Appendix 4.9-C 2005 Noise Assessment

CITY OF COTATI GENERAL PLAN UPDATE
NOISE ASSESSMENT

October 31, 2005

SETTING SECTION

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SETTING

INTRODUCTION

State law requires that a Noise Element be prepared as part of all City General Plans. Noise Elements are required to identify noise problems in the community and work towards their resolution. The purpose of this report is to provide an update of the City ofCotati's General Plan pertaining to noise issues within the City.

LEGAL AUTHORITY

Government Code Section 65302(f) requires:

A noise element shall identify and appraise noise problems in the community. The noise element shall recognize the guidelines established by the Office of Noise Control in the State Department of Health Services and shall analyze and quantify, to the extent practicable, as determined by the legislative body, current and projected noise levels for all of the following sources:

→ Highways and freeways.
→ Primary arterials and major local streets.
→ Passenger and freight on-line railroad operations and ground rapid transit systems.
→ Commercial, general aviation, heliport, helistop, and military airport operations, aircraft over flights, jet engine test stands, and all other ground facilities and maintenance functions related to airport operation.
→ Local industrial plants, including, but not limited to, railroad classification yards.
→ Other ground stationary sources identified by local agencies as contributing to the community noise environment.

Noise contours shall be shown for all of these sources and stated in terms of community noise equivalent level (CNEL) or day/night average level (L_{dn}). The noise contours shall be prepared on the basis of noise monitoring or following generally accepted noise modeling techniques for the various sources. The noise contours shall be used as a guide for establishing a pattern of land uses in the land use element that minimizes the exposure of community residents to excessive noise. The noise element shall include implementation measures and possible solutions that address existing and foreseeable noise problems. The adopted noise element shall serve as a guideline for compliance with the state's noise insulation standards.

MEASUREMENT AND EFFECTS OF NOISE

Noise may be defined as unwanted sound. Noise is usually objectionable because it is disturbing or annoying. The objectionable nature of sound could be caused by its *pitch* or its loudness. *Pitch* is the height or depth of a tone or sound, depending on the relative rapidity (frequency) of the vibrations by which it is produced. Higher pitched signals sound louder to humans than sounds with a lower pitch. *Loudness* is intensity of sound waves combined with the reception characteristics of the ear. Intensity may be compared with the height of an ocean wave in that it is a measure of the amplitude of the sound wave.

In addition to the concepts of pitch and loudness, there are several noise measurement scales, which are used to describe noise in a particular location. *A decibel (dB)* 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. An increase of 10 decibels represents a ten-fold increase in acoustic energy, while 20 decibels is 100 times more intense, 30 decibels is 1,000 times more intense, etc. There is a relationship between the subjective noisiness or loudness of a sound and its intensity. Each 10-decibel increase in sound level is perceived as approximately a doubling of loudness over a fairly wide range of intensities. Technical terms are defined in Table 1.

TERM	DEFINITIONS
Decibel, dB	A unit describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure, which is 20 micropascals (20 micronewtons per square meter).
Frequency, Hz	The number of complete pressure fluctuations per second above and below atmospheric pressure.
A-Weighted Sound Level, dBA	The sound pressure level in decibels as measured on a sound level meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise. All sound levels in this report are A-weighted, unless reported otherwise.
L_{01}, L_{10}, L_{50}, L_{90}	The A-weighted noise levels that are exceeded 1%, 10%, 50%, and 90% of the time during the measurement period.
Equivalent Noise Level, L_{eq}	The average A-weighted noise level during the measurement period.
Community Noise Equivalent Level, CNEL	The average A-weighted noise level during a 24-hour day, obtained after addition of 5 decibels in the evening from 7:00 pm to 10:00 pm and after addition of 10 decibels to sound levels measured in the night between 10:00 pm and 7:00 am.
Day/Night Noise Level, L_{dn}	The average A-weighted noise level during a 24-hour day, obtained after addition of 10 decibels to levels measured in the night between 10:00 pm and 7:00 am.
L_{max}, L_{min}	The maximum and minimum A-weighted noise level during the measurement period.
Ambient Noise Level	The composite of noise from all sources near and far. The normal or existing level of environmental noise at a given location.
Intrusive	That noise which intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends upon its amplitude, duration, frequency, and time of occurrence and tonal or informational content as well as the prevailing ambient noise level.

DEFINITIONS OF ACOUSTICAL TERMS | **Table 1**

There are several methods of characterizing sound. The most common in California is the *A-weighted sound level or dBA.* This scale gives greater weight to the frequencies of sound to which the human ear is most sensitive. Representative outdoor and indoor noise levels in units of dBA are shown in Table 2.

At a Given Distance From Noise Source	A-Weighted Sound Level in Decibels	Noise Environments	Subjective Impression
Civil Defense Siren (100')	130		
Jet Takeoff (200')	120		Pain Threshold
	110	Rock Music Concert	
Diesel Pile Driver (100')	100		Very Loud
	90	Boiler Room	
Freight Cars (50')		Printing Press Plant	
Pneumatic Drill (50')	80		
Freeway (100')		In Kitchen With Garbage	
Vacuum Cleaner (10')	70	Disposal Running	Moderately Loud
	60	Data Processing Center	
Light Traffic (100')	50	Department Store	
Large Transformer (200')			
	40	Private Business Office	Quiet
Soft Whisper (5')	30	Quiet Bedroom	
	20	Recording Studio	
	10		Threshold of Hearing
	0		

Typical Sound Levels Measured in the Environment and Industry — **Table 2**

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Because sound levels can vary markedly over a short period of time, a method for describing either the average character of the sound or the statistical behavior of the variations must be utilized. Most commonly, environmental sounds are described in terms of an average level that has the same acoustical energy as the summation of all the time-varying events. This energy-equivalent sound/noise descriptor is called L_{eq}. The most common averaging period is hourly, but L_{eq} can describe any series of noise events of arbitrary duration.

The scientific instrument used to measure noise is the sound level meter. Sound level meters can accurately measure environmental noise levels to within about plus or minus 1 dBA. Various computer models are used to predict environmental noise levels from sources, such as roadways and airports. The accuracy of the predicted models depends upon the distance the receptor is from the noise source. Close to the noise source, the models are accurate to within about plus or minus 1 to 2 dBA.

Since the sensitivity to noise increases during the evening and at night -- because excessive noise interferes with the ability to sleep -- 24-hour descriptors have been developed that incorporate artificial noise penalties added to quiet-time noise events. The *Community Noise Equivalent Level, CNEL,* is a measure of the cumulative noise exposure in a community, with a 5 dB penalty added to evening (7:00 pm - 10:00 pm) and a 10 dB addition to nocturnal (10:00 pm - 7:00 am) noise levels. The *Day/Night Average Sound Level, L_{dn},* is essentially the same as CNEL, with the exception that the evening time period is dropped and all occurrences during this three-hour period are grouped into the daytime period.

