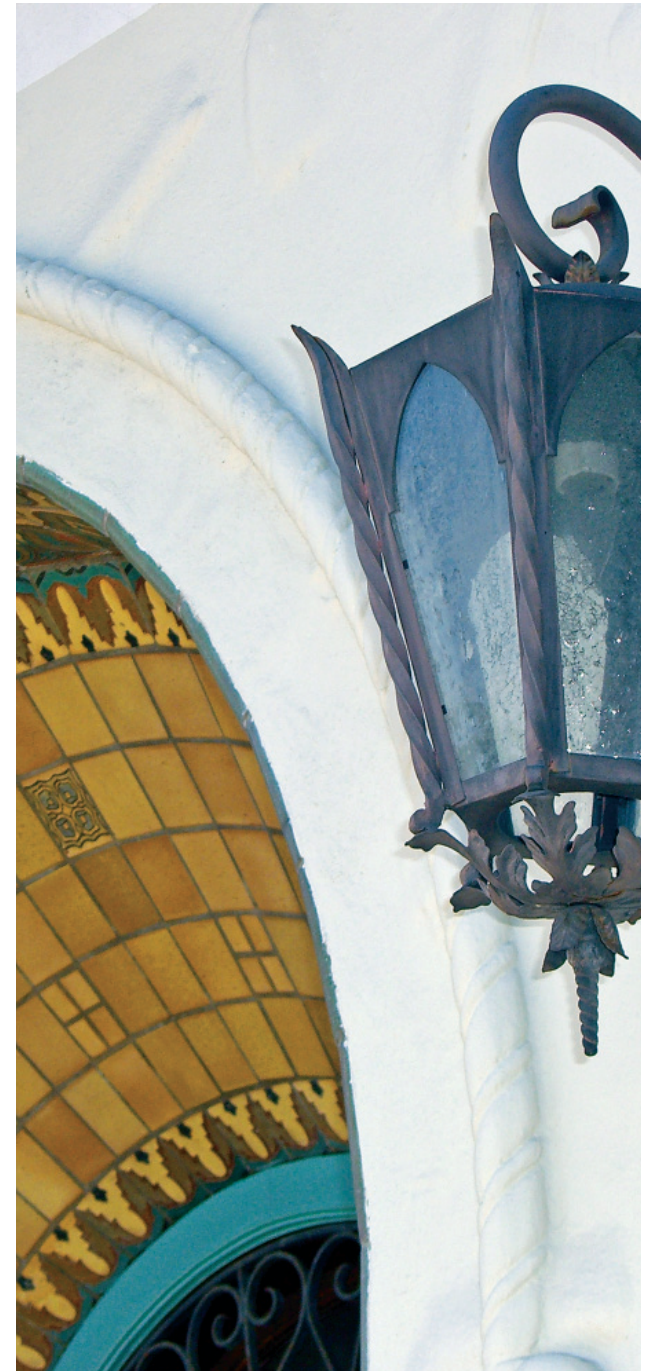
Vibration Level, PPV (in/sec)	Human Reaction	Effect on Buildings
0.006–0.019	Threshold of perception, possibility of intrusion	Vibrations unlikely to cause damage of any type
0.08	Vibrations readily perceptible	Recommended upper level of vibration to which ruins and ancient monuments should be subjected
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). 2013, September. Transportation and Construction Vibration Guidance Manual.

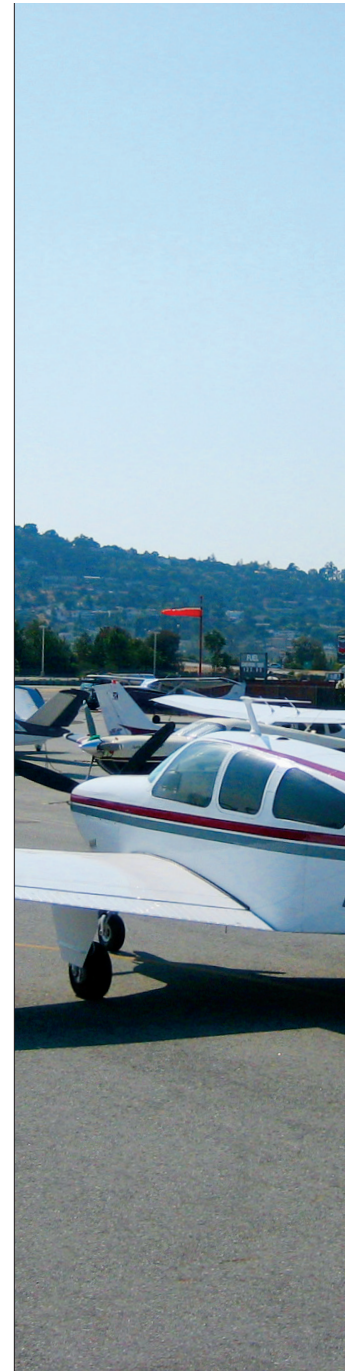
LOCAL REGULATIONS AND STANDARDS

SAN CARLOS 2030 GENERAL PLAN

ADOPTED OCTOBER 12, 2009



NOISE ELEMENT 9



The purpose of the Noise Element is to identify sources of noise in San Carlos and to define strategies for reducing the negative impact of noise to the community. Noise is an environmental pollutant that can threaten the quality of life and human health by causing annoyance or disrupting sleep and everyday activities. With the presence of significant noise sources in San Carlos, including Highway 101, El Camino Real, the Caltrain corridor and the San Carlos Airport, reducing the negative impact of unwanted and excessive noise is an important aspect of maintaining the city's high quality of life and community character.

Contents

- 226 Introduction
- 227 Background Information
 - Noise Terminology
 - Noise Control Ordinance 1086
 - Land Use Compatibility
 - Existing Noise
 - Future Noise
- 239 Goals, Policies and Actions



Introduction

State law requires that the General Plan include a Noise Element, which is to be prepared according to guidelines adopted by the California Office of Noise Control (ONC). In accordance with State law requirements, this Noise Element provides a systematic approach to limiting community exposure to noise, including the following components:

- Quantitative analysis, based on noise measurements and modeling of major existing and future noise sources in the community, including both mobile and stationary sources;
- Mapping of generalized noise level contours to be used as a basis for land use decision-making; and

- Goals, policies and actions to address community exposure to existing and projected noise sources.

The Noise Element describes compatible land uses for varying noise levels, provides background information on existing sources of noise and projects noise conditions in 2030.

The Noise Element is divided into two basic sections:

- Background Information
- Goals, Policies and Actions

Background Information

The following provides a discussion of existing and future noise sources within San Carlos, as well as how these noise sources affect the various land use types in the city. Major noise sources that will be addressed include transportation sources such as traffic, public transit and airport and industrial operations.

The Noise Element should provide a systematic approach to the measurement and modeling of noise; the establishment of noise standards; the control of major noise sources; and community planning for the regula-

tion of noise. This Noise Element provides baseline information on the existing noise environment based on noise measurements taken throughout the city and identifies noise-sensitive uses in San Carlos.

According to State Government Code and the State Office of Noise Control Guidelines, the following major noise sources should be considered in the preparation of a Noise Element:

- Highways and freeways.
- Primary arterials and major local streets.
- Railroad operations.
- Aircraft and airport operations.
- Local industrial facilities.
- Other stationary sources.

The Noise Element establishes uniformity between City policy and programs undertaken to control and abate environmental noise. The California Government Code and State Office of Noise Control Guidelines require that certain major noise sources and areas containing noise-sensitive land uses be identified and quantified by preparing generalized noise exposure

contours for current and projected levels of activity within the community. The noise exposure information developed for the Noise Element is incorporated into the General Plan to serve as a basis for achieving land use compatibility with respect to noise. Noise exposure information is also used to provide baseline levels and noise source identification for use in the development and enforcement of a local noise control ordinance and for ensuring compliance with the State's noise insulation standards, which are discussed in more detail below.

Noise Terminology

The discussion of noise requires the use of a number of technical terms. Some of the key noise-related terms used in this Element include:

- **Decibel (dB).** A decibel is a unit of measurement which indicates the relative amplitude of a sound. The zero on the decibel scale is based on the lowest sound level that the healthy, unimpaired human ear can detect. Sound levels in decibels are calculated on a logarithmic basis. Each 10 decibel increase in sound level is perceived as approximately a doubling of loudness over a fairly wide range of intensities.
- **A-weighted sound level (dBA).** The A-weighted sound level is the most common method to characterize sound in California. This scale gives greater weight to the frequencies of sound to which the human ear is most sensitive. All sound levels in this chapter are A-weighted, unless reported otherwise.
- **Energy-equivalent sound/noise level (L_{eq}).** L_{eq} describes the average level that has the same acoustical energy as the summation of all the time-varying events. This descriptor is useful because sound levels can vary markedly over a short period of time. The most common averaging period for L_{eq} is hourly, but it can be of any duration.
- **Day/night average sound level (L_{dn}).** Since the sensitivity to noise increases during the evening and at night, 24-hour descriptors have been developed that incorporate artificial noise penalties added to quiet-time noise events. L_{dn} is a measure of the cumulative noise exposure in a community, with a 10 dB addition to nocturnal (10:00

p.m. to 7:00 a.m.) noise levels. This is the measurement that the City of San Carlos normally uses in noise evaluations and analysis.

- **Community Noise Equivalent Level (CNEL).** CNEL is the energy average of the A-weighted sound levels occurring during a 24-hour period, with 10 dB added to the A-weighted sound levels occurring between 10:00 p.m. and 7:00 a.m. and 5 dB added to the A-weighted sound levels occurring between 7:00 p.m. and 10:00 p.m.

Noise Control Ordinance 1086

The City of San Carlos' noise ordinance is intended to protect residents and visitors to San Carlos from unreasonable noise associated with machines, persons, or devices. It specifies that unreasonable noise is that which exceeds 10 dBA above local ambient noise levels. Noise levels are measured at a distance of 49 feet from the property lines of either public or private property. Some noise sources are exempt from these regulations, including transportation, construction, home workshops or gardening tools and solid waste pick-up. Violations of the specified noise levels are monitored by the San Carlos Police Department and are considered misdemeanors.

Land Use Compatibility

Land uses deemed as noise sensitive by the State of California include schools, hospitals, rest homes, long-term care and mental care facilities. Many jurisdictions consider residential uses particularly noise sensitive because families and individuals expect to use time in the home for rest and relaxation and noise can interfere with these activities. Some variability in standards for noise sensitivity may apply to different densities of residential development; single-family uses are frequently considered the most sensitive. Jurisdictions may identify other uses as noise sensitive such as churches, libraries, day care centers and parks.

Land uses that are relatively insensitive to noise include some office, commercial and retail developments. There is a range of insensitive noise receptors which generate significant noise levels or where human occupancy is typically low. Examples of insensitive uses include industrial and manufacturing uses, utilities, agriculture, vacant land, parking lots and transit terminals.

