Appendix G

Noise

Noise Background and Modeling Data

NOISE BACKGROUND

Terminology and Noise Descriptors

The following are brief definitions of noise terminology:

- **Sound.** A vibratory disturbance that, 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 on a logarithmic scale, which indicates the squared ratio of sound pressure amplitude to a reference sound pressure amplitude. The reference pressure is 20 micropascals.

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

- **Equivalent Continuous Noise Level (Leq).** The mean of the noise level averaged over the measurement period, regarded as an average level.

- **Day-Night Level (Ldn).** 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 during the period from 10 PM to 7 AM. The L_{dn} and the CNEL are similar noise descriptors and rarely differ by more than 1 dBA.

- **Community Noise Equivalent Level (CNEL).** The energy average of the A-weighted sound levels occurring during a 24-hour period, with 5 dB added to the A-weighted sound levels occurring during the period from 7 to 10 PM and 10 dB added to the A-weighted sound levels occurring during the period from 10 PM to 7 AM.

- **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.

L_{dn} and CNEL values rarely differ by more than 1 dB. As a matter of practice, L_{dn} and CNEL values are considered to be equivalent and are treated as such in this assessment.

Characteristics of Sound

Sound is a pressure wave transmitted through the air. When an object vibrates, it radiates part of its energy as acoustical pressure in the form of a sound wave. Sound can be described in terms of amplitude (loudness), frequency (pitch), or duration (time). The standard unit of measurement of the loudness of sound is the decibel (dB). The human hearing system is not equally sensitive to sound at all frequencies. Sound waves below 16 Hz are not heard at all and are "felt" more as a vibration. Similarly, while 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. Since the human ear is not equally sensitive to sound at all frequencies, a special frequency-dependent rating scale is usually used to relate noise to human sensitivity. The A-weighted decibel scale (dBA) performs this compensation by discriminating against frequencies in a manner approximating the sensitivity of the human ear.

Because of the physical characteristics of noise transmission and noise perception, the relative loudness of sound does not closely match the actual amounts of sound energy. Table 1, Change in Sound Pressure Level, dB, presents the subjective effect of changes in sound pressure levels. Typical human hearing can detect changes of approximately 3 dBA or greater under normal conditions. Changes of 1 to 3 dBA are detectable under quiet, controlled conditions and changes of less than 1 dBA are usually indiscernible. A change of 5 dBA or greater is typically noticeable to most people in an exterior environment and a change of 10 dBA is perceived as a doubling (or halving) of the noise.

Table 1
Change in Sound Pressure Level, dB

Change in Apparent Loudness	
± 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 and Hansen 2003.

Point and Line Sources

Noise may be generated from a point source, such as a piece of construction equipment, or from a line source, such as a road containing moving vehicles. Because noise spreads in an ever-widening pattern, the given amount of noise striking an object, such as an eardrum, is reduced with distance from the source. This is known as "spreading loss." The typical spreading loss for point source noise is 6 dBA per doubling of the distance from the noise source.

A line source of noise, such as vehicles proceeding down a roadway, would also be reduced with distance, but the rate of reduction is affected by of both distance and the type of terrain over which the noise passes. Hard sites, such as developed areas with paving, reduce noise at a rate of 3 dBA per doubling of the distance while soft sites, such as undeveloped areas, open space and vegetated areas reduce noise at a rate of 4.5 dBA per doubling of the distance. These represent the extremes and most areas would actually contain a combination of hard and soft elements with the noise reduction placed somewhere in between these two factors. Unfortunately, the only way to actually determine the absolute amount of attenuation that an area provides is through field measurement under operating conditions with subsequent noise level measurements conducted at varying distances from a constant noise source.

Objects that block the line of sight attenuate the noise source if the receptor is located within the "shadow" of the blockage (such as behind a sound wall). If a receptor is located behind the wall, but has a view of the source, the wall would do little to reduce the noise. Additionally, a receptor located on the same side of the wall as the noise source may experience an increase in the perceived noise level, as the wall would reflect noise back to the receptor compounding the noise.

Noise Metrics

Several rating scales (or noise "metrics") exist to analyze adverse effects of noise, including traffic- generated noise, on a community. These scales include the equivalent noise level (L_{eq}), the community noise equivalent level (CNEL) and the day/night noise level (L_{dn}). L_{eq} is a measurement of the sound energy level averaged over a specified time period.

The CNEL noise metric is based on 24 hours of measurement. CNEL differs from L_{eq} in that it applies a time-weighted factor designed to emphasize noise events that occur during the evening and nighttime hours (when quiet time and sleep disturbance is of particular concern). Noise occurring during the daytime period (7:00 AM to 7:00 PM) receives no penalty. Noise produced during the evening time period (7:00 to 10:00 PM) is penalized by 5 dB, while nighttime (10:00 PM to 7:00 AM) noise is penalized by 10 dB. The L_{dn} noise metric is similar to the CNEL metric except that the period from 7:00 to 10:00 PM receives no penalty. Both the CNEL and L_{dn} metrics yield approximately the same 24-hour value (within 1 dB) with the CNEL being the more restrictive (i.e., higher) of the two.

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. In comparison, extended periods of noise exposure above 90 dBA would result in permanent cell damage. Table 2 shows typical noise levels from various noise sources.

Table 2
Typical Noise Levels from Noise Sources

Common Outdoor Activities	*Noise Level*	*Common Indoor Activities*
	110	Rock Band
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 2009.

Vibration

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 such as railroads or vibration-intensive stationary sources, but can also be associated with construction equipment, such as jackhammers, pile drivers, and hydraulic hammers. Vibration displacement is the distance that a point on a surface moves away from its original static position. The instantaneous speed that a point on a surface moves is described as the velocity, and the rate of change of the speed is described as the acceleration. Each of these descriptors can be used to correlate vibration to human response, building damage, and acceptable equipment vibration levels. During the construction of a building, the operation of construction equipment could cause groundborne vibration. The three main wave types of concern in the propagation of groundborne vibrations are surface or Rayleigh waves, compression or P-waves, and shear or S-waves.

- Surface or Rayleigh waves travel along the ground surface. They carry most of their energy along an expanding cylindrical wave front, similar to the ripples produced by throwing a rock into a lake. The particle motion is more or less perpendicular to the direction of propagation (known as retrograde elliptical).
- Compression or P-waves are body waves that carry their energy along an expanding

spherical wave front. The particle motion in these waves is longitudinal, in a push-pull motion. P-waves are analogous to airborne sound waves.

- Shear or S-waves are also body waves, carrying their energy along an expanding spherical wave front. Unlike P-waves, however, the particle motion is transverse, or perpendicular to the direction of propagation.

The peak particle velocity (PPV) or the root mean square (RMS) velocity is usually used to describe vibration amplitudes. PPV is defined as the maximum instantaneous peak of the vibration signal and RMS is defined as the square root of the average of the squared amplitude of the signal. PPV is more appropriate for evaluating potential building damage, whereas RMS is typically more suitable for evaluating human response.

The units for PPV and RMS velocity are normally inches per second (in/sec). Often, vibration is presented and discussed in dB units to compress the range of numbers required to describe the vibration. All PPV and RMS velocity are in in/sec and all vibration levels in this study are in dB relative to 1 micro-inch per second (abbreviated as VdB). The threshold of perception is approximately 65 VdB. Typically groundborne vibration generated by manmade activities attenuates rapidly with distance from the source of the vibration. Manmade vibration problems are usually confined to short distances (500 feet or less) from the source.

Construction generally includes a wide range of activities that can generate groundborne vibration. In general, demolition of structures generates the highest vibrations. Vibratory compactors or rollers, pile drivers, and pavement breakers can generate perceptible amounts of vibration at distances within 200 feet of the vibration sources. Heavy trucks can also generate groundborne vibrations that vary, depending on vehicle type, weight, and pavement conditions. Potholes, pavement joints, discontinuities, differential settlement of pavement, etc., all increase the vibration levels from vehicles passing over a road surface. Construction vibration is normally of greater concern than vibration of normal traffic on streets and freeways with smooth pavement conditions. Trains generate substantial quantities of vibration due to their engines, steel wheels, and heavy loads.

Operation of construction equipment generates vibrations that spread through the ground and diminish in amplitude (strength) with distance from the source. The effect on buildings near a construction site varies depending on soil type, ground strata, and receptor building construction. The generation of vibration can range from no perceptible effects at the lowest vibration levels, to low rumbling sounds and perceptible vibrations at moderate levels, to slight damage at the highest levels. Ground vibrations from construction activities rarely reach levels that can damage structures, but can achieve the perceptible ranges in buildings close to a construction site.

Sensitive Receptors

Certain land uses are particularly sensitive to noise and vibration. Noise- and vibration-sensitive uses include land uses where quiet environments are necessary for enjoyment and public health and safety. Residences, schools, guest lodging, libraries, religious institutions, hospitals, nursing homes, and passive recreation areas are generally more sensitive to noise than commercial and industrial land use.

NOISE AND VIBRATION REGULATORY ENVIRONMENT

Noise

To limit exposure of people to intrusive and physically and/or psychologically damaging noise levels, the federal government, the State of California, some county governments, and most municipalities in the state have established standards and ordinances to control noise.

The United States Environmental Protection Agency (USEPA) has developed general guidelines for recommended maximum noise levels to protect public health and welfare and the hearing of workers exposed to occupational noise.

State

Cities and counties in California are preempted by federal law from controlling noise generated from most mobile sources, including noise generated by vehicles and trucks on the roadway, trains on the railroad, and airplanes. Table 3 shows a land use compatibility chart for community noise adopted by the State of California as part of General Plan Guidelines.[1] This table provides urban planners with a tool to gauge the compatibility of new land uses relative to existing and future noise levels. As shown in the table, hotels, motels, and other transient lodging are normally acceptable land uses up to a noise level of 65 dBA CNEL.

[1] California Office of Noise Control, *Guidelines for the Preparation and Content of Noise Elements of the General Plan,* February 1976. Included in the State of California General Plan Guidelines.

Table 3
Land Use Compatibility for Community Noise Exposure

Land Uses	*CNEL (dBA)* 55	60	65	70	75	80
Residential-Low Density Single Family, Duplex, Mobile Homes						
Residential- Multiple Family						
Transient Lodging, Motels, Hotels						
Schools, Libraries, Churches, Hospitals, Nursing Homes						
Auditoriums, Concert Halls, Amphitheatres						
Sports Arena, Outdoor Spectator Sports						
Playgrounds, Neighborhood Parks						
Golf Courses, Riding Stables, Water Recreation, Cemeteries						
Office Buildings, Businesses, Commercial and Professional						
Industrial, Manufacturing, Utilities, Agricultural						

Explanatory Notes

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

Normally Unacceptable:
New construction or development should generally be discouraged. If new construction does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.

Conditionally Acceptable:
New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and the needed noise insulation features included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning will normally suffice.

Clearly Unacceptable:
New construction or development should generally not be undertaken.

Source: California Office of Noise Control, Guidelines for the Preparation and Content of Noise Elements of the General Plan, February 1976. Included in the State of California General Plan Guidelines.

City of Vallejo Municipal Code

Pertinent Sections dealing with Noise and Vibration

Chapter 2.68 - MARINA REGULATIONS

Sections:

2.68.270 - Noise limited during certain hours.

All persons within the Vallejo Marina shall keep noise to a minimum between eleven p.m. and seven a.m. No person shall shout, talk loudly, play musical instruments, or operate other noise making devices or equipment (except in an emergency) upon a vessel within the Vallejo Marina between these hours. Violation of this section, after appropriate warning, will constitute sufficient cause for the harbormaster to order the removal of the vessel from its berthing space at the Vallejo Marina.

(Ord. 136 N.C.(2d) § 3.05, 1973.)

Chapter 7.84 - REGULATION OF NOISE DISTURBANCES

Sections:

7.84.010 - General prohibition—Loud unnecessary and unusual noise.