Effects of Noise

Hearing Loss

While physical damage to the ear from an intense noise impulse is rare, a degradation of auditory acuity can occur even within a community noise environment. Hearing loss occurs mainly due to chronic exposure to excessive noise, but may be due to a single event such as an explosion. Natural hearing loss associated with aging may also be accelerated from chronic exposure to loud noise. The Occupational Safety and Health Administration (OSHA) has a noise exposure standard, which is set at the noise threshold where hearing loss may occur from long-term exposures. The maximum allowable level is 90 dBA averaged over eight hours. If the noise is above 90 dBA, the allowable exposure time is correspondingly shorter.

Sleep and Speech Interference

The thresholds for speech interference indoors are about 45 dBA if the noise is steady and above 55 dBA if the noise is fluctuating. Outdoors the thresholds are about 15 dBA higher. Steady noise of sufficient intensity (above 35 dBA) and fluctuating noise levels above about 45 dBA have been shown to affect sleep. Interior residential standards for multi-family dwellings are set by the State of California at 45 dBA L_{dn}. Typically, the highest steady traffic noise level during the daytime is about equal to the L_{dn} and nighttime levels are 10 dBA lower. The standard is designed for sleep and speech protection and most jurisdictions apply the same criterion for all residential uses. Typical structural attenuation is 12-17 dBA with open windows. With closed windows in good condition, the noise attenuation factor is around 20 dBA for an older structure and 25 dBA for a newer dwelling. Sleep and speech interference is therefore possible when exterior noise levels are about 57-62 dBA L_{dn} with open windows and 65-70 dBA L_{dn} if the windows are closed. Levels of 55-60 dBA are common along collector streets and secondary arterials, while 65-70 dBA is a typical value for a primary/major arterial. Levels of 75-80 dBA are normal noise levels at the first row of development outside a freeway right-of-way. In order to achieve an acceptable interior noise environment, bedrooms facing secondary roadways need to be able to have their windows closed, those facing major roadways and freeways typically need special glass windows.

Annoyance

Attitude surveys are used for measuring the annoyance felt in a community for noises intruding into homes or affecting outdoor activity areas. In these surveys, it was determined that the causes for annoyance include interference with speech, radio and television, house vibrations, and interference with sleep and rest. The L_{dn} as a measure of noise has been found to provide a valid correlation of noise level and the percentage of people annoyed. People have been asked to judge the annoyance caused by aircraft noise and ground transportation noise. There continues to be disagreement about the relative annoyance of these different sources. When measuring the percentage of the population highly annoyed, the threshold for ground vehicle noise is about 55 dBA L_{dn}. At an L_{dn} of about 60 dBA, approximately 2 percent of the population is highly annoyed. When the L_{dn} increases to 70 dBA, the percentage of the population highly annoyed increases to about 12 percent of the population. There is, therefore, an increase of about 1 percent per dBA between an L_{dn} of 60-70 dBA. Between an L_{dn} of 70-80 dBA, each decibel increase increases by about 2 percent the percentage of the population highly annoyed. People appear to respond more adversely to aircraft noise. When the L_{dn} is 60 dBA, approximately 10 percent of the population is believed to be highly annoyed. Each decibel increase to 70 dBA adds about 2 percentage points to the number of people highly annoyed. Above 70 dBA, each decibel increase results in about a 3 percent increase in the percentage of the population highly annoyed.

REGULATORY BACKGROUND

Community noise within the City of Cotati is presently covered by the guidelines established in the current General Plan. Other noise policies that effect development in the area are those established by the California Environmental Quality Act (CEQA), the Federal Highway Administration (FHWA) and the California Department of Transportation (Caltrans) regulating highway noise. A review of these noise guidelines and regulations are presented below:

CURRENT CITY OF COTATI NOISE ELEMENT STANDARDS

The City of Cotati has adopted the following objectives and policies related to community noise s in the Noise Element of the General Plan to ensure compatible developments within the City:

Objective: **Minimize noise levels to enhance the quality of existing and future land uses.**

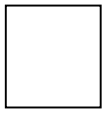
POLICIES AND IMPLEMENTATION

Noise and Land Use Compatibility Standards. Encourage the maintenance of the Noise and Land Use Compatibility Standards indicated in Table 3.

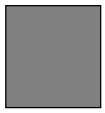
a) Review all land use and development proposals for compliance with the Noise and Land Use Compatibility Standards.
b) The City shall use a standard of 45 dBA L_{dn} for indoor noise levels for all new residential development, including hotels and motels.
c) The City shall require an acoustical study for all new projects with potential noise impacts. The study shall describe how the project will comply with Noise and Land Use Compatibility Standards and indoor noise level standards.

Table 3: Land Use Compatibility For Community Noise Environment

Land Use Category	Exterior Noise Exposure L_{dn} or CNEL, dB 55 60 65 70 75 80
Residential, Hotels, and Motels	
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	
Industrial, Manufacturing, Utilities and Agriculture	



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

Control Non-Transportation Related Noise from Site Specific Noise Sources.

a) The City shall ensure that the noise resulting from new sources shall not exceed the standards in Table 4 as measured at the exterior property line of an affected residential land use.

Develop and enforce a City of Cotati Noise Ordinance.

a) The City shall develop a Noise Ordinance. Prior to a City Ordinance being developed the State of California Model Noise Ordinance shall be implemented.

Local truck traffic, including loading and unloading, shall be limited to specific routes, times and speeds appropriate to each zoning district.

a) The Police Department shall continue to implement the truck ordinance which limits truck traffic routes, times, and speeds in areas where it will effectively reduce noise pollution.

Encourage the enforcement of sections of the California Vehicle Code relating to adequate vehicle mufflers, and modified exhaust systems.

a) The Police Department shall work with the California Highway Patrol to actively enforce the California Vehicle Code as it relates to adequate vehicle mufflers, and modified exhaust systems

Work with Caltrans to ensure that adequate noise studies are prepared and alternative noise mitigation measures are considered in State projects

a) Planning staff shall remain in communication with Caltrans requesting that Caltrans obtain City concurrence prior to initiating any noise mitigation project in Cotati or affecting Cotati.

Require acoustical studies and mitigation measures for new developments and transportation improvements which affect noise sensitive uses such as schools, hospitals, libraries, group care facilities, convalescent homes, and residential areas.

a) Planning staff, through the environmental review process, shall ensure that acoustical studies are performed and mitigation measures implemented when noise sensitive uses are affected.

Stationary equipment, such as air compressors, shall be located as far away as feasible from sensitive noise receptors, and shall be shielded. Construction equipment shall be fitted with effective mufflers. The hours for construction operations shall be limited to the weekdays and the daytime where extreme noise sources are found.

a) The Building inspector shall determine, during the environmental review process, if proposed construction will constitute a significant impact on nearby residents and require limited construction hours.

