Noise

Purpose

Requirements for the Noise Element of the General Plan are set forth in California Government Code Section 65302(f), which provides the following overall guidance:

> *A Noise Element shall identify and appraise noise problems in a 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:*
>
> *(A) Highways and freeways.*
> *(B) Primary arterials and major local streets.*
> *(C) Passenger and freight online railroad operations and ground rapid transit systems.*
> *(D) Commercial or general aviation, heliport, helistop, and military airport operations, aircraft overflights, jet engine test stands, and all other ground facilities and maintenance functions related to airport operation.*
> *(E) Local industrial plants, including but not limited to railroad classification yards.*
> *(F) Other ground stationery sources...identified by local agencies as contributing to the community noise environment.*

The MV2040 General Plan contains policies and programs to prevent problems created by excessive noise levels and to maintain or reduce current noise levels in the community, consistent with the City's adopted noise ordinance. The City's noise ordinance (Mill Valley Municipal Code Chapter 7.16) contains quantitative noise limits for noise sources within the Mill Valley city limits and establishes acceptable exterior noise levels, acceptable interior noise levels, and exemptions from the ordinance for special activities such as construction. Special noise limits are also established for certain noise-generating activities.

Typical noise levels experienced in a community are illustrated in Figure 8.9

Existing Conditions

Noise Measurement Survey

A noise measurement survey was completed in January 2013 to establish existing noise levels in Mill Valley. Long-term measurements made hour-by-hour over a period of 24 hours or more provide information on how noise levels vary throughout the day and night and may vary from day to day. A series of attended short-term measurements were also made. These measurements are also useful because they identify the noise sources that occur during the measurement and note the level of noise associated with identifiable events. This assists in quantitatively and qualitatively characterizing the noise environments along the major roadways and also in the quieter areas of the City.

Major roadways cause most of the ambient noise in Mill Valley. Highway 101 runs along the eastern border of the City. Major local roadways, which include Miller Avenue, East Blithedale Avenue, and Camino Alto. Hamilton Drive, Lomita Drive, and Sycamore Avenue, are relatively quiet roads, but they are adjoined by a large number of residences and, therefore, contribute to residential noise exposure in Mill Valley.

The noise survey was from the afternoon of Monday, January 7, 2013, to the afternoon of Wednesday, January 9, 2013, and (at one location) from the afternoon of Wednesday, January 9, 2013, to the afternoon of Friday, January 11, 2013. Noise measurement locations are shown in Figure 8.1. During the noise survey, weather conditions were moderate in terms of temperature and wind. The noise survey was conducted with Larson Davis Laboratories Type 820 precision sound level meters. Instrumentation was calibrated at the beginning of the noise survey and post-calibrated at the end of the survey. No calibration corrections were necessary. During the survey, the microphones were fitted with windscreens.

Noise Measurement Terminology

The State Office of Planning and Research guidelines related to the preparation of the Noise Element of the General Plan mandate that noise exposure levels be expressed in terms of the day/night average sound level (Ldn) or the community noise equivalent level (CNEL). Both of these descriptors represent the 24-hour average

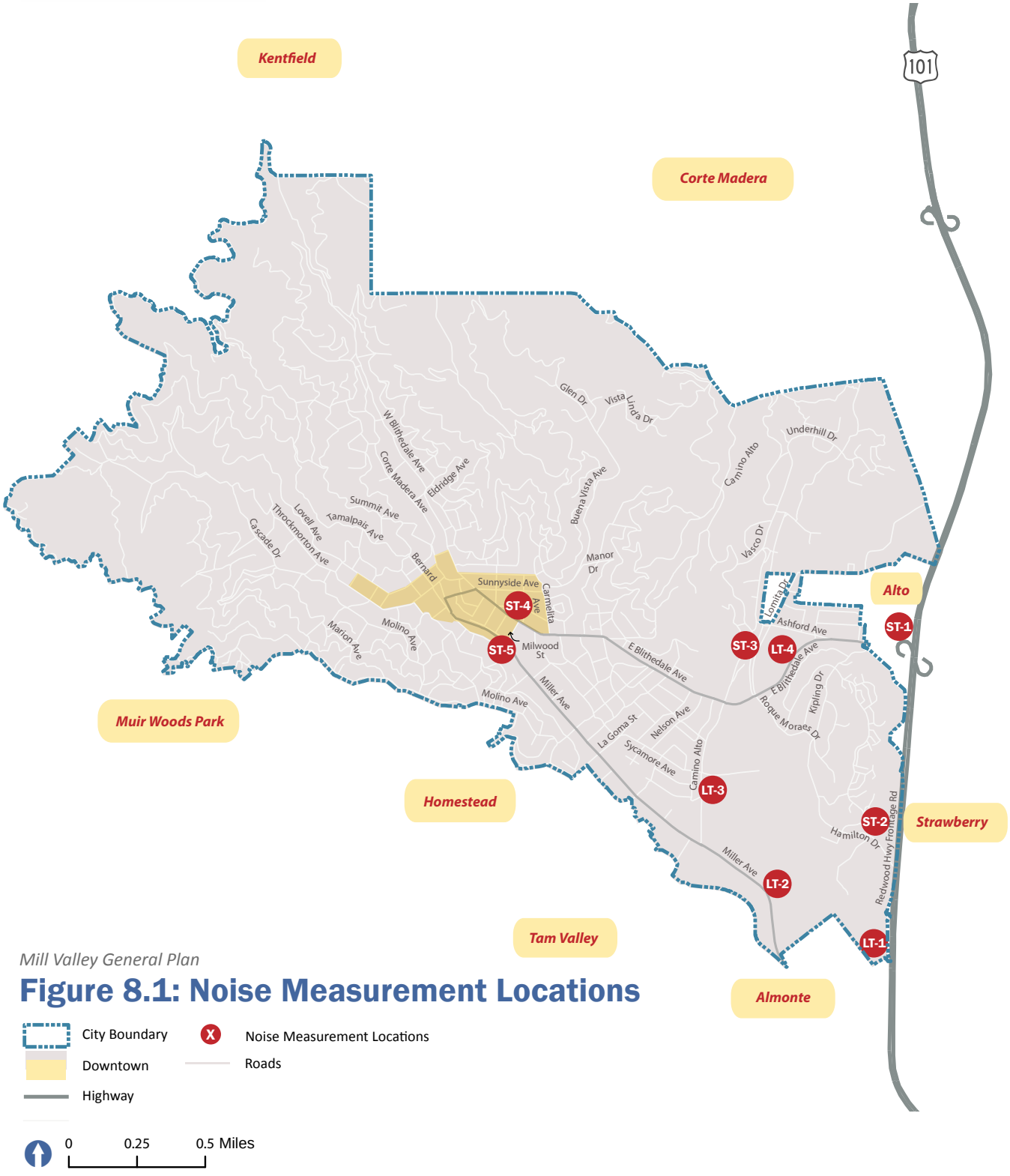

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Figure 8.1: Noise Measurement Locations