Notwithstanding any other provisions of the Vallejo Municipal Code and in addition thereto, it shall be unlawful for any person to willfully make or continue, or cause to be made or continued, any loud, unnecessary, and unusual noise which disturbs the peace or quiet of any neighborhood or which causes discomfort or annoyance to any reasonable person of normal sensitiveness residing in the area. The standard which may be considered in determining whether a violation of the provisions of this chapter exist may include, but not be limited to, the following:

A. The level of noise;

B. Whether the nature of the noise is usual or unusual;

C. whether the origin of the noise is natural or unnatural;

D. The level and intensity of the background noise, if any;

E. The proximity of the noise to residential sleeping facilities;

F. The nature and zoning of the area within which the noise emanates;

G. The density of the inhabitation of the area within which the noise emanates;

H. The time of the day and night the noise occurs;

I. The duration of the noise;

J. Whether the noise is recurrent, intermittent, or constant; and

K. Whether the noise is produced by a commercial or noncommercial activity.

(Ord. 1377 N.C. (2d) § 1 (part), 1997.)

7.84.010 - General prohibition—Loud unnecessary and unusual noise.

Notwithstanding any other provisions of the Vallejo Municipal Code and in addition thereto, it shall be unlawful for any person to willfully make or continue, or cause to be made or continued, any loud, unnecessary, and unusual noise which disturbs the peace or quiet of any neighborhood or which causes discomfort or annoyance to any reasonable person of normal sensitiveness residing in the area. The standard which may be considered in determining whether a violation of the provisions of this chapter exist may include, but not be limited to, the following:

A. The level of noise;

B. Whether the nature of the noise is usual or unusual;

C. whether the origin of the noise is natural or unnatural;

D. The level and intensity of the background noise, if any;

E. The proximity of the noise to residential sleeping facilities;

F. The nature and zoning of the area within which the noise emanates;

G. The density of the inhabitation of the area within which the noise emanates;

H. The time of the day and night the noise occurs;

I. The duration of the noise;

J. Whether the noise is recurrent, intermittent, or constant; and

K. Whether the noise is produced by a commercial or noncommercial activity.

(Ord. 1377 N.C. (2d) § 1 (part), 1997.)

7.84.020 - Specific prohibitions.

In addition to and separate from the prohibition set forth in Section 7.84.010 above, the following acts, and the causing or permitting thereof, are hereby declared to be in violation of this ordinance. As used in this section, the term "noise disturbance" means any sound which (1) endangers or injures the safety or health of humans or animals; (2) annoys or disturbs a reasonable person of normal sensitiveness; or (3) endangers or injures personal or real property. The listing of specific prohibited activities in this section is not intended to limit the city's authority to regulate any and all loud, unnecessary and unusual noise pursuant to Section 7.84.010. Any noise not falling within the specific prohibitions set forth in this section is subject to regulation under the provisions of Section 7.84.010 above.

A. Mechanical or (Electronic Devices. It shall be unlawful to use or permit to be used any mechanical or electronic device for the intensification of any sound or noise into the public streets which causes a noise disturbance.

B. Advertisement. It shall be unlawful to use or permit to be used any instrument, whistle, drum, bell, or to make any other noise disturbance for the purpose of advertising, announcing, or otherwise calling attention to any goods, wares, merchandise, or any show, entertainment, or event. The provisions of this subsection shall not be construed to prohibit the selling by outcry of merchandise, food, or beverages at lawfully permitted sporting events, parades, fairs, circuses or other similarly permitted entertainment events.

C. Animals and Birds. It shall be unlawful for any person owning, possessing, or harboring any animal or bird to allow said animal or bird to howl, bark, meow, squawk, or make other annoying noises continuously and/or incessantly for an unreasonable period of time so as to create a noise disturbance across a residential real property line. For purposes of this subsection, the

animal or bird noise shall not be deemed a noise disturbance if a person is trespassing or threatening to trespass upon private property in or upon which the animal or bird is situated, or is using any other means to tease or provoke the animal or bird. This provision shall not apply to a zoo or animal theme park.

D. Emergency Signalling Device. It shall be unlawful to intentionally sound or permit the sounding outdoors of any fire, burglar, or civil defense alms, siren, whistle or similar stationary emergency signalling device, except for emergency purposes or for testing, as provided in subsections D 1 and 2 below.

1. The testing of a stationary emergency signalling device shall not occur before seven a.m. or after nine p.m. Any such testing shall use only the minimum cycle test time, and in no case shall such test time exceed sixty seconds.

2. The testing of the complete emergency signalling system, including the functioning of the signalling device, and personnel response to the signalling device, shall not occur before seven a.m. or after nine p.m. In no case shall such test exceed ten minutes.

E. Burglar or Fire Alarm. It shall be unlawful to intentionally sound or permit the sounding, or fail to take reasonable actions to prevent the sounding of any exterior burglar, security or fire alarm or any motor vehicle burglar or security alarm which is not terminated within ten minutes of activation.

F. Loading and Unloading. It shall be unlawful to load, unload, open, close, or to do other handling of boxes, crates, containers, building materials, garbage cans, or similar objects between the hours of nine p.m. and seven a.m. in such a manner as to cause a noise disturbance across a residential real property boundary. This subsection shall not apply to the collection and disposal of garbage and recyclable materials by the city's franchises.

G. Domestic Power Tools. It shall be unlawful to operate or permit the operation of any mechanically powered saw, drill, sander, grinder, lawn, or garden tool, lawnmower, or other similar device between nine p.m. and seven a.m. so as to create a noise disturbance across a residential real property boundary.

H. Sensitive Uses. It shall be unlawful to create or permit to be created within the city any noise disturbance in the vicinity of any hospital, church during hours of worship services, court house during hours of operation, or school during school hours.

(Ord. 1377 N.C. (2d) § 1 (part), 1997.)

7.84.030 - Violations and penalties; violations deemed a public nuisance.

A. Any person who violates or causes or permits another person to violate any provision of this chapter is subject to, but not limited to, the fines and penalties specified in Chapter 1.12 of the Vallejo Municipal Code, and the administrative fines and administrative citations authorized pursuant to Chapter 1.15 of the Vallejo Municipal Code.

B. As an alternative to the procedures set forth in subsection A, a person violating any provision of this chapter may be given a written or verbal warning to abate the noise violation as an intermediate enforcement measure. If the noise violation persists for more than five minutes after the warning is given or recurs within a one week period from the warning, a citation may be given in place of the warning. It is not a prerequisite to the enforcement of any provision of this chapter or the establishment of a violation of any provision of this chapter that a written or verbal warning to abate the noise violation be given to the person(s) responsible for such violation.

C. In addition to the penalties herein provided, any condition caused or permitted to exist in violation of any of the provisions of this chapter is a threat to the public health, safety and welfare, and is declared and deemed a public nuisance.

(Ord. 1377 N.C. (2d) § 1 (part), 1997.)

7.84.040 - Remedies not exclusive.

The remedies under this chapter are in addition to and do not supersede or limit any and all other remedies, civil or criminal. The remedies provided for herein shall be cumulative and not exclusive.

(Ord. 1377 N.C. (2d) § 1 (part), 1997.)

7.84.050 - Exceptions; public entities.

The prohibitions contained in this chapter shall not apply to the activities of any public entity, including but not limited to, the Greater Vallejo recreation district and the Vallejo City unified school district.

(Ord. 1377 N.C. (2d) § 1 (part), 1997.)

Chapter 7.90 - MOTOR VEHICLES OPERATED ON PUBLIC AND PRIVATE PROPERTY

Sections:

7.90.040 - Noise limitation.

No person shall operate on public or private property, other than a public street or highway, a motor vehicle, including a motorcycle or motor-driven cycle, as such are defined by the California Vehicle Code, at any time or under any condition of grade, load, acceleration or deceleration, in such a manner as to exceed the noise limit established for the type of vehicle being operated by the California Vehicle Code.

(Ord. 229 N.C. (2d) § 1 (part), 1974.)

Chapter 12.40 - EXCAVATIONS, GRADING AND FILLING

Sections:

12.40.010 - Purpose.

It is in the public interest, and it is necessary for the promotion and protection of the public safety, convenience, comfort, prosperity, general welfare and the city's natural resources, to establish minimum requirements for grading in order to:

A. Preserve and enhance the natural beauty of the land, streams and shorelines;

B. Reduce or eliminate the hazards of earthslides, mud flows, rock falls, undue settlement, erosion, siltation and flooding.

(Ord. 400 N.C.(2d) § 1 (part), 1977.)

12.40.020 - Definitions.

Additional information not considered relevant to construction noise was omitted for brevity

(Ord. 400 N.C.(2d) § 1 (part), 1977.)

12.40.070 - Excavating, grading and filling—Regulations.

The following regulations shall apply to all excavating, grading and filling:

A. One copy of approved plans and specifications shall be kept on the site at all times during the progress of grading work.

B. All grading and noise therefrom, including, but not limited to, warming of equipment motors, in residential zones or within one thousand feet of any residential occupancy, hotel, motel or hospital shall be limited to between the hours of seven a.m. and six p.m.

Additional information not considered relevant to construction noise was omitted for brevity

(Ord. 620 N.C.(2d) § 3, 1981; Ord. 400 N.C.(2d) § 1 (part), 1977.)

12.40.150 - Violations—Creation of a dangerous or hazardous condition—Criminal penalties.

A. The city engineer/director of public works may issue a stop-work order until violation of any provision of this chapter is corrected. If, in the opinion of the city engineer/director of public works, a grading operation creates a dangerous or hazardous condition, the engineer/director shall require the applicant to immediately abate such condition. If the applicant fails to abate the condition, the applicant's grading bond shall be called by the city and the cost of corrective work charged to the bond.

B. In addition to the above and to the criminal provisions provided for in this code, violation of any provision of this chapter is declared to be a public nuisance and may be abated by the city.

(Ord. 620 N.C.(2d) § 4, 1981: Ord. 400 N.C.(2d) § 1 (part), 1977.)

Chapter 16.72 - PERFORMANCE STANDARDS REGULATIONS

Sections:

16.72.010 - Title and purpose.

The provisions of Section 16.72.010 through Section 16.72.100, inclusive, shall be known as the performance standards regulations. The purpose of these provisions is to control dangerous or objectionable impacts of land uses and to implement the noise element of the Vallejo general plan.

(Ord. 558 N.C.(2d) § 2 (part), 1980.)

16.72.020 - Compliance.

The development services director may require the applicant for a building permit, prior to the issuance of such permit, to submit such information with respect to proposed machinery, processes, products, or environmental impacts as may be necessary to demonstrate the ability of the proposed uses to comply with applicable performance standards. Such required information may include reports by expert consultants. Whenever an environmental impact report has been submitted and determined to be adequate under state and city guidelines, no further information shall be required.

(Ord. 1368 N.C.(2d) § 18, 1996: Ord. 558 N.C.(2d) § 2 (part), 1980.)

16.72.030 - Noise performance standards.

No land use shall generate sound exceeding the maximum levels permitted in the following table when such sounds are measured in any of the zoning districts listed in this table:

Zoning District	Maximum Sound Pressure Level in Decibels
Resource Conservation, Rural Residential, and Medical Districts	55
Low, Medium, and High Density Residential Districts	60
Professional Offices, Neighborhood, Pedestrian, and Waterfront Shopping and Services Districts	70
Freeway Shopping and Service, Linear Commercial and Intensive Use Districts	75

(Ord. 649 N.C.(2d) § 20, 1982: Ord. 558 N.C.(2d) § 2 (part), 1980.)

16.72.040 - Noise performance standards—Correction factors.

The following correction factors, when applicable, shall be applied to the maximum sound pressure levels given in Section 16.72.030:

Time and Operation of Type of Noise	Correction in Maximum Permitted Decibels
Emission only between 7 a.m. and 10 p.m.	Plus 5
Noise of unusual impulsive character such as hammering or drill pressing	Minus 5
Noise of unusual periodic character such as hammering or screeching	Minus 5

(Ord. 558 N.C.(2d) § 2 (part), 1980.)

16.72.050 - Noise performance standards—Exceptions.

The following sounds, upon compliance with state conditions, may exceed the maximum sound pressure levels given in Section 16.72.030:

A. Time signals produced by places of employment or worship and school recess signals providing no one sound exceeds five seconds in duration and no one series of sounds exceeds twenty-four seconds in duration;

B. Devotional and patriotic music of worship provided such music is emitted only between hours of seven and ten p.m.;

C. Sounds from transportation equipment used exclusively in the movement of goods and people to and from a given premises, temporary construction or demolition work; and

D. Sounds made in the interest of public safety.

(Ord. 558 N.C.(2d) § 2 (part), 1980.)