Table 4: Allowable Noise Exposure From Non-Transportation Noise Sources

	Daytime (7:00 am - 10:00 pm)	Nighttime (10:00 pm - 7:00 am)
Hourly L_{eq}, dB	50	45
Maximum Level, dB	70	65
Maximum Level, dB (Impulsive Noise)	65	60

Guidelines for Use of Table 4

1. The measurements are made at the property line of the receiving land use. The effectiveness of noise mitigation measures should be determined by applying the standards on the receptor side of noise barriers or other property line noise mitigation measures.
2. The nighttime standards apply only when the receiving land use operates or is occupied during nighttime hours.
3. Sound level measurements to determine maximum level noise shall be made with "slow" meter response.
4. Sound level measurements for impulsive noise sources shall be made with "fast" meter response. Impulsive noises are defined as those which have sharp, loud peaks in decibel levels, but which quickly disappear. Examples include a dog's bark, a hammer's bang and noise with speech or music content.

FHWA AND CALTRANS NOISE ASSESSMENT CRITERIA (NAC)

The Federal Highway Administration (FHWA) stipulates procedures and criteria for noise assessment studies for federal highway projects (23 CFR 772). It requires that noise abatement measures be considered on all major transportation projects if the project will cause a significant increase in noise levels, or if projected noise levels approach or exceed the noise abatement criteria level for activities occurring on adjacent lands. The California Department of Transportation (Caltrans) utilizes similar procedures and criteria.

The FHWA NAC for various land use ratings (called activity categories) are given in Table 5. These noise criteria are assigned to both exterior and interior activities. The FHWA identifies a traffic noise impact when the predicted traffic noise levels approach or exceed the noise abatement criteria. If these criteria sound levels are predicted to be approached or exceeded during the noisiest 1-hour period, noise abatement measures must be considered and, if found to be reasonable and feasible, they must be incorporated as part of a given project. Caltrans has interpreted this statement in *The Traffic Noise Analysis Protocol for New Highway and Reconstruction Projects* dated October 1998. Following the Caltrans protocol, a traffic noise impact will occur when predicted noise levels approach within 1 dBA or exceed the noise abatement criteria. The result of this interpretation is that 66 dBA becomes the threshold for activity Category B Land Uses. Noise attenuation provided by most residential structures leads to compliance with the interior design noise level if the exterior criterion is attained (FHWA 1995).

TABLE 5: FEDERAL NOISE ABATEMENT CRITERIA

Activity Category	Noise Abatement Criteria (dBA), L_{eq}	Description of Activity Category
A	57 exterior	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to serve its intended purpose.
B	67 exterior	Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals.
C	72 exterior	Developed lands, properties, or activities not included in Categories A or B above.
D	---	Undeveloped lands.
E	52 interior	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums.

SOURCE: Federal Highway Administration, 1982.

CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA) GUIDELINES

The California Environmental Quality Act (CEQA) has established guidelines to evaluate the significance of effects of environmental noise attributable to a proposed project. CEQA asks the following questions relevant to this project:

Would the project result in?

- Exposure of persons to or generation of noise levels in excess of standards established in the local General Plan or Noise Ordinance, or applicable standards of other agencies?
- A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?
- A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?

CEQA does not define what noise level increase would be considered substantial. Typically, in high noise environments, if the Average Day-Night noise Level (L_{dn}) due to the project would increase by more than 3 dBA, the impact would be considered significant. Where the existing noise level is lower, a somewhat higher increase can be tolerated before significance occurs. For the proposed project, an increase in the L_{dn} resulting from the project at noise sensitive land uses of 3 dBA or greater would be considered a significant impact when projected noise levels currently exceed those considered acceptable for the affected land use. Where noise levels would remain below acceptable levels for the affected land use, an increase of 5 dBA would be considered a significant impact.

EXISTING NOISE EXPOSURE

The primary source of environmental noise within the City of Cotati is generated by vehicular traffic on US Highway 101 and the major roadways in the community, including the Gravenstein Highway (State Route 116), Old Redwood Highway, West Sierra Avenue, East Cotati Avenue, and Commerce Boulevard. Vehicular traffic on smaller local roads also contributes to the noise environment along these roadways. General aviation and occasional high altitude jet aircraft overflights are also audible throughout the community but do not make a substantial contribution to community noise levels. To evaluate the existing noise levels within the City long-term noise measurements (over a continuous 24-hour period) were made at 10 locations selected to represent noise levels along both large and small thoroughfare transportation corridors. The results of these measurements are shown in Table 6. The 24-hour day/night average noise level (L_{dn}) is shown for each of the long-term measurements. The equivalent sound level (L_{eq}) during each hour as well as selected statistical descriptors representing near maximum noise levels (L_{01} and L_{10}), median noise levels (L_{50}) and background noise levels (L_{90}) are also provided to describe the range of noise levels that occurred during the measurements. Charts containing the noise measurement data are included in Appendix A. Other noise sources in the community include noise resulting from residential maintenance activities, commercial business activities, and light industrial facilities. These non-transportation noise sources are local and typically only affect their adjacent neighbors.

Table 6: Noise Measurement Summary

Location	Time of Day	Sound Levels, dBA					
		L_{01}	L_{10}	L_{eq}	L_{50}	L_{90}	L_{dn}
LT-1: 50 feet from the centerline of Old Redwood Highway South of Myrtle Avenue	Daytime	78	74	70	68	58	**72**
	Nighttime	74	67	64	60	50	
LT-2: 45 feet from the centerline of Old Redwood Highway, north of Page Street	Daytime	79	71	69	66	58	**72**
	Nighttime	76	67	64	59	50	
LT-3: 45 feet from the centerline of West Sierra Avenue between Page and Olaf Streets	Daytime	74	68	65	62	54	**67**
	Nighttime	70	63	59	53	49	
LT-4: 100 feet from the centerline of East Cotati Avenue between La Plaza and Charles Street	Daytime	70	66	63	62	57	**66**
	Nighttime	67	62	59	56	51	
LT-5: 35 feet from the centerline of La Salle Avenue	Daytime	68	58	56	51	49	**58**
	Nighttime	58	50	50	48	47	
LT-6: 85 feet from the centerline of East Cotati Avenue near Santero Way	Daytime	73	69	66	65	57	**67**
	Nighttime	68	63	59	55	44	
LT-7: 205 feet from the centerline of Hwy 101 near lane at the end of St. Joseph Street	Daytime	73	69	66	66	62	**70**
	Nighttime	71	66	63	61	57	
LT-8: 170 feet from the centerline of Old Redwood Highway south of Hwy 116	Daytime	67	63	61	60	57	**64**
	Nighttime	63	59	56	55	51	
LT-9: 45 feet from the centerline of Hwy 116 west of Alder Lane	Daytime	82	77	7	73	64	**77**
	Nighttime	77	73	70	68	63	
LT-10: 30 feet from the centerline of Wilford Lane	Daytime	66	59	56	53	51	**61**
	Nighttime	62	55	54	52	50	

Existing noise levels due to transportation related noise sources are summarized on a noise exposure map, which was developed through noise modeling based on the results of the above noise measurements, the results of the Citywide Traffic Improvement Plan [Winzler & Kelly, 4/27/05] and accepted distance attenuation for traffic noise sources in urban and rural environments (see Figure 1). The noise exposure map shows areas noise contours for areas exposed to a noise level of 60 and 65 dBA L_{dn}. Noise levels along each of the major roadways exceed an L_{dn} of 60 dBA. Noise contour distances from US Highway 101 should be considered an average exposure within City Limits because only limited affects of topography were included in the modeling. Large terrain features such as the hill north of the West Sierra interchange, or tall buildings would result in somewhat lower noise levels and sites with completely unobstructed views of the US Highway 101 such as in the areas north of the Hwy 116 interchange could be exposed to noise levels of over 60 dBA L_{dn} within approximately 1,800 feet and 65 dBA L_{dn} within 850 feet of the centerline of the Highway.