To assist with evaluating the compatibility of land uses with various noise levels, the California General Plan

9 NOISE ELEMENT

Guidelines compare the compatibility of noise levels with various land uses. Figure 9-1 summarizes the Guidelines' recommendations.

Research determined how much noise is acceptable for different land uses. In the mid-1970s, the Environmental Protection Agency concluded that a noise level of 55 dBA L_{dn} (including a 5 dBA margin of safety) would have "no impact" on a residence. The State of California built upon this information and established guidelines suggesting 60 dBA L_{dn} as an upper limit for acceptable environmental noise in a residential setting. Certain land uses are sensitive to noise outdoors and exterior noise thresholds are appropriate.

Other land uses are only sensitive to noise indoors (e.g. professional office spaces, high-density housing in a downtown area).

One of the requirements of a Noise Element is to facilitate the noise insulation standards contained in the State Building Code that are applicable to new multi-family housing development. Where the exterior noise exposure level is 60 dBA L_{dn} or greater, the residential building must attenuate the interior noise level to 45

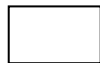
dBA L_{dn} or less in residential living areas. The intent of the Noise and Land Use Compatibility Guidelines is to achieve an interior noise level of 45 dBA L_{dn} or less in all new residential housing. Three acceptability categories are identified: normally acceptable, conditionally acceptable and unacceptable. In the normally acceptable category, a use would be acceptable without additional mitigation measures. In the conditionally acceptable category, the use would be acceptable with the application of mitigation measures. In the unacceptable category, the use may be unacceptable even after the application of available mitigation measures.

Existing Noise

A noise study was completed as part of the General Plan update and included noise measurements along major roadways. The major noise sources in San Carlos are vehicular traffic on major roadways, railroad operations along the Caltrain corridor and the San Carlos Airport. Table 9-2 details the current traffic noise levels for major roadways in San Carlos.

FIGURE 9-1 LAND USE COMPATIBILITY FOR COMMUNITY NOISE ENVIRONMENT						
Land Use Category	Exterior Noise Exposure (L_{dn})					
	55	60	65	70	75	80
Single-Family Residential						
Multi-Family Residential, Hotels and Motels		a				
Outdoor Sports and Recreation, Neighborhood Parks and Playgrounds						
Schools, Libraries, Museums, Hospitals, Personal Care, Meeting Halls, Churches						
Office Buildings, Business, Commercial and Professional						
Auditoriums, Concert Halls, Amphitheaters						

^a See Policy NOI-1.5.



NORMALLY ACCEPTABLE. Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special insulation requirements.



CONDITIONALLY ACCEPTABLE. Specified land use may be permitted only after detailed analysis of the noise reduction requirements and needed noise insulation features included in the design.



UNACCEPTABLE. New construction or development should generally not be undertaken because mitigation is usually not feasible to comply with noise element policies.

TABLE 9-1 NON-TRANSPORTATION NOISE STANDARDS

Land Use Receiving the Noise	Hourly Noise-Level Descriptor	Exterior Noise-Level Standard In Any Hour (dBA)		Interior Noise-Level Standard In Any Hour (dBA)	
		Daytime (7am-10pm)	Nighttime (10pm-7am)	Daytime (7am-10pm)	Nighttime (10pm-7am)
Residential	L _{en}	55	45	40	30
	L _{max}	70	60	55	45
Medical, convalescent	L _{eo}	55	45	45	35
	L _{max}	70	60	55	45
Theater, auditorium	L _{eo}	--	--	35	35
	L _{max}	--	--	50	50
Church, meeting hall	L _{en}	55	--	40	40
	L _{max}	--	--	55	55
School, library, museum	L _{eo}	55	--	40	--
	L _{max}	--	--	55	--

Notes:

1. The Residential standards apply to all residentially zoned properties.
2. Each of the noise levels specified above shall be lowered by 5 dBA for tonal noises characterized by a whine, screech, or hum, noises consisting primarily of speech or music, or recurring impulsive noises.
3. In situations where the existing noise level exceeds the noise levels indicated in the above table, any new noise source must include mitigation that reduces the noise level of the noise source to the existing level.
4. The exterior noise standards are measured at any point on the receiving property where there is, or could be in the future, frequent human use and quiet would be beneficial.
5. These standards do not apply to temporary sources such as construction activities.

TABLE 9-2 2009 VEHICULAR TRAFFIC NOISE ON MAJOR ROADWAYS

Major Roadway	Segment	L_{dn} at 75 ft, dBA* 2009 Existing
El Camino Real	North of Holly St	69
	San Carlos Ave to Brittan Ave	68
	Brittan Ave to Howard Ave	69
	South of Howard Ave	69
Holly Street	West of El Camino Real	62
	Old County Rd to Industrial Way	65
	East of Industrial Way	68
Old County Road	North of Holly St	63
	Holly St to Brittan Ave	64
	Brittan Ave to Howard Ave	64
	South of Holly St	62
Industrial Road	North of Holly St.	61
	Holly St to Brittan Ave	66
	South of Brittan Ave	66

Major Roadway	Segment	L_{dn} at 75 ft, dBA* 2009 Existing
San Carlos Avenue	North of Club Dr	63
	Club to Alameda de Las Pulgas	65
	Alameda de Las Pulgas to El Camino Real	62
	East of El Camino Real	59
	West of Alameda de Las Pulgas	61
Brittan Avenue	Alameda de Las Pulgas to El Camino Real	62
	Old County Rd to Industrial Way	64
	East of Industrial Way	64
Howard Avenue	West of El Camino Real	59
	East of Old County Rd	60
Dartmouth Avenue	East of San Carlos Ave	59
Club Drive	West of San Carlos Ave	57
Alameda de Las Pulgas	San Carlos Ave to Brittan Ave	62
	South of Brittan Ave	63

* Noise levels are given at a distance of 75 feet from the center of the roadway.

Vehicular

Traffic continues to be the most significant source of noise within San Carlos. Highway 101, as the dominant traffic noise source and El Camino Real (State Route 82), a major contributor to the noise environment, exhibit noise levels from 70 to 77 dBA L_{dn} at land uses immediately joining these roadways. Interstate 280 carries high volumes of traffic but does not affect existing developed areas within the city. Major arterials, including Holly Street, San Carlos Avenue, Alameda de Las Pulgas, Brittan Avenue, Old Country Road and Edgewood Road are significant noise sources and exhibit noise levels from 65 to 70 dBA L_{dn} at nearby land uses. Neighborhood streets such as Crestview Drive and Devonshire Boulevard exhibit noise levels from 60 to 65 dBA L_{dn} at nearby receivers. Residential neighborhoods insulated from through traffic have noise levels less than 60 dBA L_{dn} which is an acceptable level.

Railroad

The Caltrain railway roughly parallels Highway 101 and follows El Camino Real in the northeastern portion of the city. The San Carlos Caltrain station is near the intersection of El Camino Real and San Carlos Avenue.

In 2009, there were 35 scheduled weekday northbound stops per day and 35 scheduled weekday southbound stops per day at the San Carlos Caltrain Station. Day-night average noise levels are estimated to range from 67 to 69 dBA L_{dn} at a distance of 100 feet from the tracks. Train warning whistles can generate maximum noise levels of approximately 105 dBA at 100 feet and would be audible throughout the community. Trains are required to blow their horns at railroad stations, so L_{dn} noise levels in the station area will be substantially higher unless the City of San Carlos and Caltrain obtain Quiet Zone designations.

Trains are also a source of perceptible groundborne vibration within approximately 50 to 100 feet of the tracks. Ground-borne vibration occurs in areas adjacent to fixed rail lines when railroad trains pass through San Carlos. Ground vibration levels along the railroad corridors are proportional to the speed and weight of the trains as well as the condition of the tracks, train engine and car wheels. Vibration measurements conducted in San Carlos indicate that the acceptable vibration levels occur about 65 feet from the center of the near railroad track for the maximum measured train vibration level and about 55 feet from

the center of the near railroad track for typical train passbys.

Airport

Aircraft using San Carlos Airport intermittently contribute to ambient noise levels in the city. This general aviation airport is located in the northeast portion of the City of San Carlos east of Highway 101. The airport averages about 425 aircraft operations per day. Approximately 49 percent of aircraft operations are local general aviation, 48 percent are transient general aviation, 2 percent are air taxi operations and less than 1 percent are military operations. San Mateo County and the San Carlos Airport Pilot's Association promote noise reduction practices by airport users, including avoiding flying over sensitive areas. Existing noise contours for the San Carlos Airport are shown on Figure 9-2. Noise compatibility is regulated by the City/County Association of Governments of San Mateo County (C/CAG) Airport Land Use Commission for the County's airports. The San Mateo County Comprehensive Airport/Land Use Plan (CLUP), adopted by C/CAG in 1996, is a State-mandated document that promotes airport/land use compatibil-

ity. Table IV-2 of the CLUP includes noise compatibility standards.

Aircraft noise in California is described in terms of the CNEL. The noise levels measured in CNEL are approximately equivalent to noise measured with the day/night average noise level (Ldn) but include an additional 5 dB weighting factor for the evening hours (7:00 p.m. to 10:00 p.m.).

Jet aircraft to and from the Mineta, San José and San Francisco International Airports generate intermittent noise when passing over the City of San Carlos. Noise generated by these over-flights, although audible and noticeable in quiet areas above other ambient noise sources, do not contribute to daily average noise levels in the city.