16.72.060 - Noise level measurement.

The following provisions shall determine means for measuring noise levels. Where these provisions conflict with other provisions of the Vallejo Municipal Code, the following shall remain applicable for purposes of this title:

A. Setting of Meter. Any sound or noise level measurement made pursuant to the provisions of this title shall be measured with a sound level meter using an A-weighting and "slow" response pursuant to applicable manufacturer's instructions, except that for sounds of a duration of two seconds or less, the "fast" response shall be used and the average level during the occurrence of the sound reported.

B. Calibration of Meter. The sound level meter shall be approximately calibrated and adjusted as necessary by means of an acoustical calibrator of the coupler-type to assure meter accuracy within the tolerances set forth in American National Standards ANSI-SI.4-1971.

C. Location of Microphone. All measurements shall be taken at any lot line of a lot within the applicable zoning district. The measuring microphone shall not be less than four feet above the ground, at least four feet distant from walls or other large reflecting surfaces and shall be

protected from the effects of wind noises by the use of appropriate wind screens. In cases when the microphone must be located within ten feet of walls or similar large reflecting surfaces, the actual measured distances and orientation of sources, microphone and reflecting surfaces shall be noted and recorded. In no case shall a noise measurement be taken within five feet of the noise source.

D. Measured Sound Levels. The measurement of sound level limits shall be the average sound level for a period of one hour.

(Ord. 558 N.C.(2d) § 2 (part), 1980.)

16.72.080 - Vibration performance standards.

No use shall be operated in a manner which produces vibrations discernible without instruments at any point on the property line of the lot on which the use is located.

REFERENCES

California Department of Transportation (Caltrans). 2009. Technical Noise Supplement.

Bies, David A. and Colin H. Hansen. 2003. *Engineering Noise Control: Theory and Practice*. 3rd ed. New York: Spoon Press.

Federal Transit Administration (FTA). 2006, May. *Transit Noise and Vibration Impact Assessment*. United States Department of Transportation. FTA-VA-90-1003-06.

Governor's Office of Planning and Research. 2003, October. *State of California General Plan Guidelines*. Thalheimer, E.

2000. Construction Noise Control Program and Mitigation Strategy as the Central

Artery/Tunnel Project. Institute of Noise Control Engineering.

United States Environmental Protection Agency (USEPA). 1974, March. Information on Levels of Environmental Noise

Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety. Office of Noise Abatement and Control.

Noise Element

Introduction

Noise is part of everyday life in a community. *Noise* is generally defined as unwanted sound. Whether a sound is unwanted depends on when and where it occurs, what the listener is doing when it occurs, characteristics of the sound (loudness, pitch and duration, speech or music content, irregularity), and how intrusive it is above background sound levels.

The Noise Element of the General Plan addresses existing and projected noise in the community, sources of noise, land uses sensitive to noise, and noise guidelines and standards for guiding future development.

Purpose of the Noise Element

The Noise Element is one of the required elements of the General Plan. The Noise Element is required to present information on the existing and projected noise environment, existing noise problems, and noise standards. This information is used as a basis for a set of policies and programs that minimize the exposure of community residents to excessive noise.

Noise Fundamentals

Sound is the result of air pressure fluctuations created by vibration of an object. Sound travels through the air as waves of minute air pressure fluctuations. In general, sound waves travel away from the sound source as an expanding spherical surface. The energy contained in a sound wave is consequently spread over an increasing area as it travels away from the source. This spread results in a decrease in loudness at greater distances from the sound source.

Sound-level meters measure the pressure fluctuations caused by sound waves. Because of the ability of the human ear to respond to a wide, dynamic range of sound pressure fluctuations, loudness is measured in terms of decibels (dB) on a logarithmic scale. This approach yields a scale that measures pressure fluctuations using a convenient notation and corresponds to our auditory perception of increasing loudness.

Most sounds consist of a broad range of sound frequencies. Because the human ear is not equally sensitive to all frequencies, several frequency-weighting schemes have been used to develop composite decibel scales that approximate the way the human ear responds to sound levels. The "A-weighted" decibel scale (dBA) is the most widely used for this purpose. Typical A-weighted sound levels for various types of sound sources are summarized in Table 1.

Table 1. Typical Noise Levels

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	— 110 —	Rock band concert
Jet fly-over at 300 meters (1,000 feet)		
	— 100 —	
Gas lawn mower at 1 meter (3 feet)		
	— 90 —	
Diesel truck at 15 meters (50 feet) at 80 kph (50 mph)		Food blender at 1 meter (3 feet)
	— 80 —	Garbage disposal at 1 meter (3 feet)
Noisy urban area, daytime		
Gas lawn mower, 30 meters (100 feet)	—70 —	Vacuum cleaner at 3 meters (10 feet)
Commercial area		Normal speech at 1 meter (3 feet)
Heavy traffic at 90 meters (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
	— 20 —	
		Broadcast/recording studio
	— 10 —	
Lowest threshold of human hearing	— 0 —	Lowest threshold of human hearing

Time-varying sound levels are often described in terms of an equivalent constant decibel level. The *equivalent sound level* (L_{eq}) is a single-value description of average sound exposure over various periods of time. Such average sound exposure values often are weighted to account for the potential for the sound to annoy people (because of the time of day or other factors). The L_{eq} data used for these average sound exposure descriptors are generally based on A-weighted sound-level measurements.

Average sound exposure over a 24-hour period is often presented as a *day-night average sound level* (L_{dn}). L_{dn} values are calculated from hourly L_{eq} values, with the L_{eq} values for the nighttime period (10:00 p.m.–7:00 a.m.) increased by 10 dB

to reflect the greater potential for nighttime noises to disturb people. L_{dn} is commonly accepted as an appropriate descriptor for evaluating community noise exposure.

Existing Noise Environment

Vallejo is a developed, urban city located at the mouth of the Carquinez Straits on the northeast edge of the San Francisco Bay. On the edges of the city, lower-density residential areas abut other suburban development, rural residential, agricultural areas, and bodies of water. In the downtown area, commercial uses, water-related uses, and residential uses coexist.

Existing Noise Sources

In the City of Vallejo, vehicular traffic on roadways is the predominant source of noise. Airplanes and mechanical equipment also contribute to noise, as do intermittent sources such as leaf blowers and construction equipment. Noise levels are typically highest along highways and major traffic corridors.

Traffic and Transportation Noise Sources

Highways in the city include Interstate 80, Interstate 780, and State Routes 29 and 37. Other major traffic corridors include Admiral Callaghan Lane, Benicia Road, Broadway/Alameda Street, Columbus Parkway, Curtola Parkway, Fairgrounds Drive, Georgia Street, Glen Cove Parkway, Lake Herman Road, Redwood Street/Parkway, Sacramento Street, Tennessee Street, and Tuolumne Street.

Bus traffic in the downtown area contributes to noise levels on major streets. A rail line runs north-south through the city along the eastern edge of the downtown area; however, only one to two trains travel on this line each day. Ferries to and from Vallejo dock at the ferry terminal in downtown Vallejo. Horn noise from the ferries can be heard in the downtown area.

No airports are located near Vallejo. Accordingly, noise from aircraft is limited.

Existing traffic noise contours in the city are summarized in Appendix A.

Industrial Uses

Industrial uses generate varying levels of noise. There are very few major industrial uses that generate significant noise levels located in Vallejo. Those uses more likely to generate noise impacts are located on Mare Island. Other isolated industrial uses with noise impacts are distributed throughout the City.

Primary noise sources are associated with loading and movement of products as well as some manufacturing or service related noises. The distance across the Mare Island Straits to the mainland significantly limits the extent to which noise from these uses is heard off the island; however, residential and commercial uses are currently being developed on Mare Island.

Commercial Uses

Commercial uses in Vallejo that generate noise include amusement parks, such as Six Flags Marine World; entertainment uses, such as performance facilities and nightclubs; and other uses, such as retail facilities with noise-generating mechanical equipment or loading docks.

Other Noise-Generating Uses

Other noise-generating uses produce more limited levels of noise. These types of uses include recreational uses and institutional uses. Specific noise generators can include equipment such as air conditioning systems and loudspeakers at stadiums or ball fields.

Noise-Sensitive Land Uses

Noise-sensitive land uses in Vallejo include schools, hospitals, nursing homes, parks, and residential areas. In Vallejo, many of these uses are located in areas of high urban activity and are subject to relatively high outside noise levels.

Noise Complaints

The Police Department is responsible for responding to general noise complaints. Noise complaints are scattered throughout the City; however, there is a concentration of noise complaints in some of the older areas of town where industrial uses abut residential uses. The buildings in these areas were constructed prior to the adoption of the Zoning Ordinance in 1947. Many of these buildings, both industrial and residential, are of historic and architectural interest.

There has been a trend in the last few years to adaptively reuse some of the old industrial buildings in these areas for less intense commercial uses that are more compatible with the adjacent and neighboring residential buildings. The adaptive reuse of the historic buildings should be encouraged and will lessen the noise level incompatibilities in these older areas of town; however, development policies that encourage the mixing and co-existence of land uses will continue to make noise attenuation a challenge within Vallejo.

Projected Noise Environment

Projected traffic noise contours in the city for the year 2025 are summarized in Appendix A.

Effects of Noise on People and Basis for Noise Standards

The noise environment can have a significant effect on overall quality of life. The known effects of noise on people include hearing loss (generally not a factor with community noise), interference with communication, interference with sleep, negative physiological responses, and annoyance. Because of the potentially adverse effects of noise on people, various federal and State agencies have, over the years, developed compatibility thresholds for various types of land uses. Compatibility thresholds for exterior noise developed by the U.S. Environmental Protection Agency form the basis for thresholds recommended by the Governor's Office of Planning and Research (OPR). The exterior noise compatibility standards presented here are based on those recommended by the OPR. The interior noise standard presented here is based on the interior noise standard in the California Noise Insulation Standards (Title 24, California Code of Regulations, Part 2).

Policies

Goal: Maintain noise compatibility in a manner that is acceptable to residents and reasonable for commercial and industrial land uses

Policies

Policy 1: Apply the noise guidelines shown in Table 2 to land use decisions and other City actions.

1a: The exterior noise level at primary outdoor use areas for residences should not exceed the maximum "normally acceptable" level in Table 2 (L_{dn} of 60 dB for residences). Small decks and entry porches do not need to meet this goal. Noise levels up to L_{dn} 65 dB may be allowed at the discretion of the City where it is not economically or aesthetically reasonable to meet the more restrictive outdoor goal.

1b: The interior noise standard shall be 45 dB-L_{dn} for all residential uses, including single- and multi-family housing, hotels/motels, and residential healthcare facilities.