noise level with waiting periods for the daytime (Ldn) or the daytime and evening (CNEL). Ldn is currently the preferred metric and is used to characterize the 24-hour average noise exposure level.

It is also important to know how noise levels vary within each hour of the day and night. For this purpose, the standard statistical descriptors are the Lmax, the L10, the L50, and the L90. The Lmax noise level is the highest noise level during the interval and the L10, L50, and L90 represent sound levels exceeded 10 percent, 50 percent (the median level), and 90 percent of the time interval (representing the background noise levels). The L50 corresponds to the noise limit in the City's noise ordinance. The hourly equivalent sound level (Leq), the basis for the day/night average noise levels, was measured and reported for each hour, as well.

Long-Term Noise Measurements

Measurement LT-1 was 100 feet west of the near edge of Highway 101. The measurement position was at a small park near the Acqua Hotel parking lot and a waterfront walkway, about 60 feet from the center line of the Redwood Highway frontage road. Vehicular traffic on Highway 101 was the dominant noise source affecting the noise measurement. The daily trend in noise levels at this location is shown in Figure 8.2. The measured day/night average noise level at this location was about 71 dBA Ldn. This measurement location was well below the grade of the roadway, resulting in a lower Ldn level than would be expected at other portions of the highway at the same distance, as shown in the modeled noise levels (Table 8.1). Activities in the parking lot such as starting car engines, slamming car doors, and talking may be considered significant intermittent noise sources, but these did not affect the overall 24-hour average noise level. The data clearly demonstrate the difference in noise levels between nighttime, when the noise level dropped to 35 dBA L90 (in the absence of any local traffic and activities in the parking lot), and daytime, when the noise level reached 92 dBA Lmax.

Vehicular traffic on Miller Avenue near Tam High School

Measurement LT-2 was on Miller Avenue. This measurement location was also selected to characterize noise levels along a major road. The measurement position was in a tree near the Mill Valley-Sausalito path about 90 feet from the center line of Miller Avenue. The measurement was across Miller Avenue from the Tamalpais High School athletic fields. The dominant source of noise was ve-

hicular traffic on Miller Avenue. Measured data at LT-2 are shown in Figure 8.3. The measured noise level at this location was 67 dBA Ldn.

Measurement LT-3 was on the east side of Camino Alto along a creek of Pickleweed Inlet. The measurement position was about 100 feet from the center line of the roadway. Vehicular traffic along Camino Alto was the major source of noise. At night, it is likely that light winds in vegetation and creek water also contributed to the background noise levels. The day/night average noise level was measured to be about 65 dBA Ldn. The measured data are shown in Figure 8.4. The data show that it is quiet during the night, when noise levels drop to about 37 dBA L90 in the absence of any local traffic.

Measurement LT-4 was on East Blithedale Avenue near the shopping center northeast of Lomita Drive. The measurement position was about 75 feet from the center line of East Blithedale Avenue. Vehicular traffic along East Blithedale Avenue was the major source of noise at this location, which is busier than other local roadways in Mill Valley. The day/night average noise level at this site was measured to be about 71 dBA Ldn. Noise levels at this portion of the road varied from as low as 35 dBA L90 when there is little local traffic at night to as high as 87 dBA Lmax during daytime hours when there are bus and truck pass-bys and high engine vehicle noise. The measurement data are summarized in Figure 8.5.

Table 8.1 | Summary of Short-Term Noise Measurement Data

Noise Measurement Location	L_{max}	$L_{(1)}$	$L_{(10)}$	$L_{(50)}$	$L_{(90)}$	L_{eq}	L_{dn}
ST-1: 260 feet from the noise barrier along Highway 101 (1/8/2013, 11:40-11:50 AM)	57	56	54	51	49	52	55
ST-2: Approximately 40 feet from Hamilton Drive along Shelter Bay Avenue (1/8/2013, 12:10-12:20 PM)	73	67	63	55	50	59	61
ST-3: 240 feet from the center of Camino Alto (1/8/2013, 12:30-12:40 PM)	64	62	57	52	50	54	56
ST-4: 90 feet from the center of East Blithedale Avenue (1/8/2013, 1:00-1:10 PM)	71	66	63	60	55	51	53
ST-5: 180 feet from center of Miller Avenue along Park Avenue (1/8/2013, 2:10-2:20 PM)	64	60	56	51	44	53	54
ST-6: 150 feet from center of West Blithedale Avenue near Blithedale Park (1/8/2013, 1:30 PM)	59	52	49	48	48	48	49

Note: L_{dn} approximated by correlating to corresponding period at long-term site.