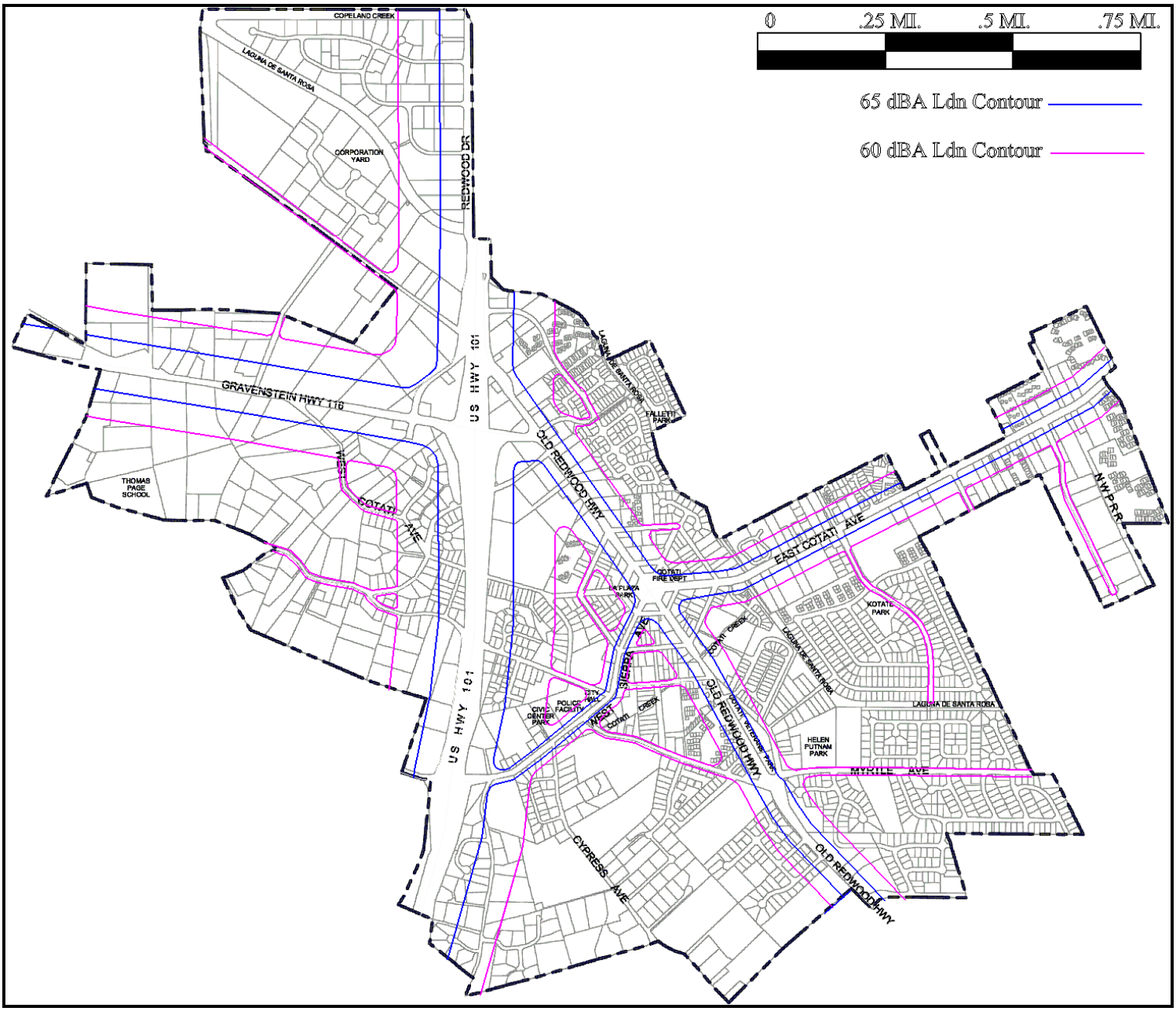


FIGURE 1: EXISTING NOISE CONTOUR MAP

Stationary noise sources associated with commercial uses also create noise within the community. Commercial uses can generate noise due to regular operations such as fans, blowers, chillers, compressors, boilers, pumps, and air conditioning systems which may run for 24 hours a day. Other sources of noise in these areas, such as horns, buzzers, and loading activities may be intermittent. These noise sources are of greatest concern when they are close to noise sensitive receptors, since the combination of transportation noise and commercial has the potential for producing noise impacts on these receptors. Other potential significant sources of noise within the City include entertainment venues, fire stations, child-care centers, and schools. When located near residential or other noise sensitive uses and thus can be sources of irritation and complaints.

APPENDIX A: NOISE MEASUREMENT CHARTS

Chart 1: LT-1 Noise Measurement Results
50 feet from the centerline of Old Redwood Highway South of Myrtle Avenue