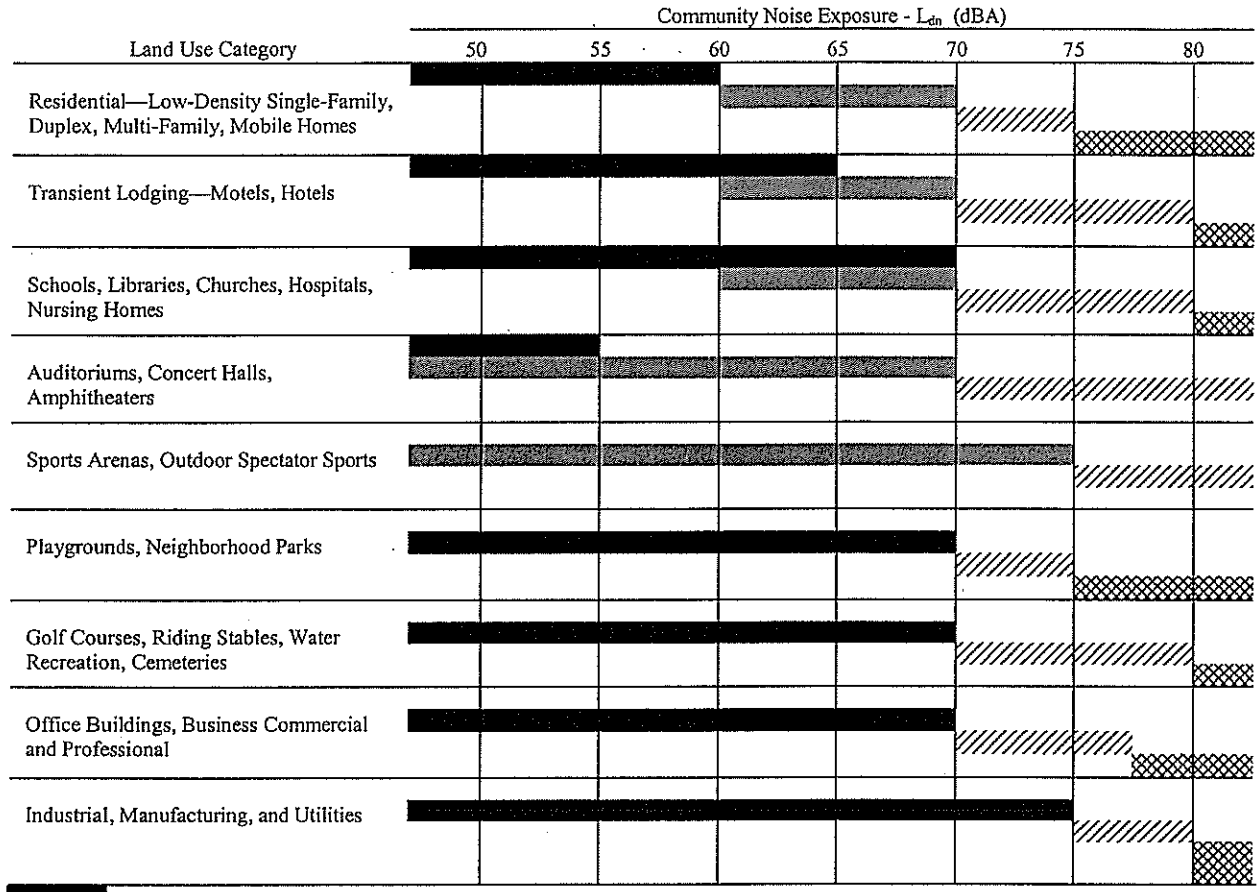
Policy 2: Avoid adverse effects of noise-producing activities on existing land uses by implementing noise reduction measures, limiting hours of operation, or by limiting increases in noise.

2a: Continue to enforce the noise regulations within the Vallejo Municipal Code, including Chapter 7.84 "Regulation of Noise Disturbances" and Chapter 16.72 "Performance Standards Regulations".

2b: Where appropriate, limit noise generating activities (for example, construction and maintenance activities and loading and unloading activities) to the hours of 7:00 a.m. to 9:00 p.m.

2c: When approving new development limit project-related noise increases to no more than 10 dB in non-residential areas and 5 dB in residential areas where the with-project noise level is less than the maximum "normally acceptable" level in Table 2. Limit project-related increases in all areas to no more than 3 dB where the with-project noise level exceeds the "normally acceptable" level in Table 2.

Table 2. City of Vallejo Land Use Compatibility Guidelines for Community Noise Environment



Normally Acceptable	Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.
Conditionally Acceptable	New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features are included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning, will normally suffice.
Normally Unacceptable	New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.
Clearly Unacceptable	New construction or development generally should not be undertaken.

GENERAL PLAN NOISE ELEMENT

APPENDIX A

Table 1: Existing Noise Contours (Page 1 of 3)

Roadway	Segment Limits		Existing L_{dn} Contour Distance (feet)				
	From	To	80	75	70	65	60
SR 29 Sonoma Street	Jct. Interstate 80	Lemon Street	--	--	--	85	183
	Lemon Street	Maine Street	--	--	--	85	183
	Maine Street	Tennessee Street	--	--	52	112	240
	Tennessee Street	Marine World Pkwy.	--	--	55	118	255
	Marine World Pkwy.	Mini Drive	--	55	118	254	546
	Mini Drive	City Limits	--	59	128	276	594
SR 37 Marine World Parkway	Solano County	Mare Island, North Gate	--	59	128	275	592
	Mare Island, North Gate	Sonoma Boulevard	--	--	79	169	365
	Sonoma Boulevard	Broadway	--	--	92	198	426
	Broadway	Fairgrounds Drive	--	86	185	398	857
	Fairgrounds Drive	Jct. Interstate 80	70	151	324	699	1505
Interstate 80	Carquinez Bridge	Jct. SR 29, Sonoma Street	95	205	442	952	2050
	Jct. SR 29, Sonoma Street	Magazine Street	92	198	426	918	1978
	Magazine Street	I-780	96	208	448	964	2078
	I-780	Georgia Street	112	242	520	1121	2416
	Georgia Street	Springs Road	116	250	538	1159	2498
	Springs Road	Tennessee Street	117	253	545	1175	2531
	Tennessee Street	Redwood Street	119	256	552	1190	2563
	Redwood Street	SR 37 Marine World Parkway	105	227	490	1055	2272
	SR 37 Marine World Parkway	Napa County Line	91	195	421	907	1955
Interstate 780	Glen Cove Road	Jct. Interstate 80	55	118	255	548	1181
	Jct. Interstate 80	Lemon Street (end)	--	89	192	414	892
Admiral Callaghan Lane	Tennessee Street	Redwood Parkway	--	--	--	--	93
	Redwood Parkway	Turner Parkway	--	--	62	134	288
	Turner Parkway	Plaza Drive	--	--	--	77	166
	Plaza Drive	Columbus Parkway	--	--	58	126	271
Alameda Street			--	--	--	--	78
Amador Street			--	--	--	--	88
Ascot Parkway			--	--	--	74	160
Benicia Road			--	--	--	--	101
Broadway	Mini Drive	SR37	--	--	53	115	248
	SR37	Tuolumne Street	--	--	--	90	195
	Tuolumne Street	Garibaldi Drive	--	--	--	105	227
	Garibaldi Drive	Sereno Drive	--	--	51	110	237
	Sereno Drive	Redwood Street	--	--	--	95	205
	Redwood Street	Tennessee Street	--	--	--	79	171
	Tennessee Street	Ohio Street	--	--	--	60	129
Columbus Parkway	Interstate 80	Admiral Callaghan Lane	--	73	156	337	726
	Admiral Callaghan Lane	Ascot Parkway	--	--	91	196	422
	Ascot Parkway	Redwood Parkway	--	--	84	180	388
	Redwood Parkway	Club House Drive	--	--	64	137	296
	Club House Drive	Lake Herman Road	--	--	65	139	300
	Lake Herman Road	Ascot Parkway	--	--	--	67	145
	Ascot Parkway	Springs Road	--	--	60	129	279
	Springs Road	Georgia Street	--	--	67	145	312
	Georgia Street	Regents Park Drive	--	--	66	142	306
	Regents Park Drive	Benicia Road	--	--	66	141	305
Corcoran Avenue	Fairgrounds Drive	Mini Drive	--	--	--	--	73
Couch Street	Sonoma Boulevard (SR29)	Broadway	--	--	--	--	89
Curtola Parkway	Mare Island Way	Solano Avenue	--	--	60	129	279
	Solano Avenue	I-780	--	--	71	154	331
Fairgrounds Drive	Corcoran Street	Borges Lane	--	--	51	110	236
	Borges Lane	Taper Avenue	--	--	52	113	243
	Taper Avenue	Gateway Drive	--	--	64	137	295
	Gateway Drive	SR37	--	--	69	148	318
	SR37	Marine World Entrance	--	--	--	68	147
	Marine World Entrance	Sereno Drive	--	--	--	68	146
	Sereno Drive	Redwood Street	--	--	--	--	101
Florida Street	Mare Island Way	Sonoma Boulevard (SR29)	--	--	--	--	65
	Sonoma Boulevard (SR29)	Alameda Street	--	--	--	--	62
	Alameda Street	Solano Avenue	--	--	--	--	92

Table 1: Existing Noise Contours (Page 2 of 3)

Roadway	Segment Limits		Existing L_{dn} Contour Distance (feet)				
	From	To	80	75	70	65	60
Georgia Street	Santa Clara Street	Sacramento Street	--	--	--	--	--
	Sacramento Street	Marin Street	--	--	--	--	--
	Marin Street	Sonoma Boulevard (SR29)	--	--	--	--	--
	Sonoma Boulevard (SR29)	Alameda Street	--	--	--	--	100
	Alameda Street	Amador Street	--	--	--	51	111
	Amador Street	Solano Avenue	--	--	--	54	117
	Solano Avenue	I-80	--	--	--	53	114
	I-80	Maple Street	--	--	--	61	132
	Maple Street	Oakwood Avenue	--	--	--	58	124
	Oakwood Avenue	Rollingwood Drive	--	--	--	--	105
	Rollingwood Drive	Columbus Parkway	--	--	--	--	73
	Columbus Parkway	Ascot Parkway	--	--	--	--	75
Glen Cove Parkway	Interstate 780	Robles Way	--	--	52	113	242
	Robles Way	New Bedford Drive	--	--	--	98	212
	New Bedford Drive	South Regatta Drive	--	--	--	80	173
	South Regatta Drive	end	--	--	--	66	143
Glen Cove Road	Benicia Road	Glen Cove Parkway	--	--	--	71	153
Hiddenbrooke Parkway	Interstate 80	Bennington Drive	--	--	--	--	85
	Bennington Drive	Landmark Drive	--	--	--	--	73
Lake Herman Road	East of Columbus Parkway		--	--	52	111	239
Lemon Street	Derr Avenue	Sonoma Boulevard (SR29)	--	--	--	57	123
	Sonoma Boulevard (SR29)	Sixth Street	--	--	--	57	123
	Sixth Street	Curtola Parkway	--	--	--	55	119
Magazine Street	Sonoma Boulevard (SR29)	I-80	--	--	--	--	92
	I-80	Laurel Street	--	--	--	--	66
	Laurel Street	City Limits	--	--	--	--	75
Mare Island Way			--	--	--	107	231
Marin Street	Curtola Parkway	Maine Street	--	--	--	--	--
	Maine Street	Georgia Street	--	--	--	--	--
	Georgia Street	Virginia Street	--	--	--	--	--
	Virginia Street	Tennessee Street	--	--	--	--	--
Meadows Drive	Sonoma Boulevard (SR29)	Echo Summit Drive	--	--	--	55	119
	Echo Summit Drive	Catalina Way	--	--	--	69	148
Mini Drive	City Limits	Sonoma Boulevard (SR29)	--	--	--	57	122
	Sonoma Boulevard (SR29)	Broadway	--	--	--	58	126
	Broadway	Corcoran Avenue	--	--	--	--	90
	Corcoran Avenue	SR37	--	--	--	--	92
Redwood Parkway	Interstate 80	Admiral Callaghan Lane	--	--	57	122	263
	Admiral Callaghan Lane	Oakwood Avenue	--	--	--	87	186
	Oakwood Avenue	Ascot Parkway	--	--	--	86	184
	Ascot Parkway	Rocky Shore Pl.	--	--	--	64	138
	Rocky Shore Pl.	Columbus Parkway	--	--	--	--	86
Redwood Street	Sacramento Street	Sonoma Boulevard (SR29)	--	--	--	79	169
	Sonoma Boulevard (SR29)	Couch Street	--	--	--	83	179
	Couch Street	Broadway	--	--	--	92	198
	Broadway	Valle Vista Avenue	--	--	--	93	200
	Valle Vista Avenue	Interstate 80	--	--	61	131	282
Rollingwood Drive			--	--	--	50	109
Sacramento Street	Maine Street	Florida Street	--	--	--	--	59
	Florida Street	Tennessee Street	--	--	--	--	90
	Tennessee Street	Hichborn Street	--	--	--	70	151
	Hichborn Street	Valle Vista Avenue	--	--	--	74	159
	Valle Vista Avenue	Redwood Street	--	--	--	64	137
	Redwood Street	SR37	--	--	--	--	106
Santa Clara Street			--	--	--	--	53
Sereno Drive	Sonoma Boulevard (SR29)	Broadway	--	--	--	53	115
	Broadway	North Camino Alto	--	--	--	69	148
	North Camino Alto	Tuolumne Street	--	--	--	56	122
	Tuolumne Street	Fairgrounds Drive	--	--	--	--	86
Solano Avenue	Sonoma Boulevard (SR29)	Fifth Street	--	--	--	--	75
	Fifth Street	Curtola Parkway	--	--	--	--	74
	Curtola Parkway	Benicia Road	--	--	--	--	91
	Benicia Road	Interstate 80	--	--	--	55	119