Figure 8.2 | Noise Levels at LT-1

~ 100 feet from the west edge of US Hwy 101
January 7 - 8, 2013 (Monday - Tuesday)

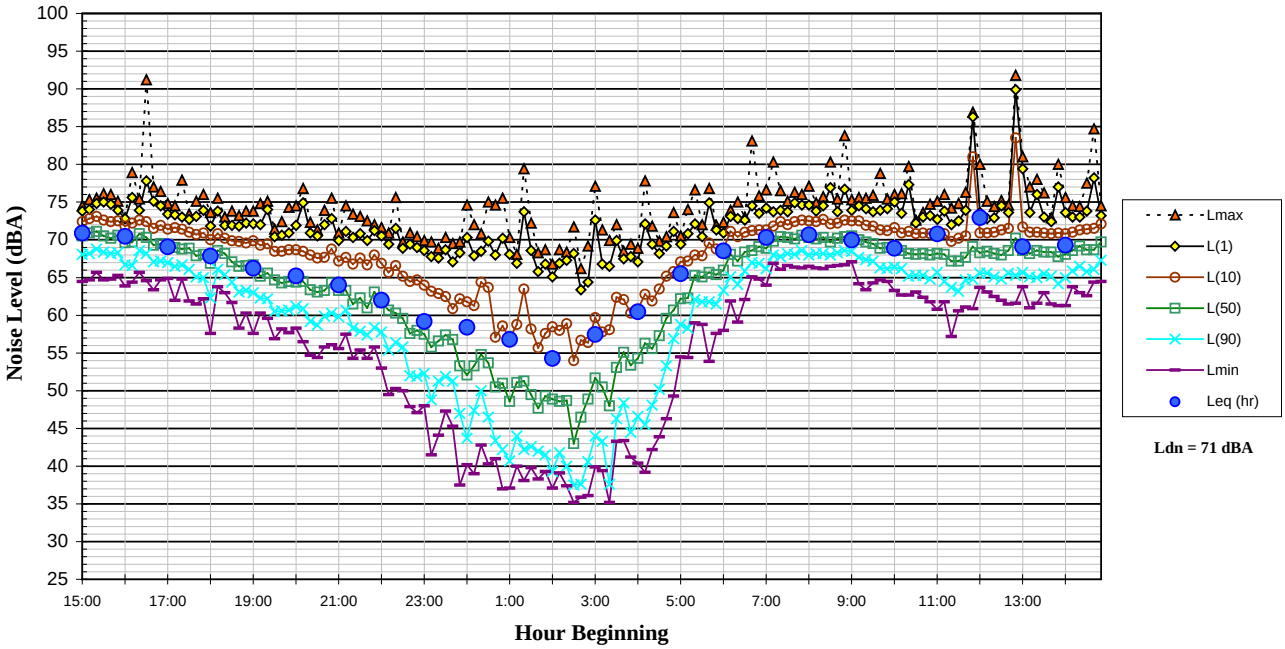


Figure 8.3 | Noise Levels at LT-2

~ 90 feet from center of Miller Rd.
January 7 - 8, 2013 (Monday - Tuesday)

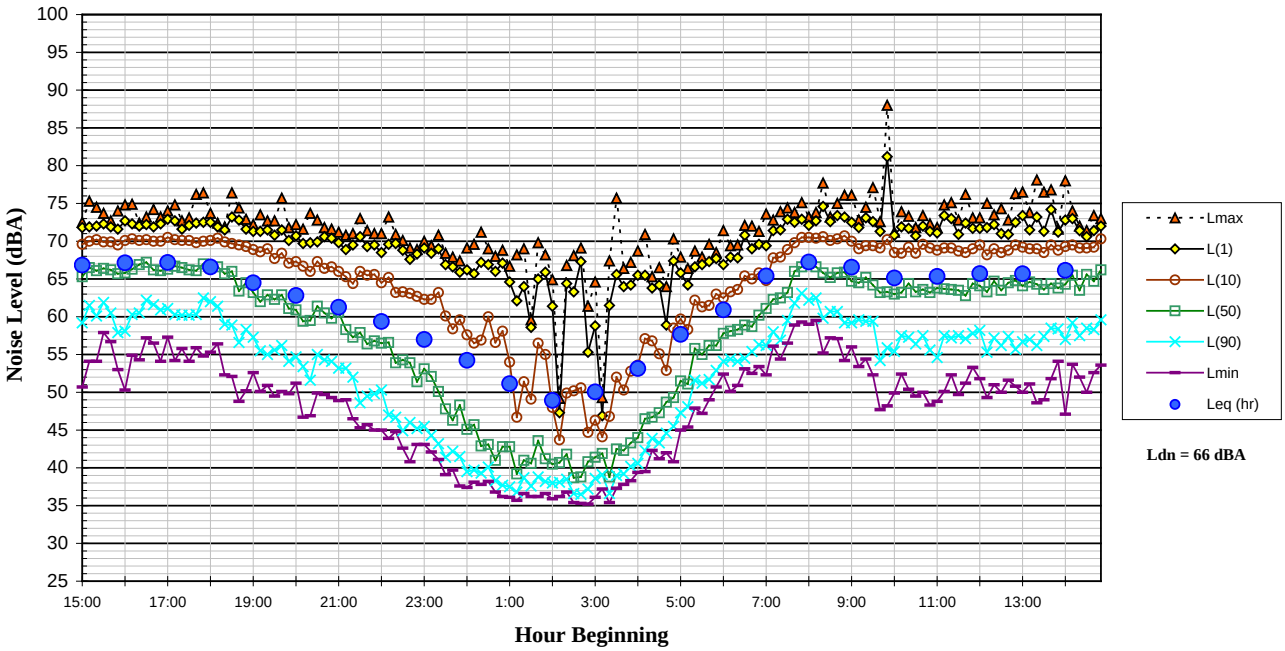


Figure 8.4 | Noise Levels at LT-3

~ 100 feet from center of Camino Alto
January 9 - 10, 2013 (Wednesday - Thursday)