Non-Vehicular

There are no known stationary noise sources that make a significant contribution to the community's noise environment. The majority of commercial and industrial land uses within San Carlos are located east-northeast of El Camino Real and may be minor contributors to

FIGURE 9-2

San Carlos Airport Noise Contour Map

City Limit

Sphere of Influence Areas

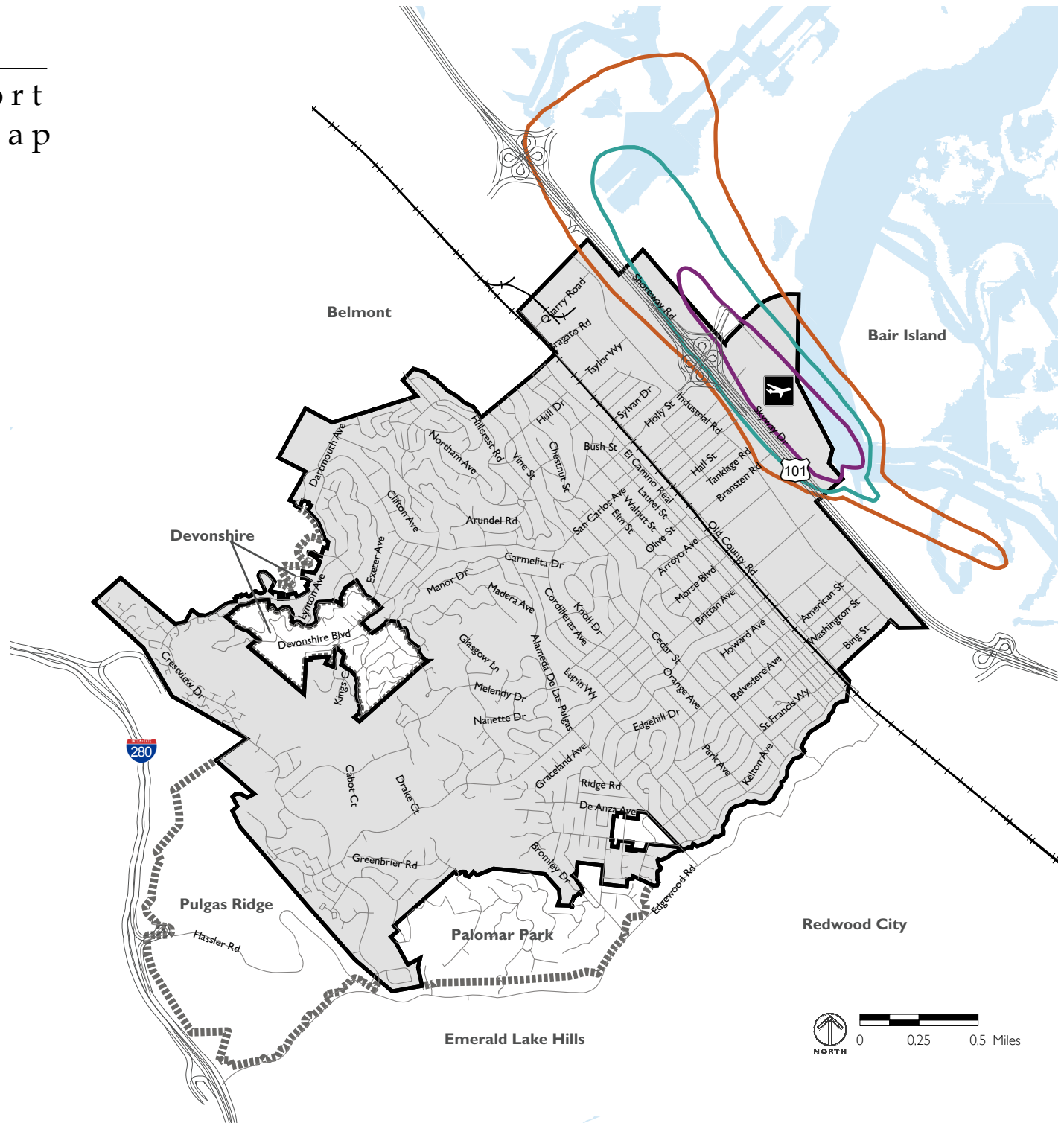
Airport Noise Contours

55 CNEL

60 CNEL

65 CNEL

Source: San Carlos Airport Master Plan Update
Airport Modernization Draft EIR (June 2002).



the noise environment, while Highway 101, major arterial roadways and the railroad contribute significantly.

Future Noise

The noise environment in San Carlos is not expected to change as a result of the implementation of the General Plan. Vehicular traffic noise, the dominant source throughout the city, is not anticipated to change substantially along local streets or major through routes, including Highway 101 and El Camino Real. Aircraft noise in the region and sources of non-transportation noise are similarly not anticipated to increase in the community. Figure 9-3 shows the projected noise contours at buildout of the General Plan.

Currently, California is considering construction of a high-speed train system that would link the San Francisco Bay Area and Los Angeles. The plan would be for high-speed trains to operate through San Carlos on or near the existing Caltrain right-of-way. Numerous at-grade crossings along the Caltrain corridor would need to be eliminated in order to facilitate the high-speed trains, which would reduce noise from the sounding of railroad train horns. The high-speed trains would likely use electric power cars, which

would eliminate the low frequency rumble associated with diesel-powered locomotives. However, overall high-speed train noise levels may increase over conventional trains due to the aerodynamic effects. Vibration of the ground caused by the passby of high-speed trains is expected to be similar to that caused by conventional steel wheels/steel rail trains. As information becomes available, it should be incorporated into the Noise Element and utilized accordingly in noise/vibration and land use planning.



View of Downtown from San Carlos train station

FIGURE 9-3

2030 Traffic and Railroad Noise Level Contours

- City Limit
- Sphere of Influence Areas
- Traffic Noise Level
 - < 55 db(A)
 - 55 - 60 db(A)
 - 60 - 65 db(A)
 - 65 - 70 db(A)
 - 70 - 75 db(A)
 - > 75 db(A)

Source: Illingworth and Rodkin, 2009.

Note: Calculations assume an acoustically hard ground surface and do not take shielding from structures or barriers into account.





Guiding Principles

The Guiding Principles are a set of key objectives that articulate San Carlos' core values relating to noise. The following Guiding Principle establishes a framework for the basic intent of this Element and is a broad statement of overall community value relating to noise in San Carlos:

- Maintain a community with a noise environment that supports a high quality of life.



Caltrain platform

Goals, Policies and Actions



GOAL NOI-1

Encourage compatible noise environments for new development and control sources of excessive noise citywide.

POLICIES

POLICY NOI-1.1 Use the Noise and Land Compatibility Standards shown in Figure 9-1, the noise level performance standards in Table 9-1 and the projected future noise contours for the General Plan shown in Figure 9-3 and detailed in Table 9-2, as a guide for future planning and development decisions.

POLICY NOI-1.2 Minimize noise impacts on noise-sensitive land uses. Noise-sensitive land uses include residential uses, retirement homes, hotel/motels, schools, libraries, community centers, places of

9 NOISE ELEMENT



public assembly, daycare facilities, churches and hospitals.

POLICY NOI-1.3 Limit noise impacts on noise-sensitive uses to noise level standards as indicated in Table 9-1.

POLICY NOI-1.4 Require a detailed acoustic report in all cases where noise-sensitive land uses are proposed in areas exposed to exterior noise levels of 60 CNEL Ldn or greater. If recommended in the report, mitigation measures shall be required as conditions of project approval.

POLICY NOI-1.5 New development of noise-sensitive land uses proposed in noise-impacted areas shall incorporate effective mitigation measures into the project design to reduce exterior and interior noise levels to the following acceptable levels:

a. For new single-family residential development, maintain a standard of 60 Ldn (day/night average noise level) for exterior noise in private use areas.

b. For new multi-family residential development maintain a standard of 65 Ldn in community outdoor recreation areas. Noise standards are not applied to private decks and balconies and shall be considered on a case-by-case basis in the downtown core.

c. Interior noise levels shall not exceed 45 Ldn in all new residential units (single- and multi-family). Development sites exposed to noise levels exceeding 60 Ldn shall be analyzed following protocols in Appendix Chapter 12, Section 1208, A, Sound Transmission Control, 2001 Building Code Chapter 12, Appendix Section 1207.11.2 of the 2007 California Building Code (or the latest revision).

d. Where new residential units (single- and multi-family) would be exposed to intermittent noise levels generated during train operations, maximum railroad noise levels in-

side homes shall not exceed 50 dBA in bedrooms or 55 dBA in other occupied spaces. These single event limits are only applicable where there are normally four or more train operations per day.

POLICY NOI-1.6 Where noise mitigation measures are required to achieve the noise level standards, the emphasis of such measures shall be placed upon site planning and project design. The use of noise barriers shall be considered after practical design-related noise mitigation measures have been integrated into the project.

POLICY NOI-1.7 The City shall seek to reduce impacts from ground-borne vibration associated with rail operations by requiring that vibration-sensitive buildings (e.g. residences) are sited at least 100 feet from the centerline of the railroad tracks whenever feasible. The development of vibration-sensitive buildings within 100 feet from the centerline of

the rail-road tracks would require a study demonstrating that ground borne vibration issues associated with rail operations have been adequately addressed (i.e. through building siting, foundation design and construction techniques).

POLICY NOI-1.8 During all phases of construction activity, reasonable noise reduction measures shall be utilized to minimize the exposure of neighboring properties to excessive noise levels.

a. Construction activities shall comply with the City's noise ordinance.

POLICY NOI-1.9 Minimize potential transportation-related noise through the use of setbacks, street circulation design, coordination of routing and other traffic control measures and the construction of noise barriers and consider use of "quiet" pavement surfaces when resurfacing roadways.

POLICY NOI-1.10 Ensure that mixed-use development projects are designed to minimize noise impacts on residential units.

POLICY NOI-1.11 Ensure that proposed noise sensitive land uses include appropriate mitigation to reduce noise impacts from aircraft operations at San Carlos Airport. Work with the San Carlos Airport Pilots Association and San Mateo County to continue to refine and implement the Airport's noise abatement procedures.

POLICY NOI-1.12 Ensure consistency with the noise compatibility policies and criteria contained in the San Carlos Airport Land Use Plan.

POLICY NOI-1.13 Require a noise analysis for new residential uses located within the 55 CNEL impact area of the San Carlos Airport. If recommended in the report, mitigation measures shall be required as conditions of project approval.

POLICY NOI-1.14 The Federal Transit Administration vibration impact criteria and assessment methods shall be used to evaluate the compatibility of train vibration with proposed land uses adjoining the UPRR (Caltrain) corridor. Site specific vibration studies shall be completed for vibration-sensitive uses proposed within 100 feet of active railroad tracks.

ACTIONS

ACTION NOI-1.1 Establish a noise abatement protocol for existing sensitive land uses located in areas anticipated to experience significant noise increases with the implementation of the General Plan. Cumulative traffic noise impacts on existing noise-sensitive uses could be reduced through the inclusion of exterior and/or interior sound-reduction measures such as set-backs, noise barriers, forced-air mechanical ventilation and sound rated window construction. The

City should research sources of funding for these actions.

ACTION NOI-1.2 Revise the City’s Noise Ordinance to be consistent with this Element.

ACTION NOI-1.3 Require residents of new mixed-use developments to be informed of potential noise from refuse collection and other activities typically associated with commercial activity.

ACTION NOI-1.4 Require the evaluation of mitigation measures for projects that would cause the following criteria to be exceeded or would cause a significant adverse community response:

- a. Cause the Ldn at noise-sensitive uses to increase by 3 dB or more and exceed the “normally acceptable” level.
- b. Cause the Ldn at noise-sensitive uses to increase 5 dB or more and remain “normally acceptable.”

c. Cause noise levels to exceed the limits in Table 9-1.

ACTION NOI-1.5 Enforce Section 27007 of the California Motor Vehicle Code that prohibits amplified sound that can be heard 50 or more feet from a vehicle.

ACTION NOI-1.6 Enforce Section 27150 of the California Motor Vehicle Code that addresses excessive exhaust noise.