Table 1: Existing Noise Contours (Page 3 of 3)

Roadway	Segment Limits		Existing L_{dn} Contour Distance (feet)				
	From	To	80	75	70	65	60
Springs Road	Interstate 80	Maple Avenue	--	--	--	84	182
	Maple Avenue	Columbus Parkway	--	--	--	80	173
Steffan Street	Benicia Road	Georgia Street	--	--	--	--	57
Tennessee Street	Mare Island Way	Sonoma Boulevard (SR29)	--	--	--	85	183
	Sonoma Boulevard (SR29)	Broadway	--	--	53	114	245
	Broadway	Tuolumne Street	--	--	62	133	288
	Tuolumne Street	Interstate 80	--	--	62	134	290
	Interstate 80	Oakwood Avenue	--	--	--	77	166
	Oakwood Avenue	Rollingwood Drive	--	--	--	56	120
	Rollingwood Drive	Columbus Parkway	--	--	--	57	122
Tuolumne Street	Broadway	Walnut Street	--	--	--	--	81
	Walnut Street	Del Mar Avenue	--	--	--	67	145
	Del Mar Avenue	Valle Vista Avenue	--	--	--	76	163
	Valle Vista Avenue	Nebraska Street	--	--	--	52	111
	Nebraska Street	Tennessee Street	--	--	--	--	89
	Tennessee Street	Solano Avenue	--	--	--	--	105
Turner Parkway	Admiral Callaghan Lane	Ascot Parkway	--	--	--	83	178
	Ascot Parkway	East of Ascot Parkway	--	--	--	66	143
Valle Vista Avenue	Sacramento Street	Sonoma Boulevard (SR29)	--	--	--	--	67
	Sonoma Boulevard (SR29)	Fairgrounds Drive	--	--	--	--	75
Wilson Avenue	SR37	Hichborn Street	--	--	--	51	110
	Hichborn Street	Tennessee Street	--	--	--	61	131

Table 2: Future Noise Contours (Page 1 of 3)

Roadway	Segment Limits		Future L_{dn} Contour Distance (feet)				
	From	To	80	75	70	65	60
SR 29 Sonoma Street	Jct. Interstate 80	Lemon Street	--	--	--	108	232
	Lemon Street	Maine Street	--	--	--	108	232
	Maine Street	Tennessee Street	--	--	66	141	305
	Tennessee Street	Marine World Pkwy.	--	--	70	150	323
	Marine World Pkwy.	Mini Drive	--	69	149	321	692
	Mini Drive	City Limits	--	75	162	349	752
SR 37 Marine World Parkway	Solano County	Mare Island, North Gate	--	106	228	492	1061
	Mare Island, North Gate	Sonoma Boulevard	--	65	141	304	654
	Sonoma Boulevard	Broadway	--	69	148	320	689
	Broadway	Fairgrounds Drive	53	114	246	529	1140
	Fairgrounds Drive	Jct. Interstate 80	71	153	331	712	1535
Interstate 80	Carquinez Bridge	Jct. SR 29, Sonoma Street	133	287	619	1334	2873
	Jct. SR 29, Sonoma Street	Magazine Street	131	282	607	1307	2815
	Magazine Street	I-780	134	288	620	1337	2880
	I-780	Georgia Street	136	294	633	1365	2940
	Georgia Street	Springs Road	137	296	638	1374	2960
	Springs Road	Tennessee Street	138	297	641	1380	2973
	Tennessee Street	Redwood Street	139	300	646	1392	2998
	Redwood Street	SR 37 Marine World Parkway	133	287	618	1333	2871
	SR 37 Marine World Parkway	Napa County Line	129	278	600	1292	2783
Interstate 780	Glen Cove Road	Jct. Interstate 80	65	141	303	653	1406
	Jct. Interstate 80	Lemon Street (end)	--	106	229	493	1062
Admiral Callaghan Lane	Tennessee Street	Redwood Parkway	--	--	--	--	102
	Redwood Parkway	Turner Parkway	--	--	68	147	316
	Turner Parkway	Plaza Drive	--	--	--	85	183
	Plaza Drive	Columbus Parkway	--	--	64	138	298
Alameda Street			--	--	--	--	95
Amador Street			--	--	--	--	90
Ascot Parkway			--	--	54	117	253
Benicia Road			--	--	--	54	117
Broadway	Mini Drive	SR37	--	--	61	132	285
	SR37	Tuolumne Street	--	--	--	104	224
	Tuolumne Street	Garibaldi Drive	--	--	56	121	260
	Garibaldi Drive	Sereno Drive	--	--	59	126	272
	Sereno Drive	Redwood Street	--	--	51	109	236
	Redwood Street	Tennessee Street	--	--	--	91	196
	Tennessee Street	Ohio Street	--	--	--	69	148
Columbus Parkway	Interstate 80	Admiral Callaghan Lane	53	115	248	533	1149
	Admiral Callaghan Lane	Ascot Parkway	--	67	144	310	667
	Ascot Parkway	Redwood Parkway	--	61	132	285	615
	Redwood Parkway	Club House Drive	--	--	101	217	468
	Club House Drive	Lake Herman Road	--	--	102	220	474
	Lake Herman Road	Ascot Parkway	--	--	--	106	229
	Ascot Parkway	Springs Road	--	--	95	205	441
	Springs Road	Georgia Street	--	--	106	229	494
	Georgia Street	Regents Park Drive	--	--	104	225	484
	Regents Park Drive	Benicia Road	--	--	104	224	482
Corcoran Avenue	Fairgrounds Drive	Mini Drive	--	--	--	--	73
Couch Street	Sonoma Boulevard (SR29)	Broadway	--	--	--	62	134
Curtola Parkway	Mare Island Way	Solano Avenue	--	--	88	189	406
	Solano Avenue	I-780	--	--	104	224	483
Fairgrounds Drive	Corcoran Street	Borges Lane	--	--	59	126	272
	Borges Lane	Taper Avenue	--	--	60	130	280
	Taper Avenue	Gateway Drive	--	--	73	158	341
	Gateway Drive	SR37	--	--	79	171	368
	SR37	Marine World Entrance	--	--	--	79	170
	Marine World Entrance	Sereno Drive	--	--	--	78	169
	Sereno Drive	Redwood Street	--	--	--	54	116
Florida Street	Mare Island Way	Sonoma Boulevard (SR29)	--	--	--	--	66
	Sonoma Boulevard (SR29)	Alameda Street	--	--	--	--	63
	Alameda Street	Solano Avenue	--	--	--	--	93

Table 2: Future Noise Contours (Page 2 of 3)

Roadway	Segment Limits		Future L_{dn} Contour Distance (feet)				
	From	To	80	75	70	65	60
Georgia Street	Santa Clara Street	Sacramento Street	--	--	--	--	--
	Sacramento Street	Marin Street	--	--	--	--	56
	Marin Street	Sonoma Boulevard (SR29)	--	--	--	--	--
	Sonoma Boulevard (SR29)	Alameda Street	--	--	--	59	127
	Alameda Street	Amador Street	--	--	--	65	140
	Amador Street	Solano Avenue	--	--	--	69	148
	Solano Avenue	I-80	--	--	--	67	145
	I-80	Maple Street	--	--	--	78	167
	Maple Street	Oakwood Avenue	--	--	--	73	158
	Oakwood Avenue	Rollingwood Drive	--	--	--	62	133
	Rollingwood Drive	Columbus Parkway	--	--	--	--	93
	Columbus Parkway	Ascot Parkway	--	--	--	--	95
Glen Cove Parkway	Interstate 780	Robles Way	--	--	56	120	258
	Robles Way	New Bedford Drive	--	--	--	105	226
	New Bedford Drive	South Regatta Drive	--	--	--	86	185
	South Regatta Drive	end	--	--	--	71	152
Glen Cove Road	Benicia Road	Glen Cove Parkway	--	--	--	73	158
Hiddenbrooke Parkway	Interstate 80	Bennington Drive	--	--	--	--	96
	Bennington Drive	Landmark Drive	--	--	--	--	82
Lake Herman Road	East of Columbus Parkway		--	--	55	118	255
Lemon Street	Derr Avenue	Sonoma Boulevard (SR29)	--	--	--	59	128
	Sonoma Boulevard (SR29)	Sixth Street	--	--	--	59	128
	Sixth Street	Curtola Parkway	--	--	--	57	124
Magazine Street	Sonoma Boulevard (SR29)	I-80	--	--	--	--	96
	I-80	Laurel Street	--	--	--	--	69
	Laurel Street	City Limits	--	--	--	--	78
Mare Island Way			--	--	89	191	411
Marin Street	Curtola Parkway	Maine Street	--	--	--	--	--
	Maine Street	Georgia Street	--	--	--	--	--
	Georgia Street	Virginia Street	--	--	--	--	54
	Virginia Street	Tennessee Street	--	--	--	--	61
Meadows Drive	Sonoma Boulevard (SR29)	Echo Summit Drive	--	--	--	62	134
	Echo Summit Drive	Catalina Way	--	--	--	77	167
Mini Drive	City Limits	Sonoma Boulevard (SR29)	--	--	--	64	137
	Sonoma Boulevard (SR29)	Broadway	--	--	--	65	141
	Broadway	Corcoran Avenue	--	--	--	--	101
	Corcoran Avenue	SR37	--	--	--	--	103
Redwood Parkway	Interstate 80	Admiral Callaghan Lane	--	--	66	142	305
	Admiral Callaghan Lane	Oakwood Avenue	--	--	--	100	216
	Oakwood Avenue	Ascot Parkway	--	--	--	99	214
	Ascot Parkway	Rocky Shore Pl.	--	--	--	75	161
	Rocky Shore Pl.	Columbus Parkway	--	--	--	--	100
Redwood Street	Sacramento Street	Sonoma Boulevard (SR29)	--	--	--	84	181
	Sonoma Boulevard (SR29)	Couch Street	--	--	--	89	191
	Couch Street	Broadway	--	--	--	98	211
	Broadway	Valle Vista Avenue	--	--	--	99	213
	Valle Vista Avenue	Interstate 80	--	--	65	139	301
Rollingwood Drive			--	--	--	52	113
Sacramento Street	Maine Street	Florida Street	--	--	--	--	66
	Florida Street	Tennessee Street	--	--	--	--	102
	Tennessee Street	Hichborn Street	--	--	--	79	170
	Hichborn Street	Valle Vista Avenue	--	--	--	83	180
	Valle Vista Avenue	Redwood Street	--	--	--	72	155
	Redwood Street	SR37	--	--	--	55	119
Santa Clara Street			--	--	--	--	58
Sereno Drive	Sonoma Boulevard (SR29)	Broadway	--	--	--	64	137
	Broadway	North Camino Alto	--	--	--	82	176
	North Camino Alto	Tuolumne Street	--	--	--	67	145
	Tuolumne Street	Fairgrounds Drive	--	--	--	--	102
Solano Avenue	Sonoma Boulevard (SR29)	Fifth Street	--	--	--	--	82
	Fifth Street	Curtola Parkway	--	--	--	--	82
	Curtola Parkway	Benicia Road	--	--	--	--	100
	Benicia Road	Interstate 80	--	--	--	61	131

Table 2: Future Noise Contours (Page 3 of 3)