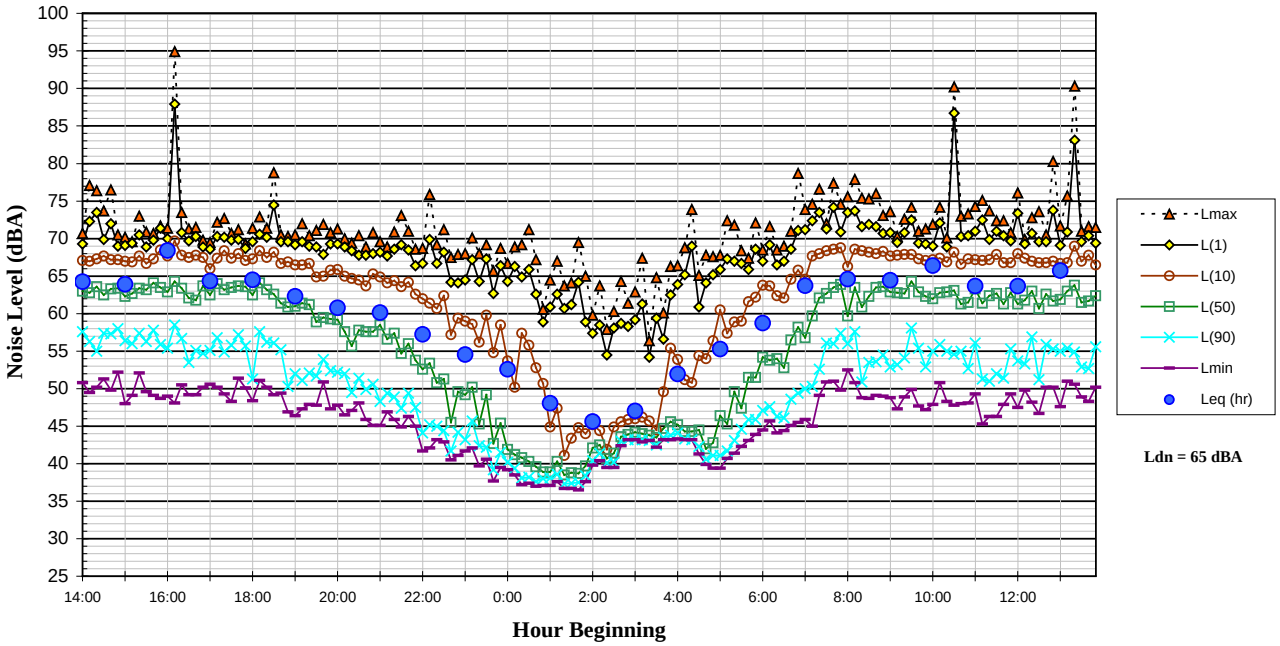
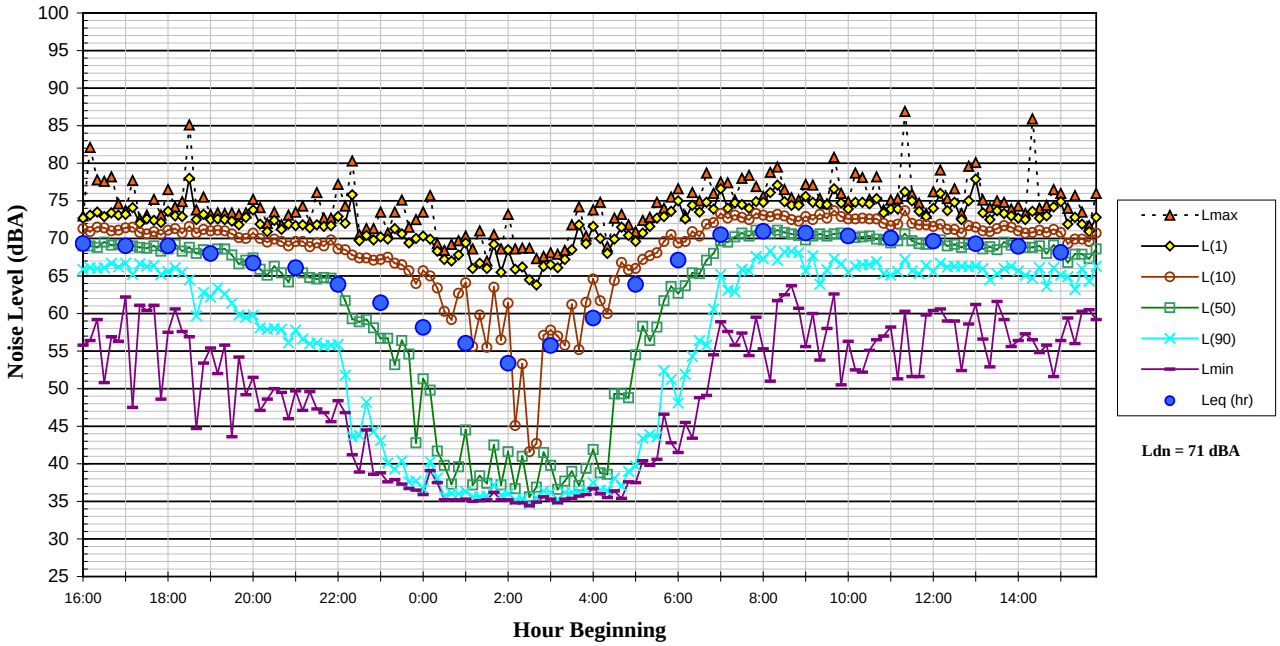


Figure 8.5 | Noise Levels at LT-4

~ 75 feet from center of Blithedale Ave.
January 7 - 8, 2013 (Monday - Tuesday)



Short-Term Noise Measurements

Short-term noise measurements were conducted during the day on January 8, 2013. The measured data are summarized in Table 8.1. Measurement ST-1 was on Valley Road, where traffic on Highway 101 was the significant contributor to measured noise levels. At ST-2, local traffic on Hamilton Drive and traffic on Highway 101 were the dominant sources of noise. A loud car pass-by on Hamilton Drive generated a maximum instantaneous noise level of 73 dBA Lmax. At ST-3, vehicular traffic on Camino Alto was the only significant contributor to measured noise levels. At ST-4, vehicular traffic along East Blithedale Avenue was the dominant source of noise. At ST-5, traffic along Miller Avenue was the only significant contributor to measured noise levels. ST-6 was located along a less dense residential stretch of East Blithedale Avenue, northwest of downtown Mill Valley, where traffic on East Blithedale Avenue was the only significant contributor to measured noise levels.