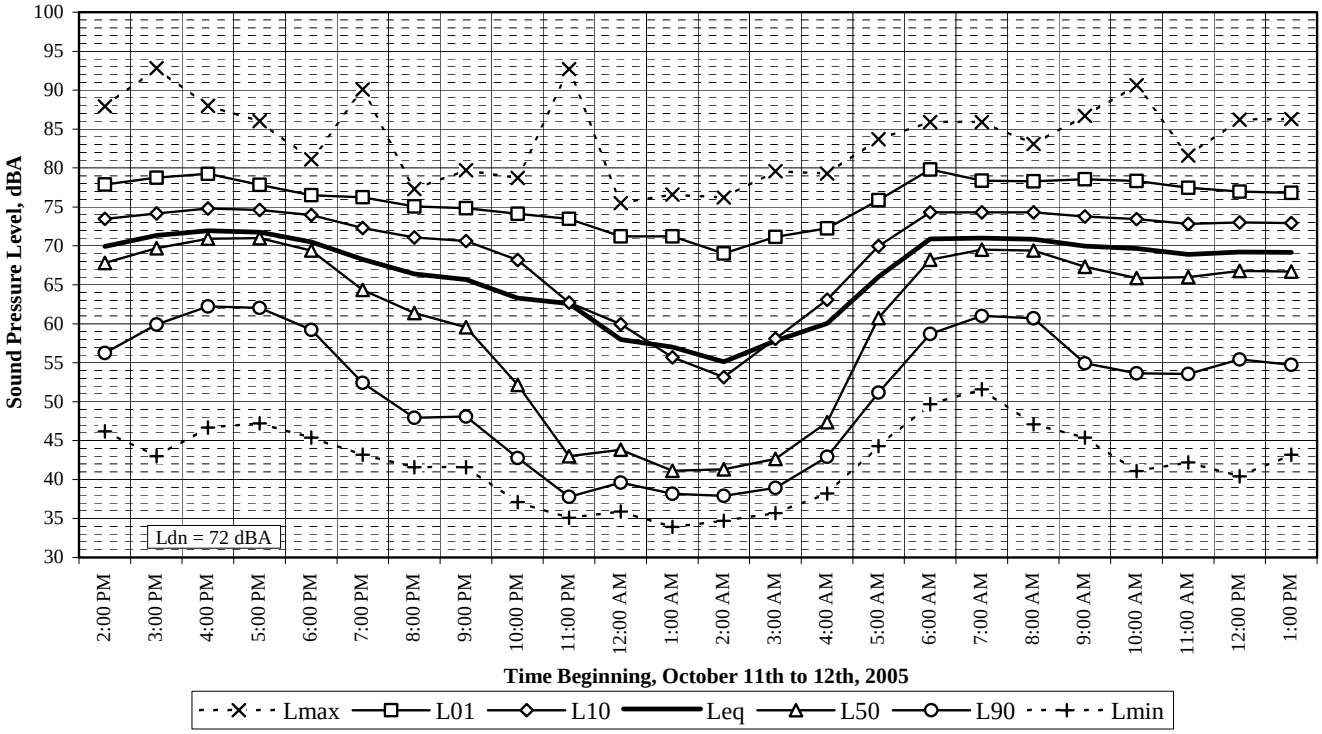


Chart 2: LT-2 Noise Measurement Results
45 feet from the centerline of Old Redwood Highway - north of Page Street

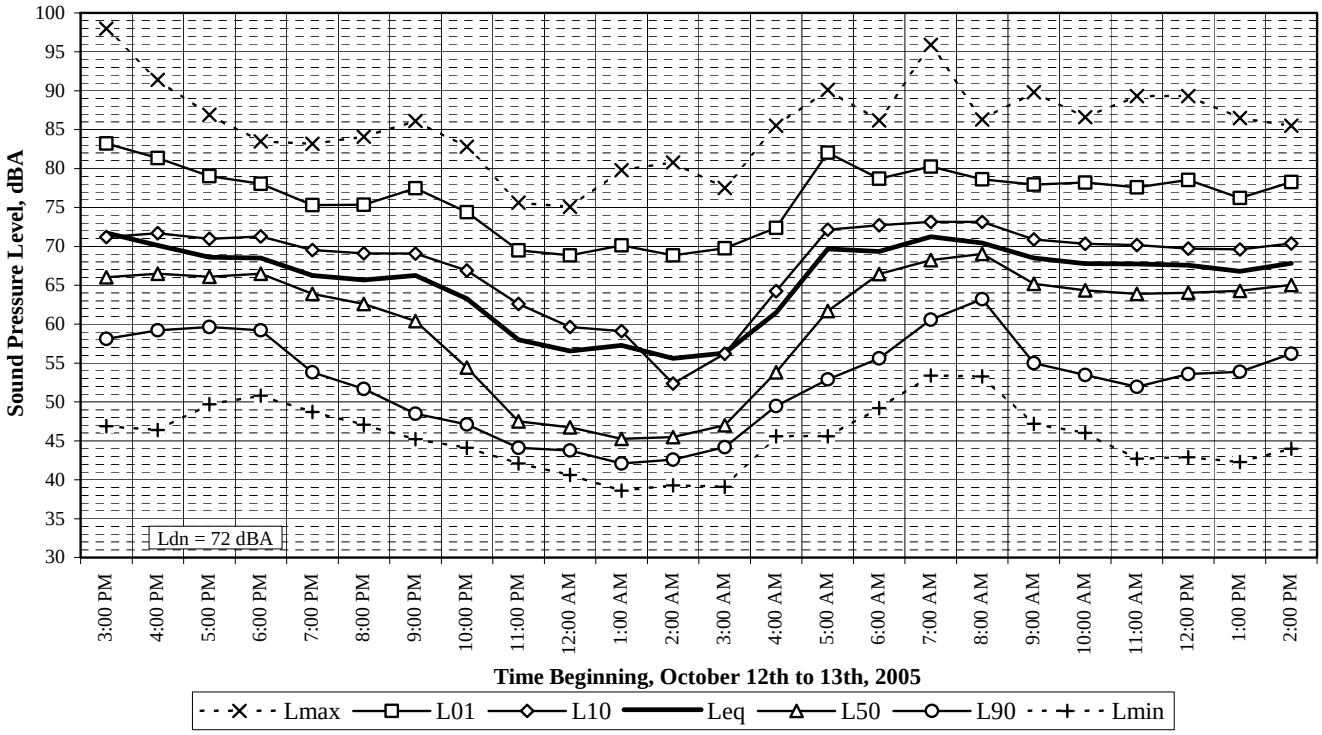


Chart 3: LT-3 Noise Measurement Results
45 feet from the centerline of West Sierra Avenue between Page and Olaf Streets