ACTION NOI-1.7 Update and review procedures for dealing with noise complaints in the community.

ACTION NOI-1.8 Evaluate the necessity of requesting Caltrain to establish a Quiet Zone designation for San Carlos.

Chapter 9.30

NOISE CONTROL

Sections:

[9.30.010 Declaration of policy.](#)

[9.30.020 Definitions.](#)

[9.30.030 Basic noise regulation.](#)

[9.30.040 Permit to exceed noise levels.](#)

[9.30.050 Enforcement.](#)

[9.30.060 Violation—Penalty.](#)

[9.30.070 Exempt activities.](#)

9.30.010 Declaration of policy.

In accordance with the General Plan of the City which calls for the “maintenance and enhancement of quality residential areas,” it is declared that the policy of the City is to protect the peace, health and safety of its citizens from unnecessary and unreasonable noises produced by any machine, person or device. It shall also be the City’s policy to continuously evaluate the noise levels specified in the body of this chapter and adjust them as quieter equipment becomes available or as demanded by State and Federal requirements. (Ord. 1439 § 4 (Exh. B (part)), 2011: Ord. 1086 § 1 (part), 1991)

9.30.020 Definitions.

As used in this chapter:

A. “Ambient” means the lowest sound level repeating itself during a six-minute period, using the A scale, and with the sound meter set on “slow.” For the purpose of this chapter, in no case shall the ambient be considered less than thirty-five dBA. In cases in which the ambient level cannot be determined by field observation, the diagram showing existing noise levels contained in the General Plan Noise Element shall establish the appropriate ambient level.

B. “Emergency” means an unforeseen combination of circumstances which require immediate action.

C. “Noise level” means the maximum continuous sound level or repetitive peak level measured using the A scale set on “slow.”

D. “Precision sound level meter” means a device for measuring sound level in decibel units according to the American National Standards Institute.

E. “Sound level” shall be expressed in decibels (dBA) as defined by the American National Standards Institute using the A-level scale.

F. “Vehicle” means any device by which any person or property may be propelled, moved or drawn upon a highway or street or private property. (Ord. 1439 § 4 (Exh. B (part)), 2011: Ord. 1086 § 1 (part), 1991)

9.30.30 sic noise regulation.

Except as otherwise permitted under this chapter, no person shall cause and no property owner shall permit, as to property owned by him, a noise produced by any person, amplified sound or device, or any combination thereof in excess of the noise limits established in Table 18.21.050-A to emanate from any property, public or private, as measured at the receiving property line. (Ord. 1439 § 4 (Exh. B (part)), 2011: Ord. 1086 § 1 (part), 1991)

9.30.040 Permit to exceed noise levels.

A. The City Planner may grant an emergency permit to waive time and noise level limitations on equipment when it is required to protect lives or property.

B. Special events or circumstances may warrant temporary exception to noise levels established in this chapter. In such cases application for a permit may be made to the City Planner, stating in writing: (1) the name, address and telephone number of the property owner responsible for the activity; and (2) the purpose for which such permit is applied for, the date and beginning and ending time thereof, and a description of the sound-producing or sound-amplifying device to be used, together with a full statement of facts justifying noncompliance. Such permits shall be issued or denied based upon a balancing of the interests of the applicant against those of surrounding residents, and shall include consideration of duration of the permit, frequency of occurrence, number of persons benefited by the activity, and other similar factors.

C. Any applicant desiring to appeal from a denial of a permit by the City Planner shall notify the City Clerk of such appeal within ten days of the denial. The appeal shall be to the City Council. The City Council shall either affirm, overrule or modify the decision of the City Planner, based upon the factors set forth in this chapter.

D. All permits issued under this chapter shall be issued for a limited time period, except that permits for recurring athletic and social events sponsored by schools, churches or similar organizations may be issued for periods of twelve months.

E. The City may set a fee for this permit by resolution. (Ord. 1439 § 4 (Exh. B (part)), 2011: Ord. 1086 § 1 (part), 1991)

9.30.050 Enforcement.

Enforcement of this chapter shall fall under the jurisdiction of the San Carlos Police Department. The Department shall investigate alleged violations of the chapter on a complaint basis. (Ord. 1439 § 4 (Exh. B (part)), 2011: Ord. 1086 § 1 (part), 1991)

9.30.60 Violation—Penalty.

Violation of the provisions of this chapter shall be a misdemeanor. At the discretion of the Police Chief, the violation may be treated as an infraction punishable by a fine of up to two hundred fifty dollars for each violation. A violation of this chapter shall also be deemed to be a public nuisance. (Ord. 1439 § 4 (Exh. B (part)), 2011: Ord. 1086 § 1 (part), 1991)

9.30.070 Exempt activities.

The following noise-generating activities are exempt from the provisions of this chapter:

- A. Transportation facilities, such as freeways, airports, buses and railroads;
- B. Construction activities; such activities, however, shall be limited to the hours of eight a.m. to six p.m. Monday through Friday, and nine a.m. to five p.m. on Saturdays and Sundays. No construction noise-related activities on the following holidays: New Year's Day, Martin Luther King Jr. Day, President's Day, Memorial Day, 4th of July, Labor Day, Veteran's Day, Thanksgiving Day and Christmas Day. All gasoline-powered construction equipment shall be equipped with an operating muffler or baffling system as originally provided by the manufacturer, and no modification to these systems is permitted (the Building Official shall have the authority to grant exceptions to construction noise-related activities);
- C. Home workshop and gas-powered gardening equipment; such activities, however, shall be limited to the hours of eight a.m. to sunset Monday through Friday, and ten a.m. to sunset on Saturday, Sunday and holidays stated in subsection B of this section;
- D. Public works and public utilities activities; such activities, however, shall be limited to the hours set forth under subsection B of this section, except for emergency situations (the Public Works Director shall have the authority to grant exceptions to public works and public utilities construction noise-related activities);
- E. Emergency vehicles;
- F. Solid waste pickup; such activities, however, shall be limited to the hours of collection set forth under the applicable franchise agreement for solid waste pickup, recyclable materials pickup and/or organic materials pickup as may be restricted for residential, commercial and City facilities. (Ord. 1439 § 4 (Exh. B (part)), 2011: Ord. 1086 § 1 (part), 1991)

18.21.050 Noise.

A. Noise Limits. No use or activity shall create noise levels that exceed the following standards. The maximum allowable noise levels specified in Table 18.21.050-A, Noise Limits, do not apply to noise generated by automobile traffic or other mobile noise sources in the public right-of-way.

TABLE 18.21.050-A: NOISE LIMITS

Land Use Receiving the Noise	Noise-Level Descriptor	Exterior Noise Level Standard in Any Hour (dBA)		Interior Noise-Level Standard in Any Hour (dBA)	
		Daytime (7 a.m. – 10 p.m.)	Nighttime (10 p.m. – 7 a.m.)	Daytime (7 a.m. – 10 p.m.)	Nighttime (10 p.m. – 7 a.m.)
Residential	L ₅₀	55	45	40	30
	L _{max}	70	60	55	45
Medical, convalescent	L ₅₀	55	45	45	35
	L _{max}	70	60	55	45
Theater, auditorium	L ₅₀	-	-	35	35
	L _{max}	-	-	50	50
Church, meeting hall	L ₅₀	55	-	40	40
	L _{max}	-	-	55	55
School, library, museum	L ₅₀	55	-	40	-
	L _{max}	-	-	55	-

1. Adjustments to Noise Limits. The maximum allowable noise levels of Table 18.21.050-A, Noise Limits, shall be adjusted according to the following provisions. No more than one increase in the maximum permissible noise level shall be applied to the noise generated on each property.

- a. Ambient Noise. If the ambient noise level at a noise-sensitive use is ten dBA or more below the standard, the allowable noise standard shall be decreased by five decibels.
- b. Duration. The maximum allowable noise level (L₅₀) shall be increased as follows to account for the effects of duration:

- i. Noise that is produced for no more than a cumulative period of fifteen minutes in any hour may exceed the noise limit by five decibels; and
 - ii. Noise that is produced for no more than a cumulative period of five minutes in any hour may exceed the noise limits by ten decibels;
 - iii. Noise that is produced for no more than a cumulative period of one minute in any hour may exceed the noise limits by fifteen decibels.
- c. Character of Sound. If a noise contains a steady audible tone or is a repetitive noise (such as hammering or riveting) or contains music or speech conveying informational content, the maximum allowable noise levels shall be reduced by five decibels.
- d. Prohibited Noise. Noise for a cumulative period of thirty minutes or more in any hour which exceeds the noise standard for the receiving land use.

B. Noise Exposure—Land Use Requirements and Limitations. Table 18.21.050-B, Noise Exposure—Land Requirements and Limitations, describes the requirements and limitations of various land uses within the listed day/night average sound level (Ldn) ranges.

TABLE 18.21.050-B: NOISE EXPOSURE—LAND USE REQUIREMENTS AND LIMITATIONS

Land Use	Day/Night Average Sound Level (Ldn)	Requirements and Limitations
Residential (1) and Other Noise-Sensitive Uses (e.g., Schools, Hospitals, and Churches)	Less than 60	Satisfactory
	60 to 75	Acoustic study and noise attenuation measures required
	Over 75	Acoustic study and noise attenuation measures required
Auditoriums, Concert Halls, Amphitheaters	Less than 70	Acoustic study and noise attenuation measures required
	Over 70	Not allowed
Commercial and Industrial	Less than 70	Satisfactory
	70 to 80	Acoustic study and noise attenuation measures required
	Over 80	Airport-related development only; noise attenuation measures required
Outdoor Sports and	Less than 65	Satisfactory

Recreation, Parks	65 to 80	Acoustic study and noise attenuation measures required; avoid uses involving concentrations of people or animals
	Over 80	Limited to open space; avoid uses involving concentrations of people or animals

Notes:

1. New residential development in noise impacted areas are subject to the following noise levels:

a. For new single-unit residential development, maintain a standard of 60 Ldn for exterior noise in private use areas.

b. For new multi-unit residential development, maintain a standard of 65 Ldn in community outdoor recreation areas. Noise standards are not applied to private decks and balconies and shall be considered on a case-by-case basis in the MU-DC District.

c. Where new residential units (single and multifamily) would be exposed to intermittent noise levels generated during train operations, maximum railroad noise levels inside homes shall not exceed forty-five dBA in bedrooms or fifty-five dBA in other occupied spaces. These single-event limits are only applicable where there are normally four or more train operations per day.

C. Acoustic Study. The Director may require an acoustic study for any proposed project that could cause any of the following:

1. Locate new residential uses within the fifty-five CNEL impact area of the San Carlos Airport;
2. Cause noise levels to exceed the limits in Table 18.21.050-A;
3. Create a noise exposure that would require an acoustic study and noise attenuation measures listed in Table 18.21.050-B, Noise Exposure—Land Use Requirements and Limitations; or
4. Cause the Ldn at noise-sensitive uses to increase three dBA or more.