Stationary Noise Sources

In general, stationary noise sources (e.g., large mechanical equipment and loading areas) are often located in primarily commercial areas and are isolated from noise-sensitive land uses (also known as "sensitive receptors"). However, the possibility of sensitive development encroaching on some of these stationary noise sources remains, which could result in some land use conflicts. Noise sources that affect sensitive receptors within the community may also include commercial land uses or those normally associated with and/or secondary to residential development. These include entertainment venues, nightclubs, outdoor dining areas, gas stations, car washes, fire stations, drive-throughs, air conditioning units, residential generators, swimming pool pumps, school playgrounds, athletic and music events, and public parks.

Construction-related equipment in Mill Valley

Stationary noise sources in Mill Valley mainly consist of rooftop and loading dock equipment at commercial uses located north of East Blithedale Avenue near Camino Alto and Lomita Drive. Commercial uses are also located along Redwood Highway, the frontage road to Highway 101.

Temporary Noise Sources

Construction is a temporary source of noise for residences and businesses located near construction sites. Construction noise

can be significant for short periods of time at any particular location as a result of public improvement projects, private development projects, remodeling, and other activities.

The highest construction noise levels are normally generated during grading and excavation, with lower noise levels occurring during building construction. Large pieces of earth-moving equipment, such as graders, scrapers, and bulldozers, generate maximum noise levels of 85 to 90 dBA at a distance of 50 feet. Typical hourly average construction-generated noise levels are about 80 to 85 dBA measured at a distance of 50 feet from the site during busy construction periods. Some construction techniques, such as impact pile driving, can generate very high levels of noise (105 dBA Lmax at 50 feet) that are difficult to control. Construction activities can elevate noise levels at adjacent businesses and residences by 15 to 20 dBA or more.

Vibration

Transportation-Related Vibration Sources

There are no fixed railroad lines that pass through Mill Valley. Transportation-related ground vibration would only occur in Mill Valley from heavy truck pass-bys on Highway 101 and occasionally on major local roadways. The resulting vibration levels at the nearest receivers are normally below the threshold of perception.

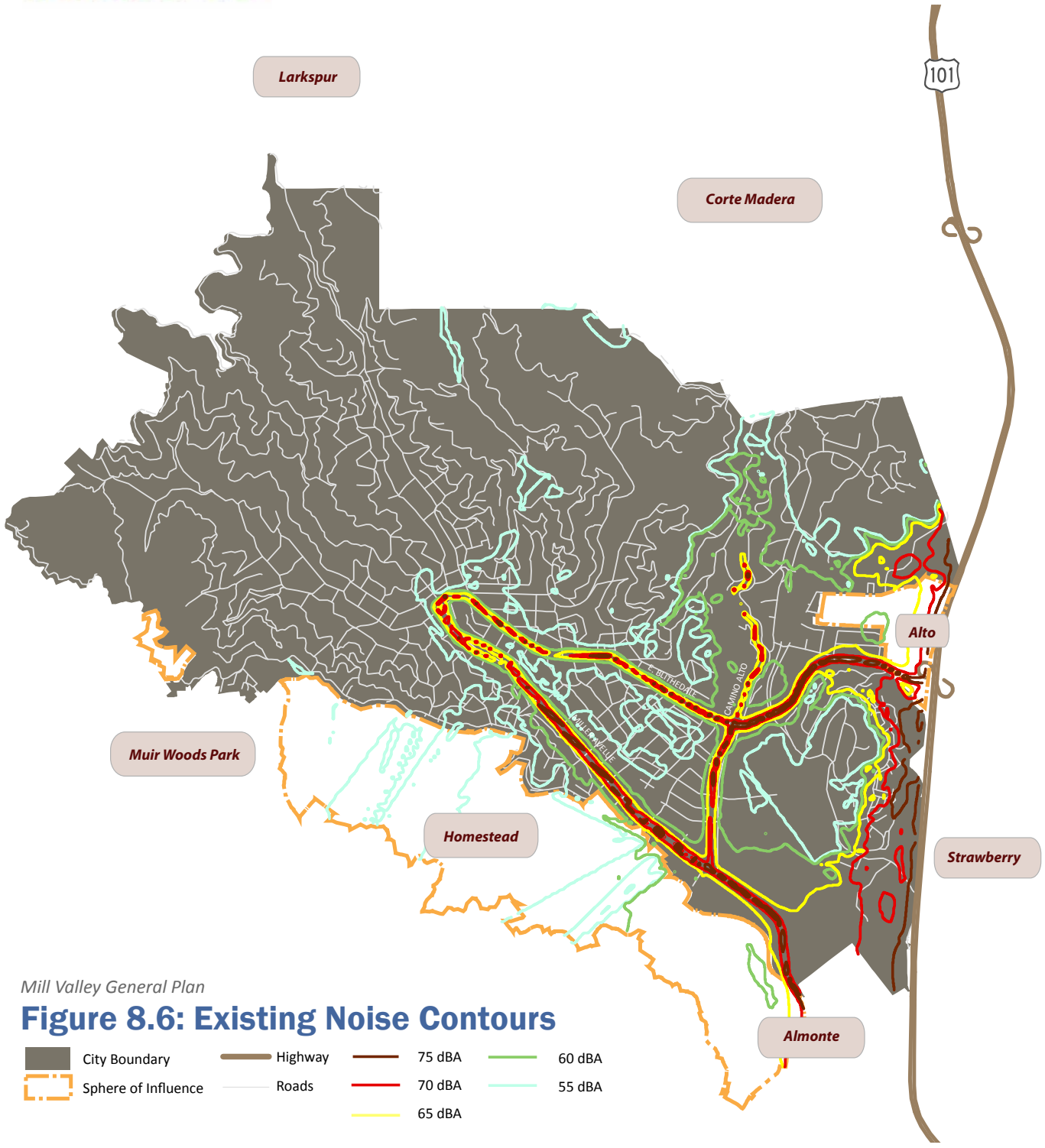
Temporary Vibration Sources

Construction activities such as building demolition, site preparation work, excavation, and foundation work can generate groundborne vibration at land uses adjoining construction sites. Impact pile driving has the potential of generating the highest ground vibration levels and is of primary concern to structural damage. Other project construction activities, such as caisson drilling, the use of jackhammers, rock drills and other high-power or vibratory tools, and rolling stock equipment (tracked vehicles, compactors, etc.), can generate substantial vibration levels in the immediate vicinity.