Roadway	Segment Limits		Future L_{dn} Contour Distance (feet)				
	From	To	80	75	70	65	60
Springs Road	Interstate 80	Maple Avenue	--	--	--	88	189
	Maple Avenue	Columbus Parkway	--	--	--	84	180
Steffan Street	Benicia Road	Georgia Street	--	--	--	--	60
Tennessee Street	Mare Island Way	Sonoma Boulevard (SR29)	--	--	--	98	211
	Sonoma Boulevard (SR29)	Broadway	--	--	61	131	283
	Broadway	Tuolumne Street	--	--	72	154	332
	Tuolumne Street	Interstate 80	--	--	72	155	334
	Interstate 80	Oakwood Avenue	--	--	--	89	191
	Oakwood Avenue	Rollingwood Drive	--	--	--	64	138
	Rollingwood Drive	Columbus Parkway	--	--	--	65	141
Tuolumne Street	Broadway	Walnut Street	--	--	--	--	89
	Walnut Street	Del Mar Avenue	--	--	--	74	161
	Del Mar Avenue	Valle Vista Avenue	--	--	--	83	180
	Valle Vista Avenue	Nebraska Street	--	--	--	57	123
	Nebraska Street	Tennessee Street	--	--	--	--	98
	Tennessee Street	Solano Avenue	--	--	--	54	116
Turner Parkway	Admiral Callaghan Lane	Ascot Parkway	--	--	--	98	211
	Ascot Parkway	East of Ascot Parkway	--	--	--	79	169
Valle Vista Avenue	Sacramento Street	Sonoma Boulevard (SR29)	--	--	--	--	74
	Sonoma Boulevard (SR29)	Fairgrounds Drive	--	--	--	--	82
Wilson Avenue	SR37	Hichborn Street	--	--	--	78	167
	Hichborn Street	Tennessee Street	--	--	--	92	199

Table 3: Existing and Future Railroad Noise Contours

Location	Railroad L_{dn} Contour Distances (feet)				
	75	70	65	60	55
Within 1/4 mile of an at-grade roadway crossing	--	--	51	109	235
Farther than 1/4 mile from an at-grade roadway crossing	--	--	--	--	50

Figure 1: 24-Hour Noise Measurement: State Route 29, Sonoma Boulevard North of Virginia Street, East Side 33 Feet from Centerline of Near Lane

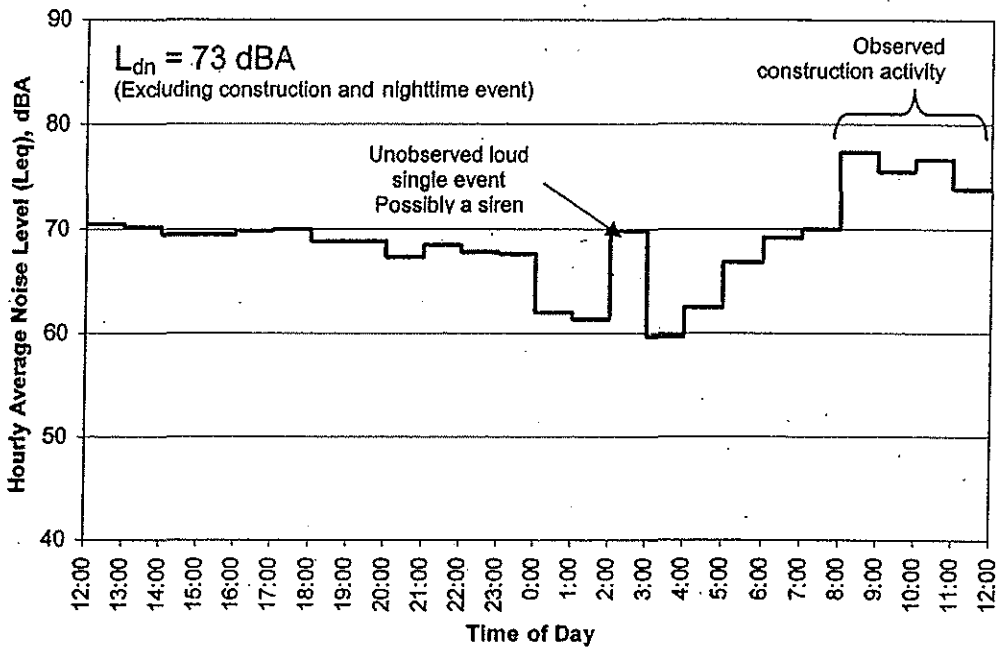


Figure 2: 24-Hour Noise Measurement: Columbus Parkway North of Springs Road, West Side 33 Feet from Centerline of Near Lane

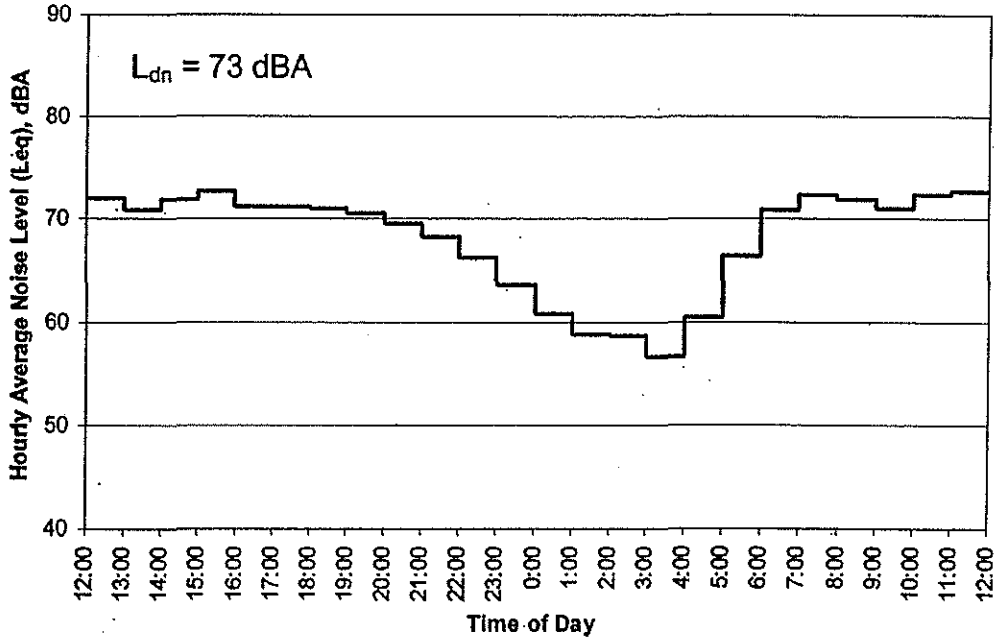


Figure 3: 24-Hour Noise Measurement: Interstate 780
At Cedar Street, North Side
105 Feet from Centerline of Near Lane

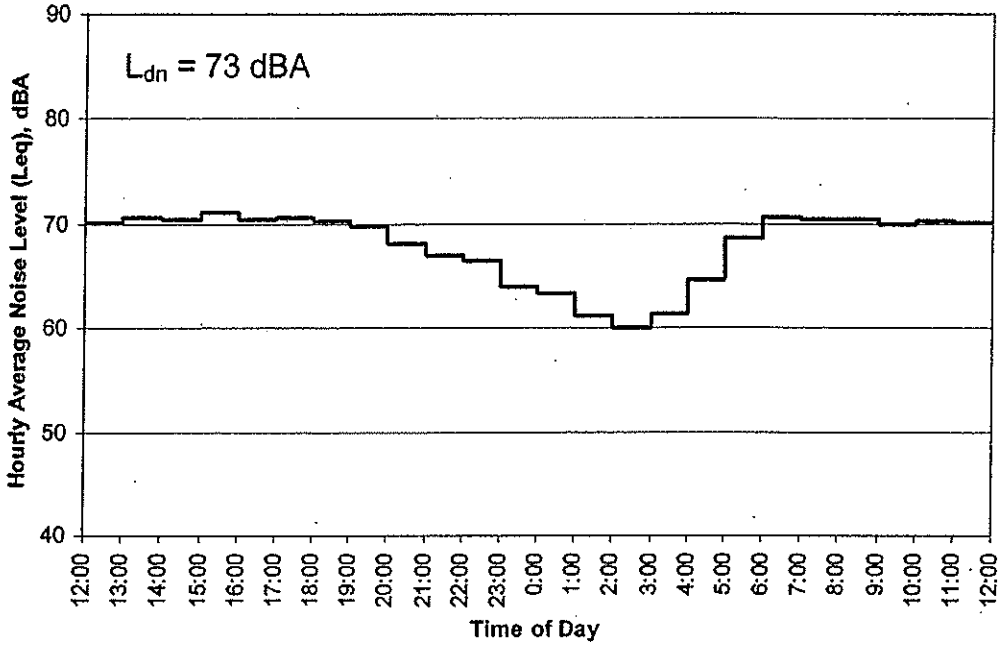
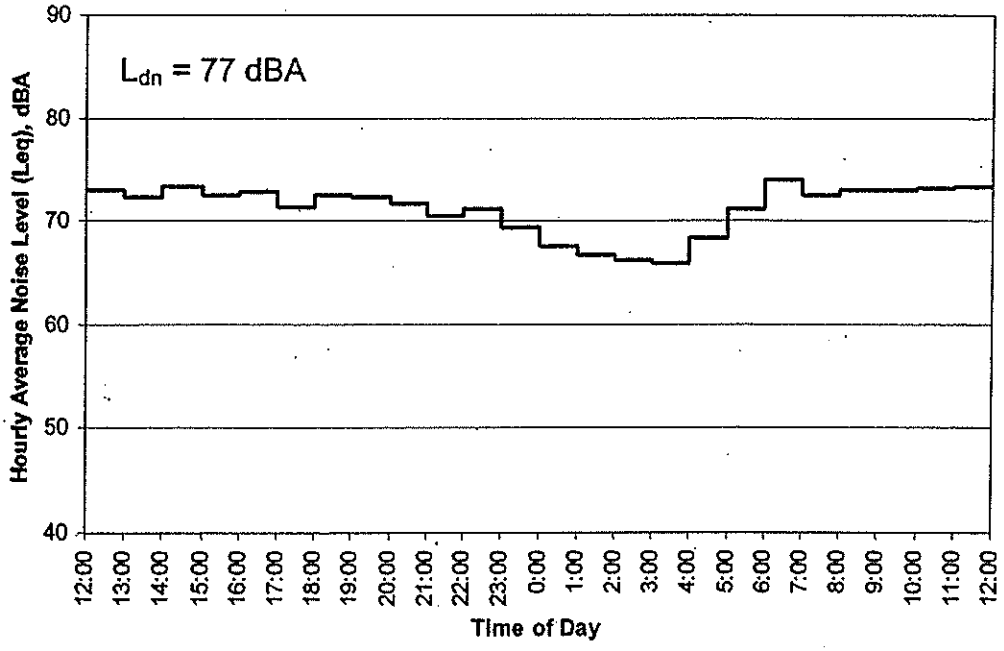


Figure 4: 24-Hour Noise Measurement: Interstate 80
South of Florida Street, East Side
100 Feet from Centerline of Near Lane



Construction Generated Vibration

Vibration Annoyance

Receptor:	Average Vibration Level - Home to the East	Average Distance (feet):	290

Equipment	Approximate Reference Velocity Level at 25 ft, VdB	Approximate Velocity Level, VdB
Vibratory Roller	94	73
Caisson Drill	87	66
Large bulldozer	87	66
Small bulldozer	58	37
Jackhammer	79	58
Loaded trucks	86	65
	Criteria	**78**

Receptor:	Average Vibration Level - Homes to the North Across Valle Vista	Average Distance (feet):	320

Equipment	Approximate Reference Velocity Level at 25 ft, VdB	Approximate Velocity Level, VdB
Vibratory Roller	94	72
Caisson Drill	87	65
Large bulldozer	87	65
Small bulldozer	58	36
Jackhammer	79	57
Loaded trucks	86	64
	Criteria	**78**

Receptor:	Average Vibration Levels - Storage Center to the Southeast	Average Distance (feet):	330

Equipment	Approximate Reference Velocity Level at 25 ft, VdB	Approximate Velocity Level, VdB
Vibratory Roller	94	72
Caisson Drill	87	65
Large bulldozer	87	65
Small bulldozer	58	36
Jackhammer	79	57
Loaded trucks	86	64
	Criteria	**78**

Construction Generated Vibration

Vibration Structural Damage

Receptor:	Maximum Vibration Levels - Home to the East	Closest Distance (feet):	50

Equipment	Approximate Reference RMS Velocity at 25 ft, inch/second	Approximate RMS Velocity Level, inch/second
Vibratory Roller	0.210	0.074
Caisson Drill	0.089	0.031
Large bulldozer	0.089	0.031
Small bulldozer	0.003	0.001
Jackhammer	0.035	0.012
Loaded trucks	0.076	0.027
	Criteria	**0.200**

Receptor:	ximum Vibration Levels - Homes to the North Across Valle Vista A	Closest Distance (feet):	90

Equipment	Approximate Reference RMS Velocity at 25 ft, inch/second	Approximate RMS Velocity Level, inch/second
Vibratory Roller	0.210	0.031
Caisson Drill	0.089	0.013
Large bulldozer	0.089	0.013
Small bulldozer	0.003	0.000
Jackhammer	0.035	0.005
Loaded trucks	0.076	0.011
	Criteria	**0.200**

Receptor:	Maximum Vibration Levels - Outpatient Facility to the East	Closest Distance (feet):	130

Equipment	Approximate Reference RMS Velocity at 25 ft, inch/second	Approximate RMS Velocity Level, inch/second
Vibratory Roller	0.210	0.018
Caisson Drill	0.089	0.008
Large bulldozer	0.089	0.008
Small bulldozer	0.003	0.000
Jackhammer	0.035	0.003
Loaded trucks	0.076	0.006
	Criteria	**0.200**

[1.] Determined based on use of jackhammers or pneumatic hammers that may be used for pavement demolition at a distance of 25 feet

Notes: RMS velocity calculated from vibration level (VdB) using the reference of one microinch/second.