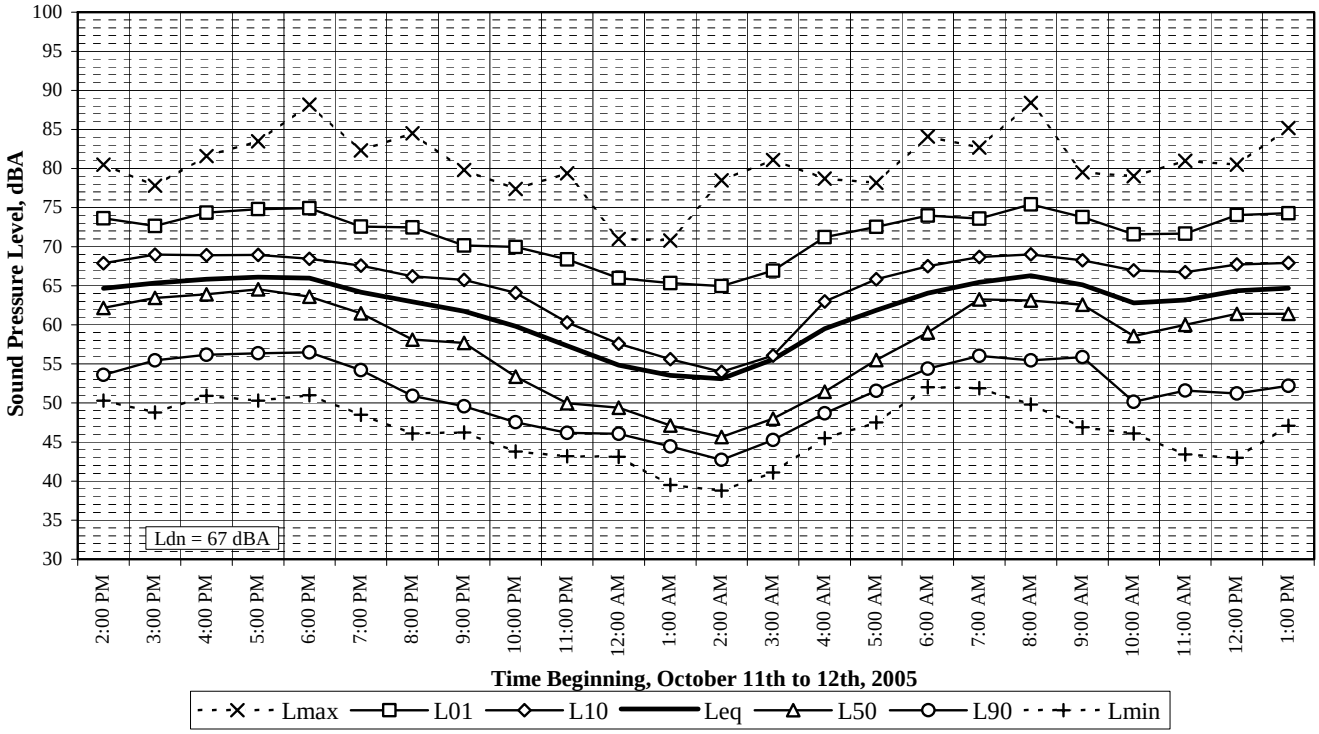


Chart 4: LT-4 Noise Measurement Results
100 feet from the centerline of East Cotati Avenue between La Plaza and Charles Street

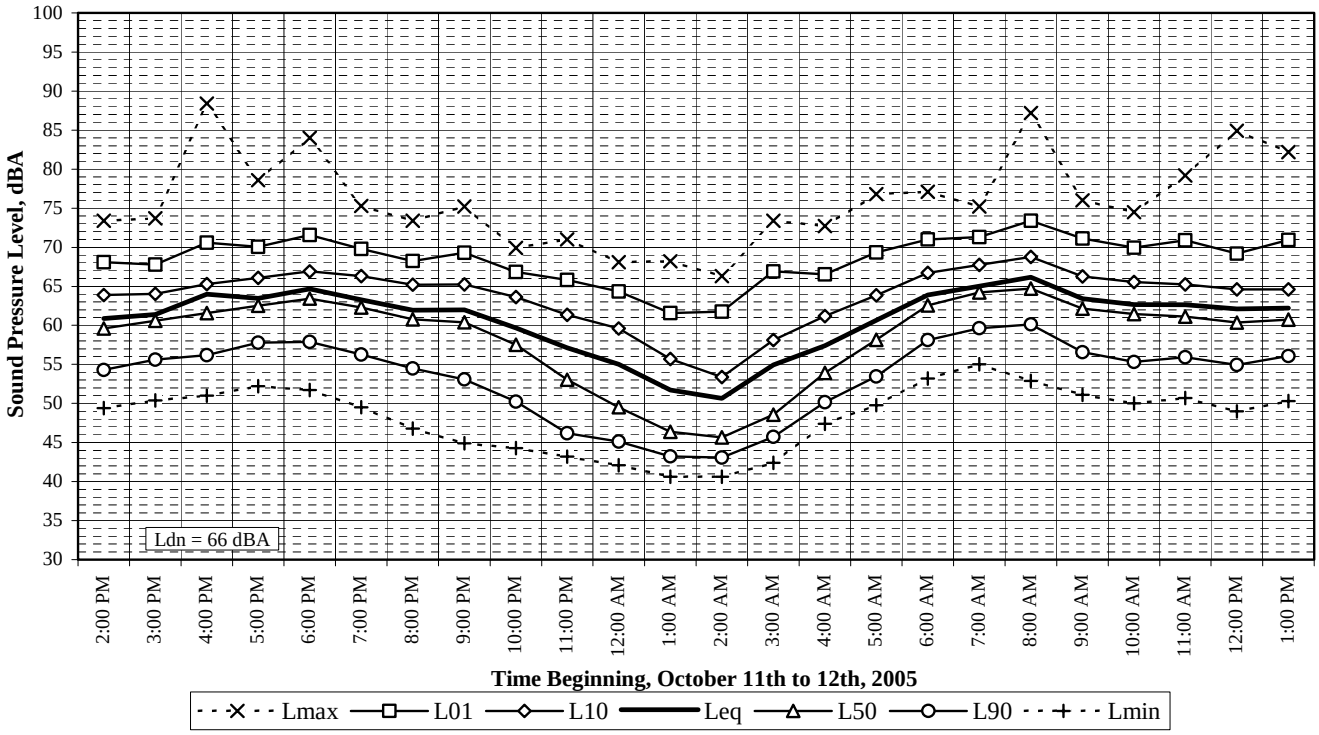


Chart 5: LT-5 Noise Measurement Results
35 feet from the centerline of La Salle Avenue

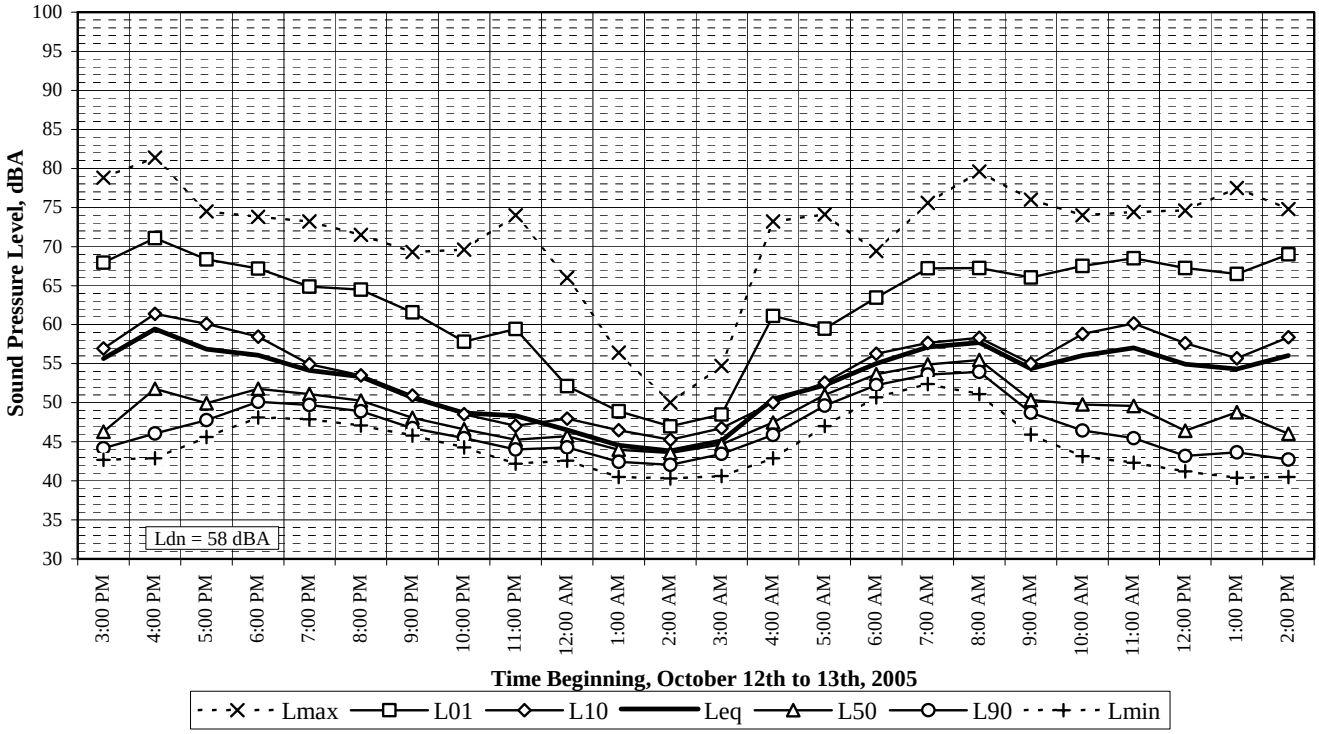


Chart 6: LT-6 Noise Measurement Results
85 feet from the centerline of East Cotati Avenue near Santero Way