D. Establishing Ambient Noise. When the Director has determined that there could be cause to make adjustments to the standards, an acoustical study shall be performed to establish ambient noise levels. In order to determine if adjustments to the standards should be made either upwards or downwards, a minimum twenty-four-hour-duration noise measurement shall be conducted. The noise measurements shall collect data utilizing noise metrics that are consistent with the noise

limits presented in Table 18.21.050-A, e.g., L_{max} (zero minutes), L_{02} (one minute), L_{08} (five minutes), L_{25} (fifteen minutes) and L_{50} (thirty minutes). An arithmetic average of these ambient noise levels during the three quietest hours shall be made to demonstrate that the ambient noise levels are regularly ten or more decibels below the respective noise standards. Similarly, an arithmetic average of ambient noise levels during the three loudest hours should be made to demonstrate that ambient noise levels regularly exceed the noise standards.

E. Noise Attenuation Measures. Any project subject to the acoustic study requirements of subsection C of this section may be required as a condition of approval to incorporate noise attenuation measures deemed necessary to ensure that noise standards are not exceeded.

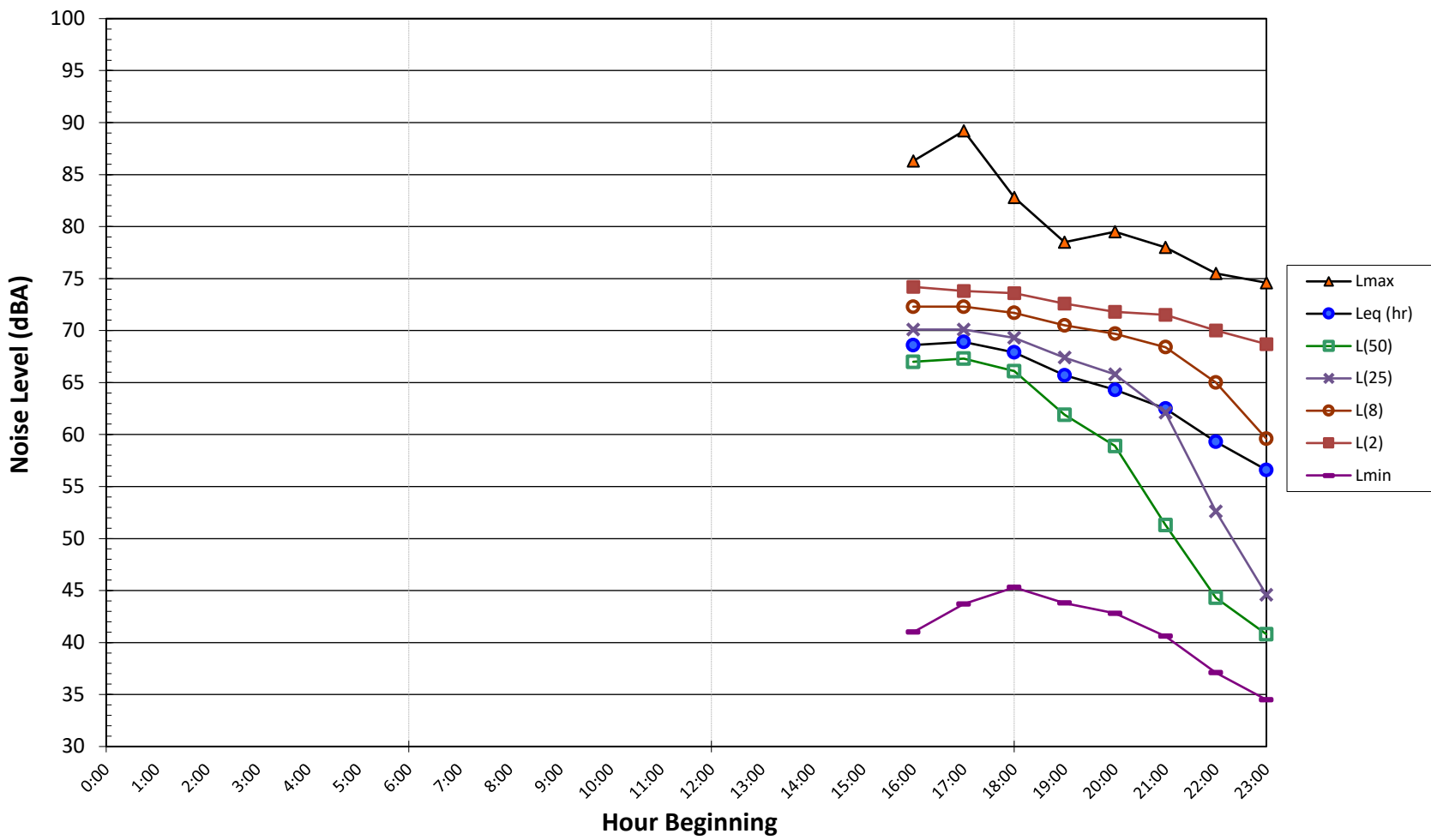
1. New noise-sensitive uses (e.g., schools, hospitals, churches, and residences) shall incorporate noise attenuation measures to achieve and maintain an interior noise level of forty-five dBA.
2. Noise attenuation measures identified in an acoustic study shall be incorporated into the project to reduce noise impacts to satisfactory levels.
3. Emphasis shall be placed upon site planning and project design measures. The use of noise barriers shall be considered and may be required only after all feasible design-related noise measures have been incorporated into the project. (Ord. 1438 § 4 (Exh. A (part)), 2011)

18.21.060 Vibration.

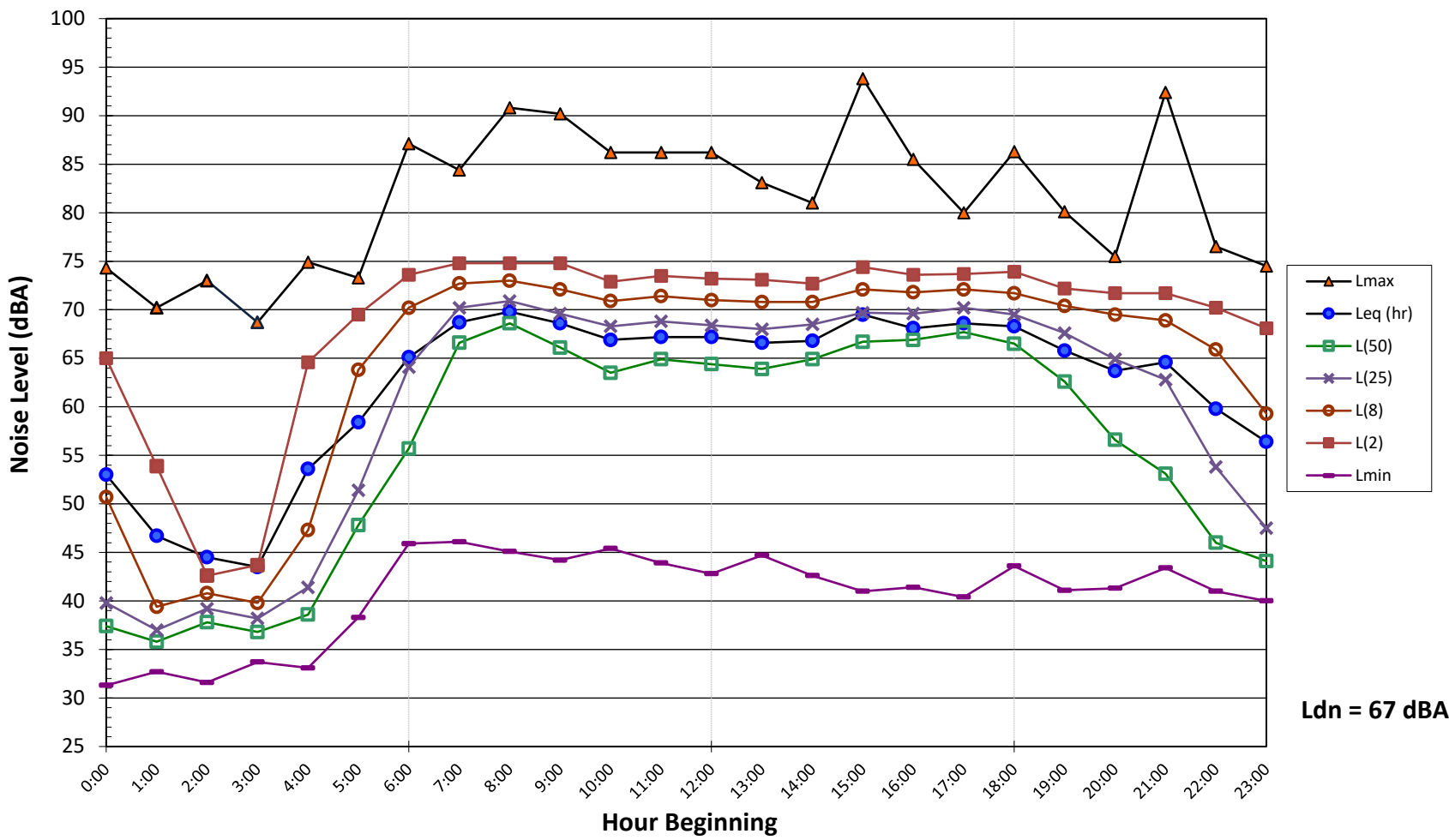
No vibration shall be produced that is transmitted through the ground and is discernible without the aid of instruments by a reasonable person at the lot lines of the site. Vibrations from temporary construction, demolition, and vehicles that enter and leave the subject parcel (e.g., construction equipment, trains, trucks, etc.) are exempt from this standard. (Ord. 1438 § 4 (Exh. A (part)), 2011)

AMBIENT NOISE MONITORING RESULTS

Noise Levels at LT-1
Alameda De Las Pulgas - San Carlos, CA
Monday, March 2, 2020