Source: Based on methodology from the United States Department of Transportation Federal Transit Administration, *Transit Noise and Vibration Impact Assessment* (2006).

ANALYST
AW

ROAD CLASSIFICATION	SPEED	LANE DISTANCE
2U	40	12
4U	40	36
4D	45	48
6D	45	84
2D	40	24

		73.6	75.88%
		13.6	14.02%
		10.22	10.54%

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.00%	DAY	75.5%
% MT	2.00%	EVENING	14.0%
% HT	1.00%	NIGHT	10.5%

We have different values from the client/traffic study, is it ok to change th

Source: Riverside, County of, Department of Public Health, Office of Industrial Hygiene. 2009, November. For Determining and Mi

Riverside County Fleet Mix: Secondary, Collectors, or Smaller

Vehicle	Overall %	Day (7 AM to	Evening (7	Night (10 PM to 7 AM)
Auto	97%	73.60	13.60	10.22
Medium Truck	2%	0.90	0.04	0.90
Heavy Truck	1%	0.35	0.04	0.35
		74.85	13.68	11.47

Vall-02 Caliber School

EXISTING NO PROJECT 2015

#	ROADWAY	SEGMENT	ADT	POSTED SPEED LIMIT	LANE DISTANCE	SITE CONDITION	LANES	GRADE (%)
1	Nebraska	Sonoma to Broadway	2,820	40	24	Soft	2D	**0%**
2	Valle Vista	Sonoma to Couch	3,940	40	24	Soft	2D	**0%**
3	Valle Vista	Couch to Napa	3,480	40	24	Soft	2D	**0%**
4	Valle Vista	Napa to Broadway	3,480	40	24	soft	2D	**0%**
5	Oregon	Napa to Broadway	390	45	48	Soft	4D	**0%**
6	Redwood	Sonoma to Couch	13,710	45	48	Soft	4D	**0%**
7	Redwood	Couch to Broadway	13,900	45	48	Soft	4D	**0%**
8	Sonoma	Redwood to Valle Vista	16,520	45	84	Soft	6D	**0%**
9	Sonoma	Valle Vista to Couch	14,900	45	84	Soft	6D	**0%**
10	Sonoma	Couch to Nebraska	17,410	45	48	Soft	4D	**0%**
11	Couch	Redwood to Valle Vista	5,400	45	48	Soft	4D	**0%**
12	Couch	Valle Vista to Sonoma	5,060	45	48	Soft	4D	**0%**
13	Broadway	Redwood to Valle Vista	11,920	45	48	Soft	4D	**0%**
14	Broadway	Valle Vista to Oregon	12,920	45	48	Soft	4D	**0%**
15	Broadway	Oregon to Nebraska	12,930	45	48	Soft	4D	**0%**

Vall-02 Caliber School

EXISTING NO PROJECT 2015 CONDITIONS NOISE CONTOURS RESULT SUMMARY TABLE

					DISTACE TO NOISE CONTOUR (FT.)		
#	ROADWAY	SEGMENT	TRAFIC VOLUMES	LEVEL AT 50 FT.	70 dBA CNEL	65 dBA CNEL	60 dBA CNEL
1	Nebraska	Sonoma to Broadway	2,820	61.7	14	30	65
2	Valle Vista	Sonoma to Couch	3,940	63.1	17	38	81
3	Valle Vista	Couch to Napa	3,480	62.6	16	35	75
4	Valle Vista	Napa to Broadway	3,480	62.6	16	35	75
5	Oregon	Napa to Broadway	390	55.0	5	11	23
6	Redwood	Sonoma to Couch	13,710	70.5	54	116	249
7	Redwood	Couch to Broadway	13,900	70.5	54	117	251
8	Sonoma	Redwood to Valle Vista	16,520	74.4	98	212	456
9	Sonoma	Valle Vista to Couch	14,900	74.0	92	198	426
10	Sonoma	Couch to Nebraska	17,410	71.5	63	136	292
11	Couch	Redwood to Valle Vista	5,400	66.4	29	62	134
12	Couch	Valle Vista to Sonoma	5,060	66.1	28	59	128
13	Broadway	Redwood to Valle Vista	11,920	69.9	49	105	227
14	Broadway	Valle Vista to Oregon	12,920	70.2	52	111	239
15	Broadway	Oregon to Nebraska	12,930	70.2	52	111	240

Vall-02 Caliber School

Near-Term Future 2018

#	ROADWAY	SEGMENT	ADT	POSTED SPEED LIMIT	LANE DISTANCE	SITE CONDITION	LANES	GRADE (%)
1	Nebraska	Sonoma to Broadway	2,800	40	24	Soft	2D	**0%**
2	Valle Vista	Sonoma to Couch	4,620	40	24	Soft	2D	**0%**
3	Valle Vista	Couch to Napa	4,070	40	24	Soft	2D	**0%**
4	Valle Vista	Napa to Broadway	3,970	40	24	soft	2D	**0%**
5	Oregon	Napa to Broadway	540	45	48	Soft	4D	**0%**
6	Redwood	Sonoma to Couch	14,320	45	48	Soft	4D	**0%**
7	Redwood	Couch to Broadway	14,530	45	48	Soft	4D	**0%**
8	Sonoma	Redwood to Valle Vista	17,660	45	84	Soft	6D	**0%**
9	Sonoma	Valle Vista to Couch	15,790	45	84	Soft	6D	**0%**
10	Sonoma	Couch to Nebraska	18,550	45	48	Soft	4D	**0%**
11	Couch	Redwood to Valle Vista	5,780	45	48	Soft	4D	**0%**
12	Couch	Valle Vista to Sonoma	6,180	45	48	Soft	4D	**0%**
13	Broadway	Redwood to Valle Vista	16,120	45	48	Soft	4D	**0%**
14	Broadway	Valle Vista to Oregon	13,570	45	48	Soft	4D	**0%**
15	Broadway	Oregon to Nebraska	13,580	45	48	Soft	4D	**0%**
16					#N/A	Soft		**0%**

ANALYST
AW

ROAD CLASSIFICATION	SPEED	LANE DISTANCE
2U	40	12
4U	40	36
4D	45	48
6D	45	84
2D	40	24

		73.6	75.88%
		13.6	14.02%
		10.22	10.54%

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.00%	DAY	75.5%
% MT	2.00%	EVENING	14.0%
% HT	1.00%	NIGHT	10.5%

We have different values from the client/traffic study, is it ok to change th

Source: Riverside, County of, Department of Public Health, Office of Industrial Hygiene. 2009, November. For Determining and Mi

Riverside County Fleet Mix: Secondary, Collectors, or Smaller

Vehicle	Overall %	Day (7 AM to	Evening (7	Night (10 PM to 7 AM)
Auto	97%	73.60	13.60	10.22
Medium Truck	2%	0.90	0.04	0.90
Heavy Truck	1%	0.35	0.04	0.35
		74.85	13.68	11.47

Vall-02 Caliber School
Near-Term Future 2018 CONDITIONS NOISE CONTOURS RESULT SUMMARY TABLE

					DISTACE TO NOISE CONTOUR (FT.)		
#	ROADWAY	SEGMENT	TRAFIC VOLUMES	LEVEL AT 50 FT.	70 dBA CNEL	65 dBA CNEL	60 dBA CNEL
1	Nebraska	Sonoma to Broadway	2,800	61.7	14	30	65
2	Valle Vista	Sonoma to Couch	4,620	63.8	19	42	90
3	Valle Vista	Couch to Napa	4,070	63.3	18	38	83
4	Valle Vista	Napa to Broadway	3,970	63.2	18	38	81
5	Oregon	Napa to Broadway	540	56.4	6	13	29
6	Redwood	Sonoma to Couch	14,320	70.6	55	119	256
7	Redwood	Couch to Broadway	14,530	70.7	56	120	259
8	Sonoma	Redwood to Valle Vista	17,660	74.7	103	221	477
9	Sonoma	Valle Vista to Couch	15,790	74.2	95	205	442
10	Sonoma	Couch to Nebraska	18,550	71.8	66	141	305
11	Couch	Redwood to Valle Vista	5,780	66.7	30	65	140
12	Couch	Valle Vista to Sonoma	6,180	67.0	32	68	146
13	Broadway	Redwood to Valle Vista	16,120	71.2	60	129	277
14	Broadway	Valle Vista to Oregon	13,570	70.4	53	115	247
15	Broadway	Oregon to Nebraska	13,580	70.4	53	115	247

Vall-02 Caliber School

Near-Term Future Plus Project 2018

#	ROADWAY	SEGMENT	ADT	POSTED SPEED LIMIT	LANE DISTANCE	SITE CONDITION	LANES	GRADE (%)
1	Nebraska	Sonoma to Broadway	3,350	40	24	Soft	2D	**0%**
2	Valle Vista	Sonoma to Couch	4,760	40	24	Soft	2D	**0%**
3	Valle Vista	Couch to Napa	4,500	40	24	Soft	2D	**0%**
4	Valle Vista	Napa to Broadway	4,770	40	24	soft	2D	**0%**
5	Oregon	Napa to Broadway	930	45	48	Soft	4D	**0%**
6	Redwood	Sonoma to Couch	14,610	45	48	Soft	4D	**0%**
7	Redwood	Couch to Broadway	14,830	45	48	Soft	4D	**0%**
8	Sonoma	Redwood to Valle Vista	18,030	45	84	Soft	6D	**0%**
9	Sonoma	Valle Vista to Couch	16,110	45	84	Soft	6D	**0%**
10	Sonoma	Couch to Nebraska	19,180	45	48	Soft	4D	**0%**
11	Couch	Redwood to Valle Vista	5,900	45	48	Soft	4D	**0%**
12	Couch	Valle Vista to Sonoma	6,070	45	48	Soft	4D	**0%**
13	Broadway	Redwood to Valle Vista	12,890	45	48	Soft	4D	**0%**
14	Broadway	Valle Vista to Oregon	14,590	45	48	Soft	4D	**0%**
15	Broadway	Oregon to Nebraska	14,130	45	48	Soft	4D	**0%**

ANALYST
AW

ROAD CLASSIFICATION	SPEED	LANE DISTANCE
2U	40	12
4U	40	36
4D	45	48
6D	45	84
2D	40	24

		73.6	75.88%
		13.6	14.02%
		10.22	10.54%

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.00%	DAY	75.5%
% MT	2.00%	EVENING	14.0%
% HT	1.00%	NIGHT	10.5%

We have different values from the client/traffic study, is it ok to change these?