Noise Exposure Maps

SoundPLAN Version V7.0, a three-dimensional ray-tracing computer program, was used to calculate traffic noise levels along major roadways throughout Mill Valley. The noise map prepared based on existing conditions is shown in Figure 8.6 and the noise map prepared based on year 2035 conditions is shown in Figure 8.7.

Truck on East Blithedale



Mill Valley General Plan

Figure 8.6: Existing Noise Contours

Source: Marin Map, 2012; Illingworth and Rodkin Inc., 2013

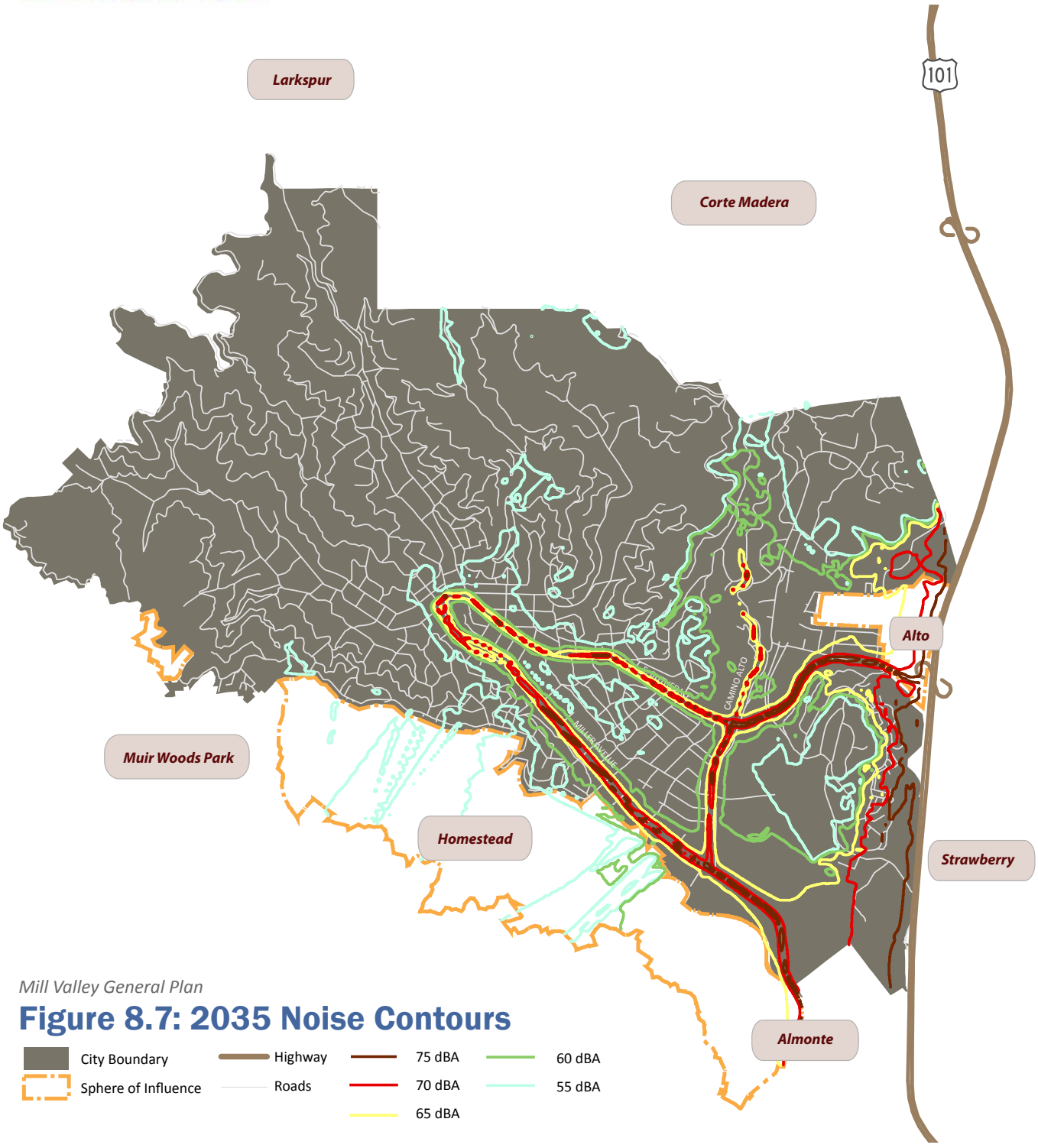


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Figure 8.7: 2035 Noise Contours

Source: Marin Map, 2012; Illingworth and Rodkin Inc., 2013

Calculations took into account the source of noise, the frequency spectra of the noise source, and the topography of the area. The geometric data used to create the model were based on geographic information system (GIS) data provided by Wallace Roberts & Todd, LLC. Existing and year 2035 average daily trip (ADT) data and travel speeds were also input into the model. For Highway 101, traffic volumes and truck mix data input into the model were based on information published by the California Department of Transportation (Caltrans). The predicted noise levels were then compared to measured noise levels for calibration purposes and adjustments were made as necessary to create an accurate model.

Table 8.2 presents existing and year 2035 day-night average noise levels calculated at a reference distance of 75 feet from the center of the near travel lane for roadways in Mill Valley.

Noise exposure in the community is defined in terms of the 24-hour day/night average noise level (Ldn). The noise levels were measured throughout the community. Noise contours were prepared for the major roadways using a combination of the measured noise levels and traffic data.