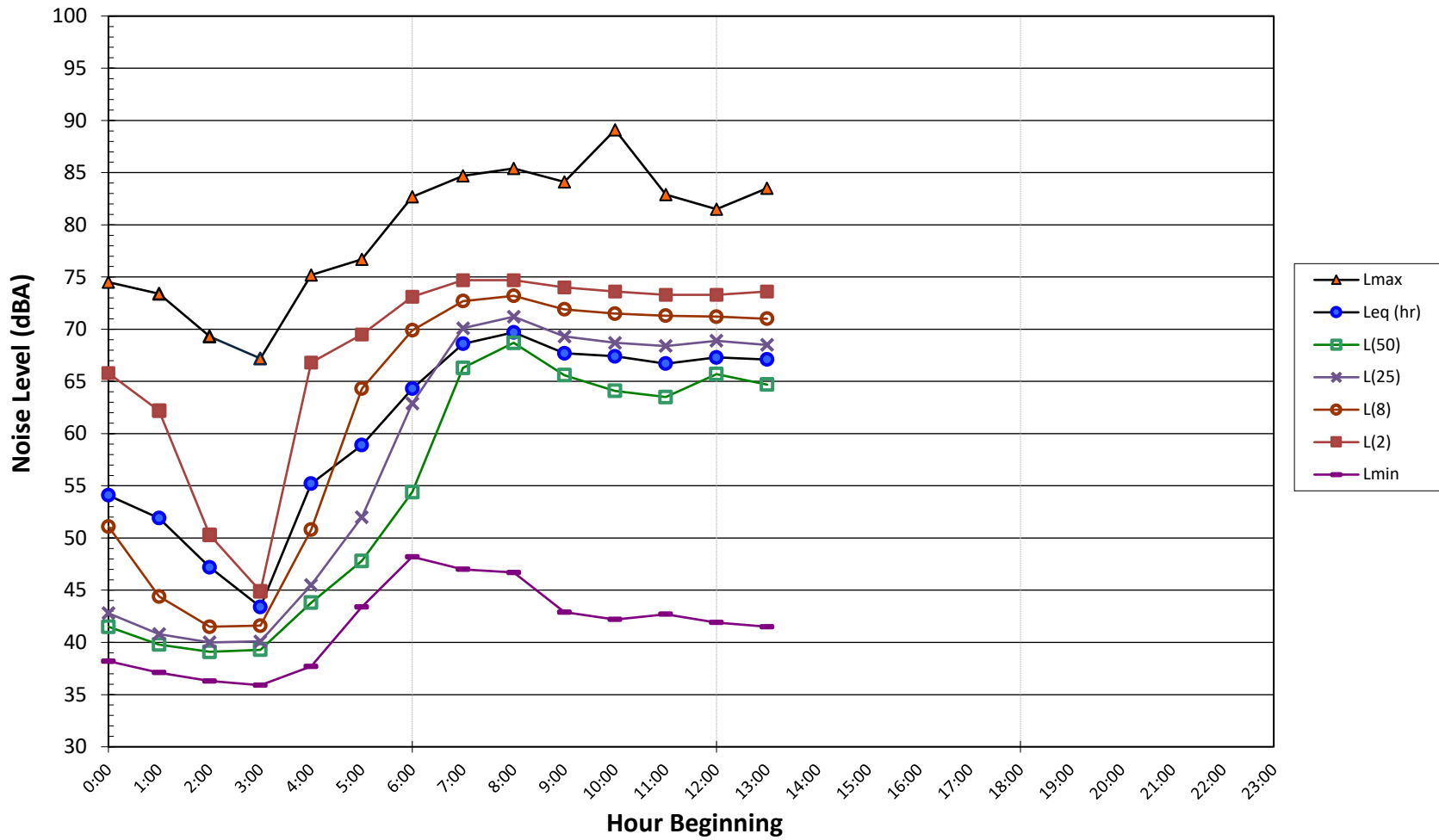


**Noise Levels at LT-1
Alameda De Las Pulgas - San Carlos, CA
Tuesday, March 3, 2020**

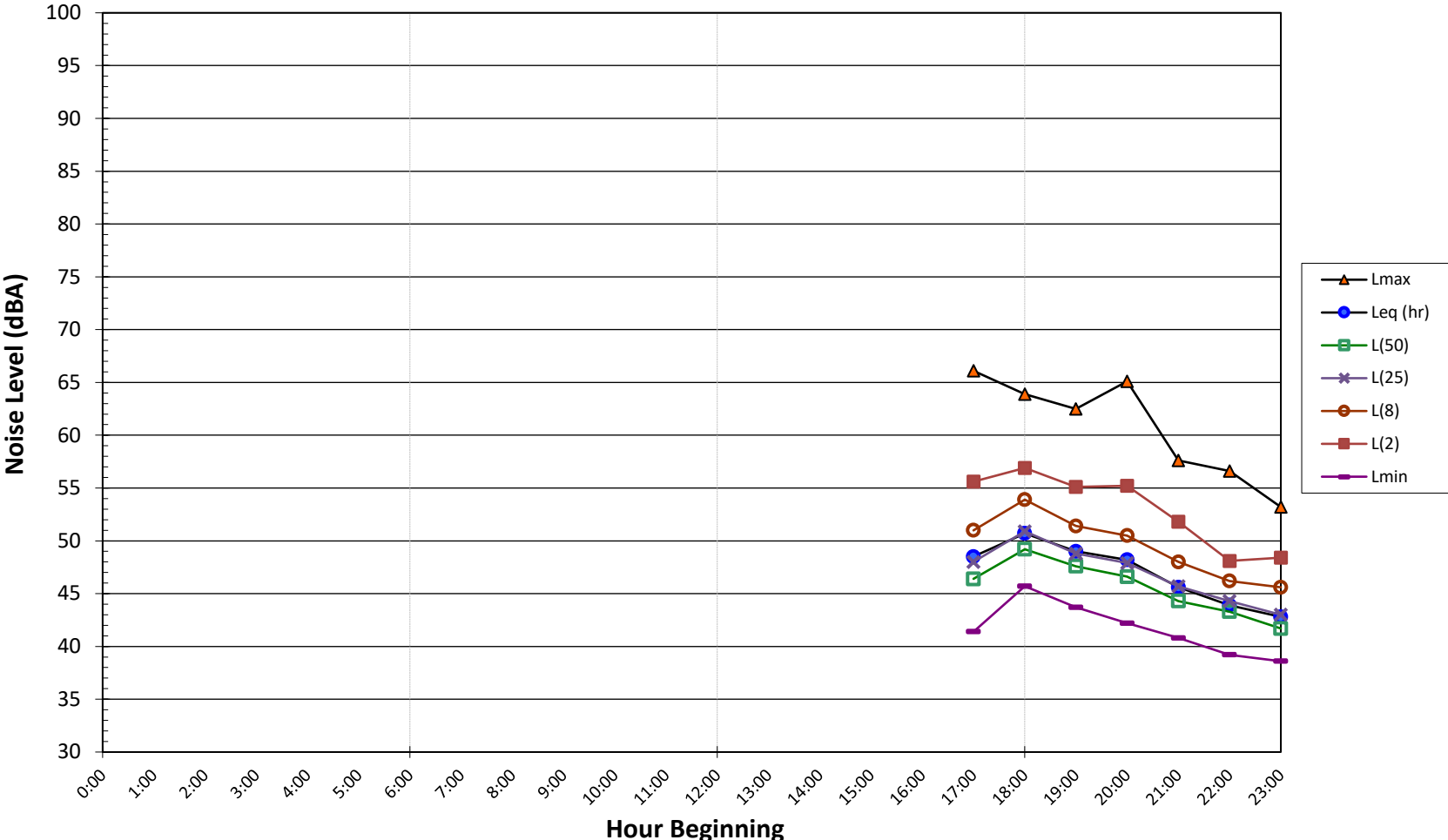


Ldn = 67 dBA

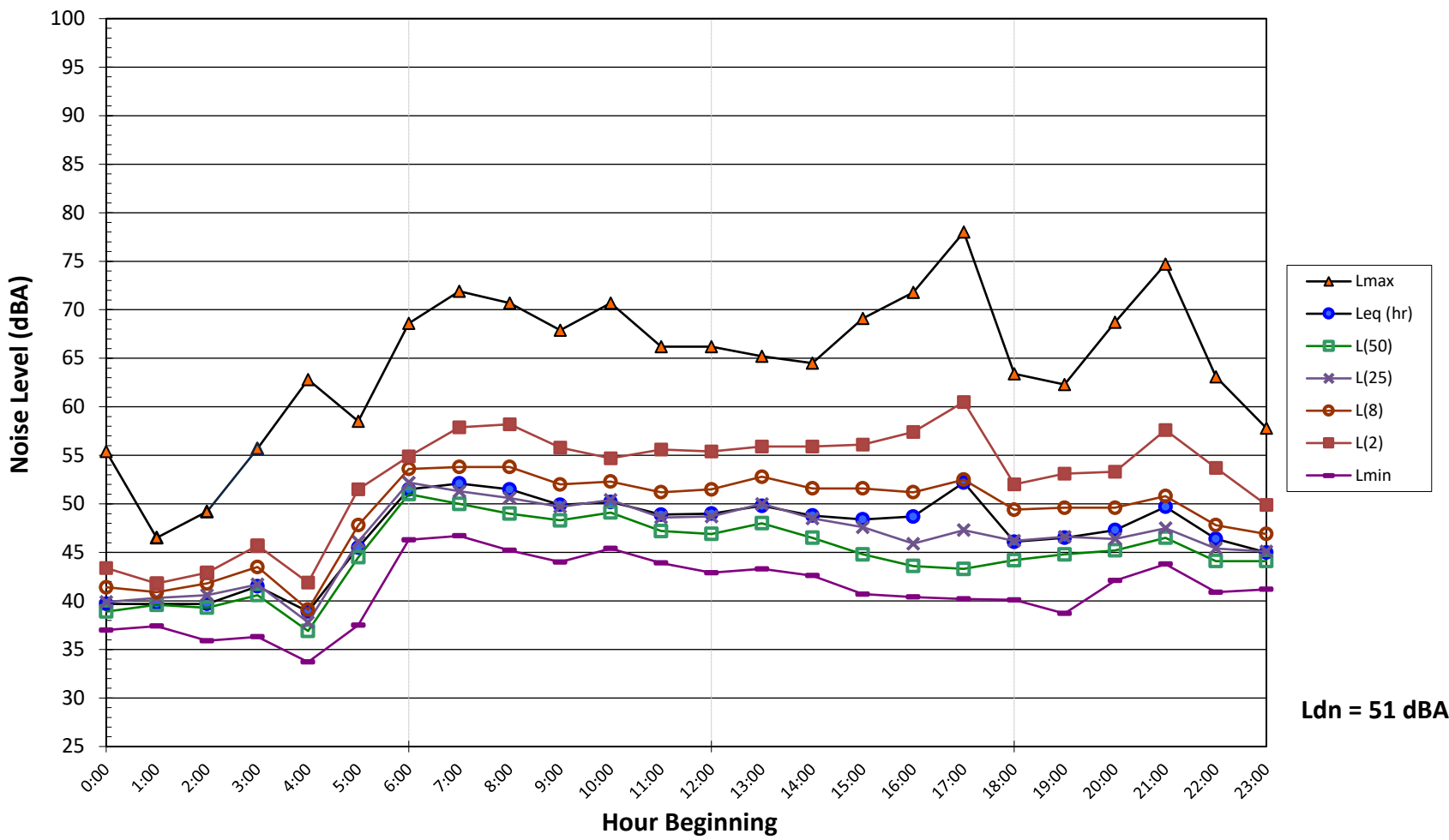
**Noise Levels at LT-1
Alameda De Las Pulgas - San Carlos, CA
Wednesday, March 4, 2020**