Source: Riverside, County of, Department of Public Health, Office of Industrial Hygiene. 2009, November. For Determining and Mitigating Traf

Riverside County Fleet Mix: Secondary, Collectors, or Smaller

Vehicle	Overall %	Day (7 AM to	Evening (7	Night (10 PM to 7 AM)
Auto	97%	73.60	13.60	10.22
Medium Truck	2%	0.90	0.04	0.90
Heavy Truck	1%	0.35	0.04	0.35
		74.85	13.68	11.47

Vall-02 Caliber School
-Term Future Plus Project 2018 CONDITIONS NOISE CONTOURS RESULT SUMMARY TABLE

					DISTACE TO NOISE CONTOUR (FT.)		
#	ROADWAY	SEGMENT	TRAFIC VOLUMES	LEVEL AT 50 FT.	70 dBA CNEL	65 dBA CNEL	60 dBA CNEL
1	Nebraska	Sonoma to Broadway	3,350	62.4	16	34	73
2	Valle Vista	Sonoma to Couch	4,760	64.0	20	43	92
3	Valle Vista	Couch to Napa	4,500	63.7	19	41	89
4	Valle Vista	Napa to Broadway	4,770	64.0	20	43	92
5	Oregon	Napa to Broadway	930	58.8	9	19	41
6	Redwood	Sonoma to Couch	14,610	70.7	56	121	260
7	Redwood	Couch to Broadway	14,830	70.8	57	122	262
8	Sonoma	Redwood to Valle Vista	18,030	74.8	104	224	483
9	Sonoma	Valle Vista to Couch	16,110	74.3	97	208	448
10	Sonoma	Couch to Nebraska	19,180	71.9	67	145	312
11	Couch	Redwood to Valle Vista	5,900	66.8	31	66	142
12	Couch	Valle Vista to Sonoma	6,070	66.9	31	67	145
13	Broadway	Redwood to Valle Vista	12,890	70.2	51	111	239
14	Broadway	Valle Vista to Oregon	14,590	70.7	56	120	260
15	Broadway	Oregon to Nebraska	14,130	70.6	55	118	254

Table 5

Noise Contours for Existing No Project Conditions

Roadway	Segment	Daily Traffic Volumes	Noise level at 50 feet (dBA CNEL)	Distance to noise contour (feet)		
				70 dBA CNEL	65 dBA CNEL	60 dBA CNEL
Nebraska	Sonoma to Broadway	2,820	61.7	14	30	65
Valle Vista	Sonoma to Couch	3,940	63.1	17	38	81
Valle Vista	Couch to Napa	3,480	62.6	16	35	75
Valle Vista	Napa to Broadway	3,480	62.6	16	35	75
Oregon	Napa to Broadway	390	55.0	5	11	23
Redwood	Sonoma to Couch	13,710	70.5	54	116	249
Redwood	Couch to Broadway	13,900	70.5	54	117	251
Sonoma	Redwood to Valle Vista	16,520	74.4	98	212	456
Sonoma	Valle Vista to Couch	14,900	74.0	92	198	426
Sonoma	Couch to Nebraska	17,410	71.5	63	136	292
Couch	Redwood to Valle Vista	5,400	66.4	29	62	134
Couch	Valle Vista to Sonoma	5,060	66.1	28	59	128
Broadway	Redwood to Valle Vista	11,920	69.9	49	105	227
Broadway	Valle Vista to Oregon	12,920	70.2	52	111	239
Broadway	Oregon to Nebraska	12,930	70.2	52	111	240

Table 5

Noise Contours for No Project Conditions

Roadway	Segment	Daily Traffic Volumes	Noise level at 50 feet (dBA CNEL)	Distance to noise contour (feet)		
				70 dBA CNEL	65 dBA CNEL	60 dBA CNEL
Nebraska	Sonoma to Broadway	2,800	61.7	14	30	65
Valle Vista	Sonoma to Couch	4,620	63.8	19	42	90
Valle Vista	Couch to Napa	4,070	63.3	18	38	83
Valle Vista	Napa to Broadway	3,970	63.2	18	38	81
Oregon	Napa to Broadway	540	56.4	6	13	29
Redwood	Sonoma to Couch	14,320	70.6	55	119	256
Redwood	Couch to Broadway	14,530	70.7	56	120	259
Sonoma	Redwood to Valle Vista	17,660	74.7	103	221	477
Sonoma	Valle Vista to Couch	15,790	74.2	95	205	442
Sonoma	Couch to Nebraska	18,550	71.8	66	141	305
Couch	Redwood to Valle Vista	5,780	66.7	30	65	140
Couch	Valle Vista to Sonoma	6,180	67.0	32	68	146
Broadway	Redwood to Valle Vista	16,120	71.2	60	129	277
Broadway	Valle Vista to Oregon	13,570	70.4	53	115	247
Broadway	Oregon to Nebraska	13,580	70.4	53	115	247

Table 6

Noise Contours for Existing Plus Project Conditions

Roadway	Segment	Daily Traffic Volumes	Noise level at 50 feet (dBA CNEL)	Distance to noise contour (feet)		
				70 dBA CNEL	65 dBA CNEL	60 dBA CNEL
Nebraska	Sonoma to Broadway	3,350	62.4	16	34	73
Valle Vista	Sonoma to Couch	4,760	64.0	20	43	92
Valle Vista	Couch to Napa	4,500	63.7	19	41	89
Valle Vista	Napa to Broadway	4,770	64.0	20	43	92
Oregon	Napa to Broadway	930	58.8	9	19	41
Redwood	Sonoma to Couch	14,610	70.7	56	121	260
Redwood	Couch to Broadway	14,830	70.8	57	122	262
Sonoma	Redwood to Valle Vista	18,030	74.8	104	224	483
Sonoma	Valle Vista to Couch	16,110	74.3	97	208	448
Sonoma	Couch to Nebraska	19,180	71.9	67	145	312
Couch	Redwood to Valle Vista	5,900	66.8	31	66	142
Couch	Valle Vista to Sonoma	6,070	66.9	31	67	145
Broadway	Redwood to Valle Vista	12,890	70.2	51	111	239
Broadway	Valle Vista to Oregon	14,590	70.7	56	120	260
Broadway	Oregon to Nebraska	14,130	70.6	55	118	254

Table 8

Project Conribution 2018

Roadway	Segment	CNEL at 50 feet (dBA)			
		No Project	With Project	Project Contribution	Potential Impact?
Nebraska	Sonoma to Broadway	61.7	62.4	0.7	no
Valle Vista	Sonoma to Couch	63.8	64.0	0.2	no
Valle Vista	Couch to Napa	63.3	63.7	0.4	no
Valle Vista	Napa to Broadway	63.2	64.0	0.8	no
Oregon	Napa to Broadway	56.4	58.8	2.4	no
Redwood	Sonoma to Couch	70.6	70.7	0.1	no
Redwood	Couch to Broadway	70.7	70.8	0.1	no
Sonoma	Redwood to Valle Vista	74.7	74.8	0.1	no
Sonoma	Valle Vista to Couch	74.2	74.3	0.1	no
Sonoma	Couch to Nebraska	71.8	71.9	0.1	no
Couch	Redwood to Valle Vista	66.7	66.8	0.1	no
Couch	Valle Vista to Sonoma	67.0	66.9	-0.1	no
Broadway	Redwood to Valle Vista	71.2	70.2	-1.0	no
Broadway	Valle Vista to Oregon	70.4	70.7	0.3	no
Broadway	Oregon to Nebraska	70.4	70.6	0.2	no

Table 8

Overall Project Off-Site Contributions

Roadway	Segment	CNEL at 50 feet (dBA)					
		Existing	Near-Term Future	Near Term Future with Project	Project Contribution	Overall Impact	Potential Impact?
Nebraska	Sonoma to Broadway	61.7	61.7	62.4	0.8	0.7	no
Valle Vista	Sonoma to Couch	63.1	63.8	64.0	0.1	0.8	no
Valle Vista	Couch to Napa	62.6	63.3	63.7	0.4	1.1	no
Valle Vista	Napa to Broadway	62.6	63.2	64.0	0.8	1.4	no
Oregon	Napa to Broadway	55.0	56.4	58.8	2.4	3.8	yes
Redwood	Sonoma to Couch	70.5	70.6	70.7	0.1	0.3	no
Redwood	Couch to Broadway	70.5	70.7	70.8	0.1	0.3	no
Sonoma	Redwood to Valle Vista	74.4	74.7	74.8	0.1	0.4	no
Sonoma	Valle Vista to Couch	74.0	74.2	74.3	0.1	0.3	no
Sonoma	Couch to Nebraska	71.5	71.8	71.9	0.1	0.4	no
Couch	Redwood to Valle Vista	66.4	66.7	66.8	0.1	0.4	no
Couch	Valle Vista to Sonoma	66.1	67.0	66.9	-0.1	0.8	no
Broadway	Redwood to Valle Vista	69.9	71.2	70.2	-1.0	0.3	no
Broadway	Valle Vista to Oregon	70.2	70.4	70.7	0.3	0.5	no
Broadway	Oregon to Nebraska	70.2	70.4	70.6	0.2	0.4	no

Roadway Construction Noise Model (RCNM),Version 1.1

Report dat ########
Case Descr Demoliton

---- Receptor #1 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Residence	Residential	55	55	55

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Tractor	No	40	84		185	0

Results

	Calculated (dBA)		Noise Limits (dBA)			
			Day		Evening	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq
Tractor	72.6	68.7	N/A	N/A	N/A	N/A
Total	72.6	68.7	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Homes Acr	Residential	55	55	55

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Tractor	No	40	84		320	0

Results

	Calculated (dBA)		Noise Limits (dBA)			
			Day		Evening	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq
Tractor	67.9	63.9	N/A	N/A	N/A	N/A
Total	67.9	63.9	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #3 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Outpatient	Commercia	55	55	55

Equipment

Description	Impact Device	Usage(%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Tractor	No	40	84		330	0

Results

	Calculated (dBA)		Noise Limits (dBA)			
			Day		Evening	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq
Tractor	67.6	63.6	N/A	N/A	N/A	N/A
Total	67.6	63.6	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report dat ########
Case Descr Site Prep

---- Receptor #1 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Residence	Residential	55	55	55

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Grader	No	40	85		185	0
Tractor	No	40	84		185	0

Equipment	Calculated (dBA) *Lmax	Leq	Results Noise Limits (dBA) Day Lmax	Day Leq	Evening Lmax	Evening Leq
Grader	73.6	69.7	N/A	N/A	N/A	N/A
Tractor	72.6	68.7	N/A	N/A	N/A	N/A
Total	73.6	72.2	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Homes Acr	Residential	55	55	55

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Grader	No	40	85		320	0
Tractor	No	40	84		320	0

Equipment	Calculated (dBA) *Lmax	Leq	Results Noise Limits (dBA) Day Lmax	Day Leq	Evening Lmax	Evening Leq
Grader	68.9	64.9	N/A	N/A	N/A	N/A
Tractor	67.9	63.9	N/A	N/A	N/A	N/A
Total	68.9	67.4	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #3 ----

	Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Outpatient	Commercia	55	55	55

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Grader	No	40	85		330	0
Tractor	No	40	84		330	0

	Results					
	Calculated (dBA)		Noise Limits (dBA)			
			Day		Evening	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq
Grader	68.6	64.6	N/A	N/A	N/A	N/A
Tractor	67.6	63.6	N/A	N/A	N/A	N/A
Total	68.6	67.2	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report dat ########
Case Descr Asphalt Curshing

---- Receptor #1 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Residence	Residential	55	55	55

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Slurry Trenching Mach	No	50		80.4	330	0

Results

	Calculated (dBA)		Noise Limits (dBA)			
			Day		Evening	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq
Slurry Trenching Mach	64	61	N/A	N/A	N/A	N/A
Total	64	61	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Homes Acr	Residential	55	55	55

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Slurry Trenching Mach	No	50		80.4	320	0

Results

	Calculated (dBA)		Noise Limits (dBA)			
			Day		Evening	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq
Slurry Trenching Mach	64.2	61.2	N/A	N/A	N/A	N/A
Total	64.2	61.2	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #3 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Outpatient	Commercia	55	55	55

Equipment

Description	Impact Device	Usage(%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Slurry Trenching Mach	No	50		80.4	330	0

Results

	Calculated (dBA)		Noise Limits (dBA)			
			Day		Evening	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq
Slurry Trenching Mach	64	61	N/A	N/A	N/A	N/A
Total	64	61	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.