The noise exposure in the community is depicted in the form of noise exposure contours along the major roadways. The noise exposure contours are lines of equal loudness, similar to elevation

Table 8.2 | Existing and Future Modeled Noise Levels Along Mill Valley Roadways

Roadway Segment	L_{dn} at 75 feet, dBA	
	Existing	Cumulative 2035
Highway 101, north of East Blithedale Avenue	79	79
Highway 101, south of East Blithedale Avenue	78	79
East Blithedale Avenue, Highway 101 to Camino Alto	70	70
East Blithedale Avenue, downtown	60	61
East Blithedale Avenue, east of Highway 101	69	69
East Blithedale Avenue, west of Camino Alto	64	64
Camino Alto, north of East Blithedale Avenue	63	64
Camino Alto, south of East Blithedale Avenue	65	66
Miller Avenue, downtown	61	61
Miller Avenue, east of Camino Alto	68	69
Miller Avenue, west of Camino Alto	65	65

contours that are lines of equal elevation. Noise exposure contours were calculated using a traffic noise model developed by the Federal Highway Administration and the California Department of Transportation that is incorporated into the SoundPLAN computer model. The traffic noise model was calibrated using the actual measured noise levels in Mill Valley. Noise exposure is presented in terms of the Ldn noise metric.

Noise/Land Use Compatibility Guidelines

Figure 8.8 shows recommended noise/land use compatibility guidelines. The three categories – normally acceptable, conditionally acceptable, and unacceptable – translate to a noise environment for a particular use that would be acceptable without additional mitigation measures, an intermediate category where the application of available mitigation measures would normally result in an acceptable noise environment, and a noise environment that could potentially be unacceptable even after the application of available mitigation measures. When evaluating a proposed development under the California Environmental Quality Act (CEQA), these three categories would indicate a less-than-significant noise impact, a less-than-significant noise impact after mitigation, and a significant and unavoidable noise impact, respectively.

Noise Elements are required to facilitate the Noise Insulation Standards contained in the California Building Code that are applicable to new multi-family housing. These standards state that where the exterior noise exposure level is 60 dBA Ldn or greater, the building must attenuate the interior noise level to 45 dBA Ldn or less. The noise and land use compatibility guidelines (Figure 8.8) are used to screen for these thresholds. Based on existing conditions in Mill Valley, an exterior noise goal of 60 dBA Ldn and an interior goal of 45 dBA Ldn are recommended for new residences.

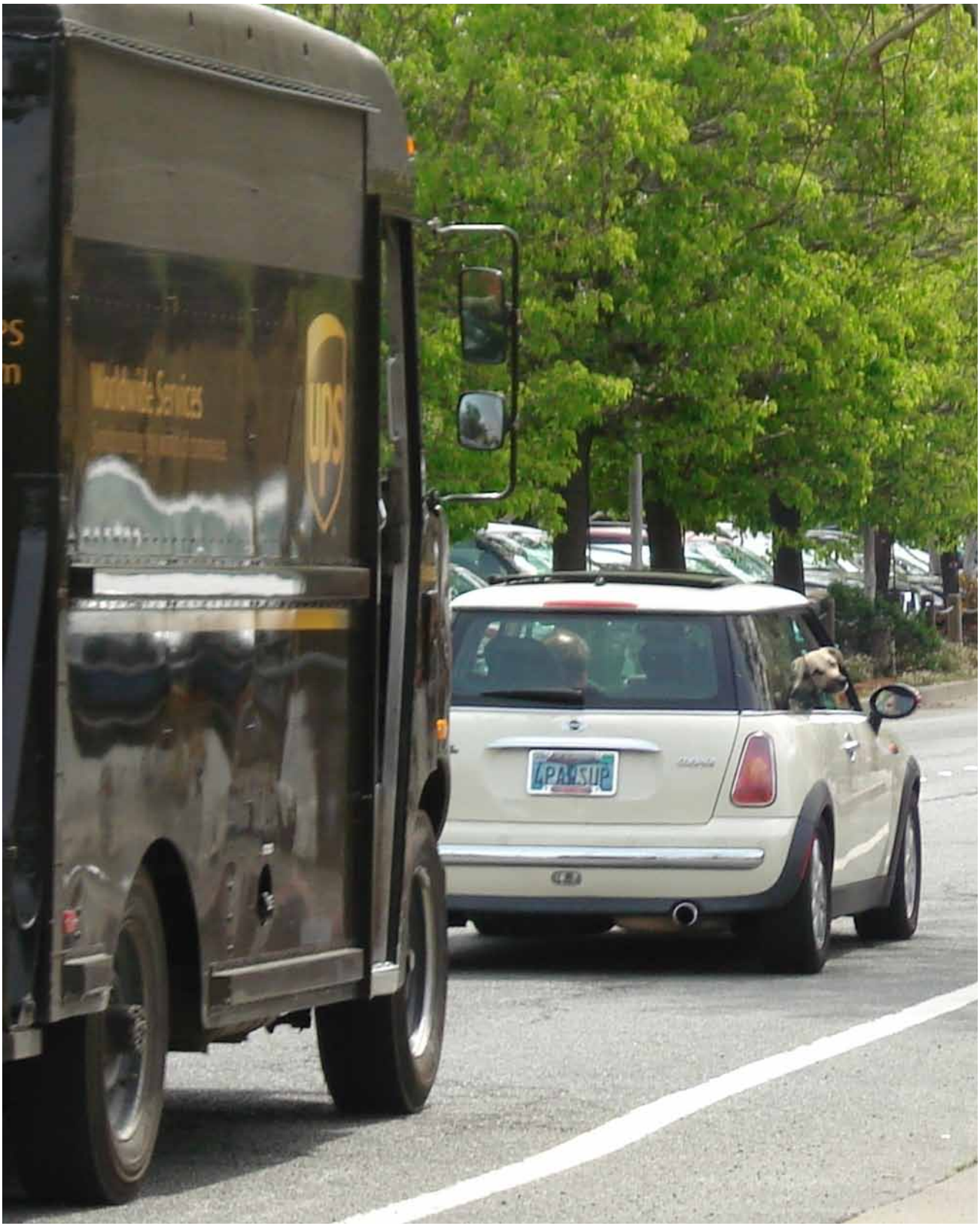
Ways of Addressing Noise Problems

Traffic noise is the most significant source of community noise in Mill Valley. The noise generated by individual vehicles is pre-empted by the state, so noise limits cannot be set for individual vehicles. Noise generated by tire pavement interaction is the predominant source of traffic noise, however, and local actions can address this source of noise. During the last seven years, extensive research on tire pavement noise has been completed, and quieter pavements have been identified. These include pavements commonly used in California, such as open-grade asphalt concrete and rubberized asphalt.