**Noise Levels at LT-2
Coronado & Vista del Grande - San Carlos, CA
Monday, March 2, 2020**

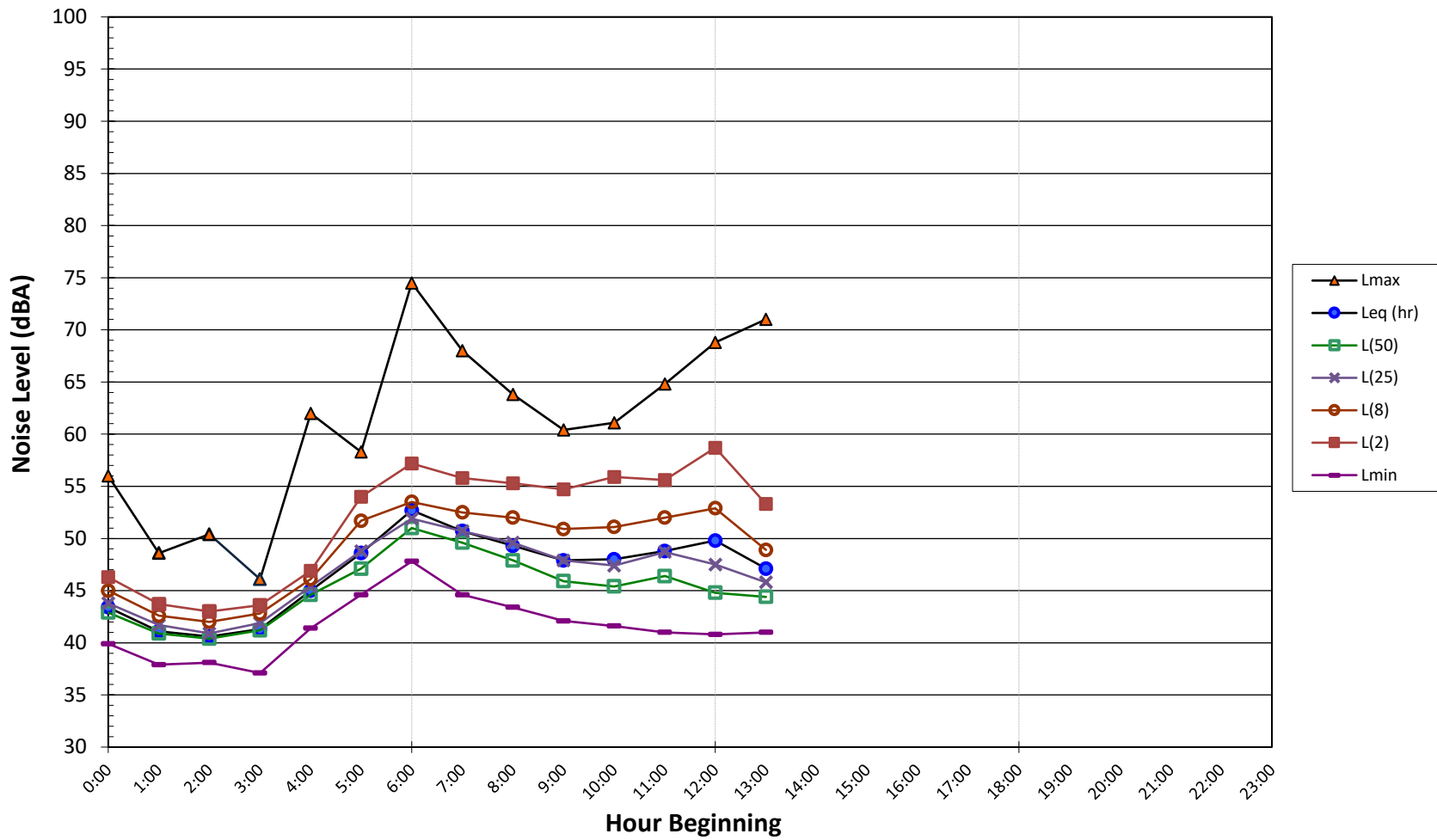


**Noise Levels at LT-2
 Coronado & Vista del Grande - San Carlos, CA
 Tuesday, March 3, 2020**



Ldn = 51 dBA

**Noise Levels at LT-2
Coronado & Vista del Grande - San Carlos, CA
Wednesday, March 4, 2020**



CONSTRUCTION NOISE MODELING

Roadway Construction Noise Model (RCNM), Version 1.1

Report date: 02/18/2022
 Case Description: Building Construction

**** Receptor #1 ****

Description	Land Use	Daytime	Baselines (dBA)	
			Evening	Night
Bldg	Residential	65.0	60.0	55.0

Description	Impact Device	Usage (%)	Equipment		Receptor Distance (feet)	Estimated Shielding (dBA)
			Spec Lmax (dBA)	Actual Lmax (dBA)		
Crane	No	16		80.6	50.0	0.0
Man Lift	No	20		74.7	50.0	0.0
Backhoe	No	40		77.6	50.0	0.0
Front End Loader	No	40		79.1	50.0	0.0
Generator	No	50		80.6	50.0	0.0
Welder / Torch	No	40		74.0	50.0	0.0
Tractor	No	40	84.0		50.0	0.0
Auger Drill Rig	No	20		84.4	50.0	0.0

Results

Noise Limit Exceedance (dBA) Noise Limits (dBA)

Equipment	Day	Calculated (dBA)		Day		Evening		Lmax
		Day	Evening	Night	Night	Lmax	Leq	
Crane		80.6	72.6	N/A	N/A	N/A	N/A	N/A
Man Lift		74.7	67.7	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
Front End Loader		79.1	75.1	N/A	N/A	N/A	N/A	N/A

Roadway Construction Noise Model (RCNM), Version 1.1

Report date: 02/18/2022
 Case Description: Paving

**** Receptor #1 ****

Description	Land Use	Daytime	Baselines (dBA)	
			Evening	Night
Paving	Residential	65.0	60.0	55.0

Description	Impact Device	Usage (%)	Equipment		Receptor Distance (feet)	Estimated Shielding (dBA)
			Spec Lmax (dBA)	Actual Lmax (dBA)		
Drum Mixer	No	50		80.0	50.0	0.0
Paver	No	50		77.2	50.0	0.0
Roller	No	20		80.0	50.0	0.0
Tractor	No	40	84.0		50.0	0.0
Front End Loader	No	40		79.1	50.0	0.0

Results

Noise Limit Exceedance (dBA) Noise Limits (dBA)

Equipment	Night	Day	Calculated (dBA)		Day		Evening		Lmax
			Lmax	Leq	Night	Evening			
Drum Mixer	N/A	N/A	80.0	77.0	N/A	N/A	N/A	N/A	N/A
Paver	N/A	N/A	77.2	74.2	N/A	N/A	N/A	N/A	N/A
Roller	N/A	N/A	80.0	73.0	N/A	N/A	N/A	N/A	N/A
Tractor	N/A	N/A	84.0	80.0	N/A	N/A	N/A	N/A	N/A
Front End Loader	N/A	N/A	79.1	75.1	N/A	N/A	N/A	N/A	N/A

N/A	Total	84.0	83.6	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	85.4	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A			

TRAFFIC NOISE INCREASE CALCULATIONS

AM	Existing												ADTs			
	NBL	NBT	NBR	EBL	EBT	EBR	SBL	SBT	SBR	WBL	WBT	WBR	North	South	East	West
El Camino Real / San Carlos Avenue	70	505	0	268	0	302	0	827	260	0	0	0	18600	17040	0	9000
Alameda De Las Pulgas / San Carlos Avenue	254	0	446	0	636	218	0	0	0	208	453	0	0	11260	17430	15610
Alameda De Las Pulgas / Brittan Avenue	34	317	98	131	242	111	117	358	120	109	191	65	11080	10270	8220	8290
El Camino Real / Brittan Avenue	69	472	121	35	465	37	449	773	41	144	201	80	18500	16160	14600	8480
Old County Road / Brittan Avenue	75	266	23	183	777	80	48	134	117	11	236	23	7710	5890	11180	14680

PM	Existing												ADTs			
	NBL	NBT	NBR	EBL	EBT	EBR	SBL	SBT	SBR	WBL	WBT	WBR	North	South	East	West
El Camino Real / San Carlos Avenue	171	987	0	217	0	177	0	831	382	0	0	0	24170	21660	0	9470
Alameda De Las Pulgas / San Carlos Avenue	249	0	256	0	361	235	0	0	0	328	678	0	0	10680	16230	15230
Alameda De Las Pulgas / Brittan Avenue	53	339	89	81	183	62	77	327	122	134	299	135	10810	10040	9170	8000
El Camino Real / Brittan Avenue	99	1002	85	64	250	74	199	816	54	277	440	227	23620	23530	14780	9810
Old County Road / Brittan Avenue	157	319	19	115	357	66	25	115	158	14	630	40	7720	6900	10850	14830

	Existing + Project												ADTs			
	NBL	NBT	NBR	EBL	EBT	EBR	SBL	SBT	SBR	WBL	WBT	WBR	North	South	East	West
El Camino Real / San Carlos Avenue	70	505	0	273	0	302	0	827	262	0	0	0	18670	17040	0	9070
Alameda De Las Pulgas / San Carlos Avenue	254	0	451	0	636	218	0	0	0	210	453	0	0	11330	17500	15610
Alameda De Las Pulgas / Brittan Avenue	34	317	98	142	242	111	122	358	147	109	191	65	11510	10270	8270	8670
El Camino Real / Brittan Avenue	69	472	121	35	469	38	449	773	41	144	201	80	18500	16170	14640	8530
Old County Road / Brittan Avenue	75	266	23	183	781	80	48	134	117	11	236	23	7710	5890	11220	14720

PM																
	NBL	NBT	NBR	EBL	EBT	EBR	SBL	SBT	SBR	WBL	WBT	WBR	North	South	East	West
El Camino Real / San Carlos Avenue	171	987	0	222	0	177	0	831	387	0	0	0	24270	21660	0	9570
Alameda De Las Pulgas / San Carlos Avenue	249	0	258	0	361	235	0	0	0	333	678	0	0	10750	16300	15230
Alameda De Las Pulgas / Brittan Avenue	53	339	89	99	183	62	79	327	132	134	299	136	11120	10040	9200	8280
El Camino Real / Brittan Avenue	100	1002	85	64	252	74	199	816	54	277	440	227	23620	23540	14800	9840
Old County Road / Brittan Avenue	157	319	19	115	359	66	25	115	158	14	630	40	7720	6900	10870	14850