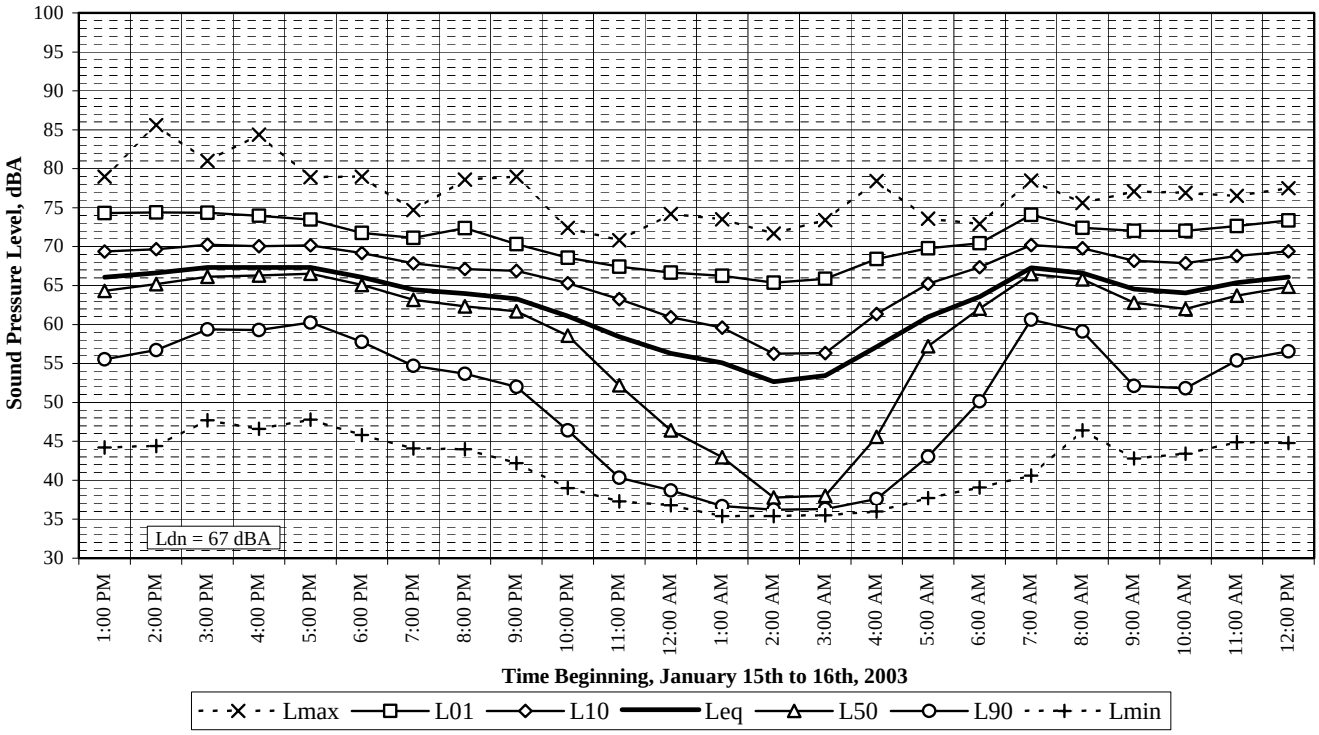


Chart 7: LT-7 Noise Measurement Results
205 feet from the centerline of Hwy 101 near lane at the end of St. Joseph Street

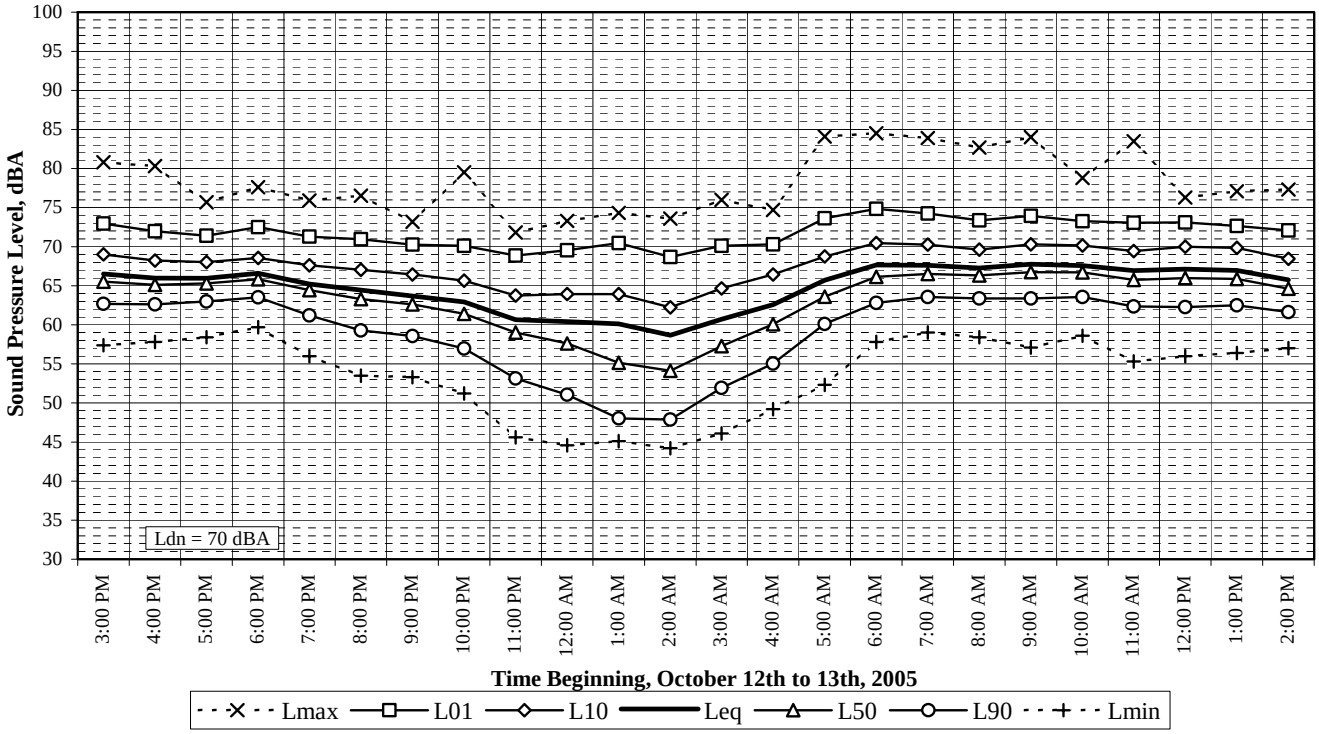


Chart 8: LT-8 Noise Measurement Results
170 feet from the centerline of Old Redwood Highway south of Hwy 116