Commercial and retail establishments generate a different kind of noise referred to as non-transportation noise. The noise results from sources such as heating, ventilating, and refrigeration equipment; loading dock activities; parking lot traffic and maintenance; and special events with music. The City's noise ordinance regulates noise from these sources.

Noise from construction activities – particularly activities associated with construction of new residences and remodeling or demolition and reconstruction on residential properties – disturbs the peace and quiet of Mill Valley. The term "construction" covers a large range of projects, from new construction or the demolition and construction of a large residence to someone repairing a deck on a Saturday afternoon. The primary method for addressing construction noise is through standards that limit work to specified times and provide guidance on equipment use and maintenance. The following is a representative list of standard controls:

- Limit construction to the hours of 8:00 AM to 5:00 PM on weekdays, and 9:00 AM to 5:00 PM on Saturdays, with no noise-generating construction on Sundays or holidays.
- Control noise from construction workers' radios to the point where they are not audible at existing residences that border the project site.
- Equip all internal combustion engine-driven equipment with mufflers that are in good condition and appropriate for the equipment.
- Use quiet models of air compressors and other stationary noise sources where technology exists.
- Locate stationary noise-generating equipment as far as possible from sensitive receptors when sensitive receptors adjoin or are near a construction project area.
- Prohibit unnecessary idling of internal combustion engines.
- Notify residents adjacent to the project site of the construction schedule in writing.
- Designate a noise disturbance coordinator who would be responsible for responding to any local complaints about construction noise. The disturbance coordinator would determine the cause of the noise complaints (e.g., starting too early, bad muffler, etc.) and institute reasonable measures warranted to correct the problem. Conspicuously post a telephone number for the disturbance coordinator at the construction site.



Delivery truck on Miller Avenue

Noise Goals, Policies & Programs

NOISE-1 | Noise

Maintain a quiet community.

N.1 Interior and Exterior Noise

Ensure that interior noise levels do not exceed 45 Ldn in all new residential units (single- and multi-family). Analyze residential development sites exposed to noise levels exceeding 60 Ldn following protocols in the most recent adopted version of the California Building Code.

N.1-1 Maintain a pattern of land uses that separates noise-sensitive land uses from major traffic noise sources, to the extent feasible.

N.1-2 Use the noise contours in Figure 8.7 and noise/land use compatibility standards in Figure 8.8 to ensure that new development and major redevelopment meet required interior and exterior noise standards.

N.1-3 Do not allow noise-sensitive land uses in noise-impacted areas unless effective mitigation measures are incorporated into the project design to reduce noise levels in outdoor activity areas to 60 dBA Ldn or less.

N.2 Roadway Noise

Reduce noise from traffic.

N.2-1 Use "quieter" pavement technologies that also meet other criteria established by the City for pavements when resurfacing roadways.

N.2-2 Control the sound of vehicle amplification systems (e.g., loud stereos) by encouraging the enforcement of Section 27007 of the California Motor Vehicle Code. This section prohibits amplified sound that can be heard 50 or more feet from a vehicle.

N.2-3 Control excessive exhaust noise by encouraging the enforcement of Section 27150 of the California Motor Vehicle Code.

N.3 Acoustical Environment

Maintain the current quality of the acoustical environment.

N.3-1 Require an acoustical analysis to mitigate noise-generating projects that would cause the following criteria to be exceeded or would cause a significant adverse community response in locations where there is greater sensitivity to excess noise:

- Cause the Ldn at noise-sensitive uses to increase by 3 dBA or more and exceed the "normally acceptable" level.
- Cause the Ldn at noise-sensitive uses to increase 5 dBA or more and remain "normally acceptable."

Locations subject to this program would include but are not limited to hospitals, nursing homes, theaters, auditoriums, churches, meeting halls, schools, libraries, museums, and parks.

Figure 8.8 | Land Use Compatibility for Roadway and Transportation Noise

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

(a) See Policy N-4
(b) Assumes indoor and outdoor events, therefore exterior noise exposure is low.

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 to comply with Noise Element policies is usually not feasible.

N.3-2 Ensure that all acoustical analyses required by the City:

- Are prepared by a qualified person or firm experienced in the fields of environmental noise assessment and architectural acoustics as selected or pre-approved by the City.
- Include representative noise level measurements with sufficient sampling periods and locations to adequately describe local conditions.
- Estimate existing and projected (20-year) noise levels in terms of Ldn and/or the standards of the noise ordinance, and compare those levels to the policies of this Noise Element.
- Recommend appropriate mitigation to achieve compliance with the adopted policies and standards of this Noise Element. Where the noise source in question consists of intermittent single events, the report shall address the effects of maximum noise levels in sleeping rooms in terms of possible sleep disturbance.
- Describe a post-project assessment program that could be used to evaluate the effectiveness of the proposed mitigation measures.

The full cost of any such studies shall be the responsibility of the project applicant.

N.3 Construction Noise

Manage noise from construction.

N.4-1 Implement appropriate standard noise controls for all construction projects.

N.4-2 Require detailed construction noise management plans.

N.4-3 Develop a guidance manual to provide information to the public regarding construction noise control.

Figure 8.9 | Typical Noise Levels in the Environment

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	110 dBA	Rock Band
Jet fly-over at 1,000 feet	100 dBA	
Gas lawn mower at 3 feet	90 dBA	
Diesel truck at 50 feet at 50 mph	80 dBA	Food blender at 3 feet Garbage disposal at 3 feet
Noisy urban area, daytime Gas lawn mower, 100 feet Commercial area	70 dBA	Vacuum Cleaner at 10 feet
Heavy traffic at 300 feet	60 dBA	Normal speech at 3 feet
Quiet urban daytime	50 dBA	Large business office Dishwasher in next room
Quiet urban nighttime Quiet suburban nighttime	40 dBA	Theater, large conference room
Quiet rural nighttime	30 dBA	Library Bedroom at night, concert hall
	20 dBA	Broadcast/recording studio
	10 dBA	
	0 dBA	

Source: Technical Noise Supplement (TeNS), Caltrans, November 2009