AM

Full Connectivity + Project

ADTs

	NBL	NBT	NBR	EBL	EBT	EBR	SBL	SBT	SBR	WBL	WBT	WBR	North	South	East	West
El Camino Real / San Carlos Avenue	70	505	0	277	0	302	0	827	264	0	0	0	18730	17040	0	9130
Alameda De Las Pulgas / San Carlos Avenue	254	0	455	0	636	218	0	0	0	212	453	0	0	11390	17560	15610
Alameda De Las Pulgas / Brittan Avenue	34	317	98	148	242	111	126	358	167	109	191	65	11810	10270	8310	8930
El Camino Real / Brittan Avenue	69	472	121	35	472	39	449	773	41	144	201	80	18500	16180	14670	8570
Old County Road / Brittan Avenue	75	266	23	183	784	80	48	134	117	11	236	23	7710	5890	11250	14750

PM

	NBL	NBT	NBR	EBL	EBT	EBR	SBL	SBT	SBR	WBL	WBT	WBR	North	South	East	West
El Camino Real / San Carlos Avenue	171	987	0	222	0	177	0	831	398	0	0	0	24380	21660	0	9680
Alameda De Las Pulgas / San Carlos Avenue	249	0	261	0	361	235	0	0	0	344	678	0	0	10890	16440	15230
Alameda De Las Pulgas / Brittan Avenue	53	339	89	126	183	62	82	327	150	134	299	137	11610	10040	9240	8730
El Camino Real / Brittan Avenue	101	1002	85	64	254	75	199	816	54	277	440	227	23620	23560	14820	9880
Old County Road / Brittan Avenue	157	319	19	115	361	66	25	115	158	14	630	40	7720	6900	10890	14870

	Direction	Segment	Existing No Project	Existing Plus Project	Full Connectivity + Project	Project Noise Increase	Cumulative Increase
	N	El Camino Real - North of San Carlos Avenue	18,600	18,670	18,730	0.0	0.0
1	S	El Camino Real - South of San Carlos Avenue	17,040	17,040	17,040	0.0	0.0
	W	San Carlos Avenue - West of El Camino Real	9,000	9,070	9,130	0.0	0.1
	S	Alameda De Las Pulgas - South of San Carlos Avenue	11,260	11,330	11,390	0.0	0.0
2	E	San Carlos Avenue - East of Alameda De Las Pulgas	17,430	17,500	17,560	0.0	0.0
	W	San Carlos Avenue - West of Alameda De Las Pulgas	15,610	15,610	15,610	0.0	0.0
	N	Alameda De Las Pulgas - North of Brittan Avenue	11,080	11,510	11,810	0.2	0.3
3	S	Alameda De Las Pulgas - South of Brittan Avenue	10,270	10,270	10,270	0.0	0.0
	E	Brittan Avenue - East of Alameda De Las Pulgas	8,220	8,270	8,310	0.0	0.0
	W	Brittan Avenue - West of Alameda De Las Pulgas	8,290	8,670	8,930	0.2	0.3
	N	El Camino Real - North of Brittan Avenue	18,500	18,500	18,500	0.0	0.0
4	S	El Camino Real - South of Brittan Avenue	16,160	16,170	16,180	0.0	0.0
	E	Brittan Avenue - East of El Camino Real	14,600	14,640	14,670	0.0	0.0
	W	Brittan Avenue - West of El Camino Real	8,480	8,530	8,570	0.0	0.0
	N	Old County Road - North of Brittan Avenue	7,710	7,710	7,710	0.0	0.0
5	S	Old County Road - South of Brittan Avenue	5,890	5,890	5,890	0.0	0.0
	E	Brittan Avenue - East of Old Country Road	11,180	11,220	11,250	0.0	0.0
	W	Brittan Avenue - Old Country Road to El Camino Real	14,680	14,720	14,750	0.0	0.0

DECK NOISE SOUNDPLAN MODELING

Project description

Project title: 808 Alameda de las Pulgas
 Project No.: COSC-07
 Project engineer: JDC
 Customer: COSC

Description:

Run description

Calculation type: Single Point Sound
 Title: Single
 Calculation group
 Run file: RunFile.runx
 Result number: 1
 Local calculation (ThreadCount=8)
 Calculation start: 2/23/2022 22:37
 Calculation end: 2/23/2022 22:38
 Calculation time: 00:01:108 [m:s:ms]
 No. of points: 30
 No. of calculated points: 30
 Kernel version: SoundPLAN 8.2 (2/23/2022) - 64 bit

Run parameters

Reflection order: 3
 Maximum reflection distance to receiver: 200 m
 Maximum reflection distance to source: 50 m
 Search radius: 5000 m
 Weighting: dB(A)
 Allowed tolerance (per individual source): 0.100 dB
 Create ground effect areas from road surfaces: Yes

Standards:

Industry: ISO 9613-2: 1996
 Air absorption: ISO 9613-1
 regular ground effect (chapter 7.3.1), for sources without a spectrum automatically alternative ground effect
 Limitation of screening loss:
 single/multiple 20.0 dB /25.0 dB
 Side diffraction: Side paths also around terrain (outdated)
 Use Eqn (Abar=Dz-Max(Agr,0)) instead of Eqn (12) (Abar=Dz-Agr) for insertion loss
 Environment:
 Air pressure: 1013.3 mbar
 rel. humidity: 70.00%
 Temperature: 10.0 °C
 Meteo. corr. C0(7-22h)[dB]=0.0; C0(22-7h)[dB]=0.0;
 Ignore Cmet for Lmax industry calculation: No
 Parameter for screening: C2=20.0
 Dissection parameters:
 Distance to diameter factor: 8
 Minimal distance: 1 m
 Max. difference ground effect + diffraction: 1.0 dB
 Max. number of iterations: 4
 Attenuation
 Foliage: ISO 9613-2
 Built-up area: ISO 9613-2
 Industrial site: ISO 9613-2
 Assessment: Day Night Level LDN
 Reflection of "own" facade is suppressed

Geometry data

Residential Map.sit 2/23/2022 22:37
 - contains:

DXF_C-CLUSTER.geo 2/23/2022 16:57
 DXF_C-GRAD-CONT-MAJR.geo 2/22/2022 13:12
 DXF_C-GRAD-CONT-MAJR-TXT.geo 2/22/2022 13:08
 DXF_C-GRAD-TEXT.geo 2/22/2022 13:08
 DXF_C-MAPP-BNDY.geo 2/22/2022 13:12
 DXF_C-ROAD-CURB-FACE.geo 2/22/2022 13:12
 DXF_C-WALL.geo 2/22/2022 13:12
 DXF_V-TOPO-MAJR.geo 2/23/2022 13:12
 DXF_V-TOPO-MAJR-DEMO.geo 2/22/2022 13:12
 DXF_V-TOPO-MINR.geo 2/22/2022 13:12
 OSM_Building.geo 2/22/2022 13:12
 Sources.geo 2/23/2022 22:37

RDGM0002.dgm

2/23/2022 21:31

Name	Source type	I or A m,m ²	Li dB(A)	R'w dB	L'w dB(A)	Lw dB(A)	KI dB	KT dB	LwMax dE	DO-Wall	dTime histo	Emission spectrum	125Hz dB(A)	250Hz dB(A)	500Hz dB(A)	1kHz dB(A)	2kHz dB(A)	4kHz dB(A)	8kHz dB(A)
Roof1	Area	49.94			68.4	85.4	0	0	0	100%/24h	Lw,S (EN ISO 3382:2012) Default		61.8	73.7	82.8	80	74	67.8	60.4
Roof2	Area	50.73			68.4	85.5	0	0	0	100%/24h	Lw,S (EN ISO 3382:2012) Default		61.9	73.8	82.9	80.1	74.1	67.9	60.5
Roof3	Area	49.18			68.4	85.3	0	0	0	100%/24h	Lw,S (EN ISO 3382:2012) Default		61.7	73.6	82.7	79.9	73.9	67.7	60.3
Roof4	Area	49.84			68.4	85.4	0	0	0	100%/24h	Lw,S (EN ISO 3382:2012) Default		61.8	73.7	82.8	80	74	67.8	60.4
Roof5	Area	52			68.4	85.6	0	0	0	100%/24h	Lw,S (EN ISO 3382:2012) Default		62	73.9	83	80.2	74.2	68	60.6
Roof6	Area	50.18			68.4	85.4	0	0	0	100%/24h	Lw,S (EN ISO 3382:2012) Default		61.8	73.7	82.8	80	74	67.8	60.4
Roof7	Area	48.64			68.4	85.3	0	0	0	100%/24h	Lw,S (EN ISO 3382:2012) Default		61.7	73.6	82.7	79.9	73.9	67.7	60.3
Roof8	Area	49.39			68.4	85.3	0	0	0	100%/24h	Lw,S (EN ISO 3382:2012) Default		61.7	73.6	82.7	79.9	73.9	67.7	60.3
Roof9	Area	48.66			68.4	85.3	0	0	0	100%/24h	Lw,S (EN ISO 3382:2012) Default		61.7	73.6	82.7	79.9	73.9	67.7	60.3

Receiver	Usage	Fl	Dir	dB(A)	Lr,lim dB(Lr,lim dB(Ldn dB(A)	Leq,d dB(A)	Leq,n dB(A)	Ldn,diff	dtLeq,d,diff	Leq,n,diff	dB
R1	SCR	G					43.2	36.8	36.8				
R2	SCR	G					46.2	39.8	39.8				
R3	SCR	G					50	43.6	43.6				
R4	SCR	G					54.6	48.2	48.2				
R5	SCR	G					49.3	42.9	42.9				
R6	SCR	G					50.9	44.5	44.5				
R7	SCR	G					45.6	39.2	39.2				
R8	SCR	G					45.6	39.2	39.2				
R9	SCR	G					45.9	39.5	39.5				
R10	SCR	G					47.3	40.9	40.9				
R11	SCR	G					51	44.5	44.5				
R12	SCR	G					52.7	46.3	46.3				
R13	SCR	G					53.4	47	47				
R14	SCR	G					53.5	47.1	47.1				
R15	SCR	G					53.3	46.9	46.9				
R16	SCR	G					52.5	46.1	46.1				
R17	SCR	G					49.5	43.1	43.1				
R18	SCR	G					48.7	42.2	42.2				
R19	SCR	G					44.8	38.4	38.4				
R20	SCR	G					31.4	25	25				
R21	SCR	G					39.4	33	33				
R22	SCR	G					40.1	33.7	33.7				
R23	SCR	G					35.6	29.2	29.2				
R24	SCR	G					40.1	33.7	33.7				
R25	SCR	G					41.7	35.3	35.3				
R26	SCR	G					42.2	35.8	35.8				
R27	SCR	G					41.5	35.1	35.1				
R28	SCR	G					43.2	36.8	36.8				
R29	SCR	G					47.4	41	41				
R30	SCR	G					40.8	34.3	34.3				