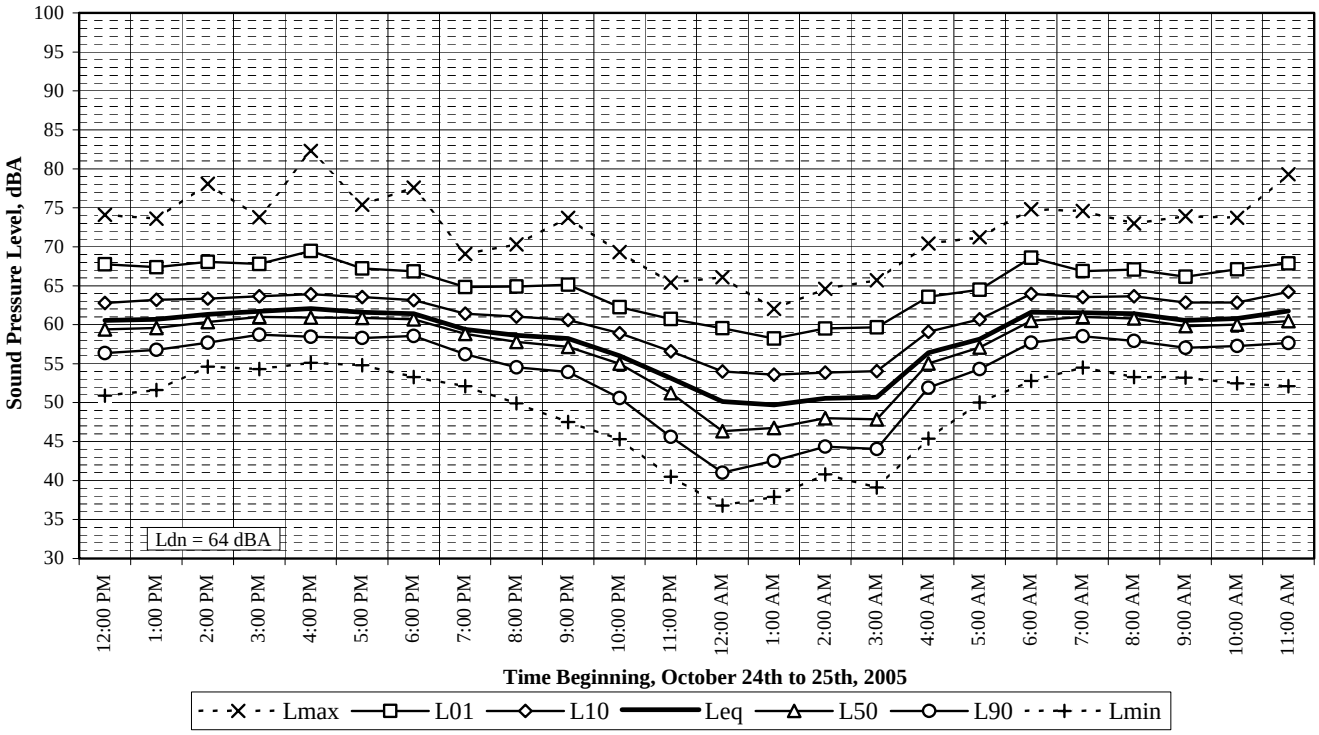


Chart 9: LT-9 Noise Measurement Results
45 feet from the centerline of Hwy 116 west of Alder Lane

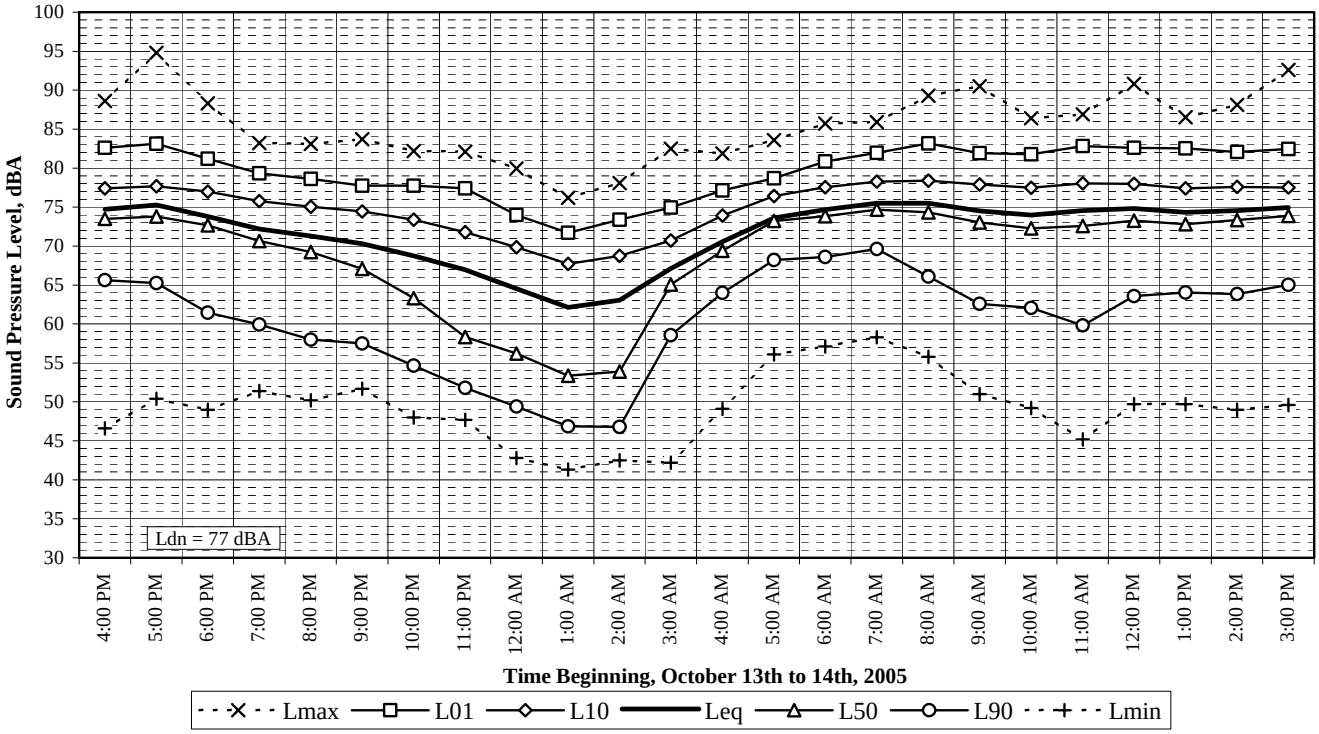


Chart 10: LT-10 Noise Measurement Results
30 feet from the centerline of Wilford Lane