9. NOISE

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A. INTRODUCTION

The Noise Element is a required element in the General Plan. The State requires local governments to identify and quantify community noise levels expressed in Community Noise Equivalent Levels (CNEL) or day-night average levels (Ldn) such sound weighting scales which are defined in Table 9.1. The findings must be included in the General Plan and used to guide

future land use decisions, implementation measures for noise control, and policies to aid in limiting the community's noise exposure. Noise management acts in coordination with Circulation, Land Use, and Housing patterns, and the purpose of this element aims to inform policies to prevent public exposure.

An adequate Noise Element must include the following two components: (1) an analysis of noise levels and the extent of noise exposure through noise measurements or modeling, and (2) noise standards to be used for land use planning. Throughout this chapter, tables and standards are given as reference materials.

Key Definitions

Noise is defined as unwanted sound. There is a consideration of actual noise and the community's perception of noise. Noise can be subdivided into two main categories: noise receptors and noise producers. The key definitions in Table 9.1 are compiled from federal and state legislation and standards.

Table 9.1 Key Noise Definitions	
Decibel, dB	A unit of measure describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measures to the reference pressure, which is 20 micropascals (20 micronewtons per square meter).
dBA	The "A-weighted" scale for measuring sound in decibels' weighs or reduces the effects f low and high frequencies in order to simulate human hearing. Every increase of 10 dBA doubles the perceived loudness though the noise is actually ten times more intense.
CNEL	Community Noise Equivalent Level. The average equivalent A-weighted sound level during a 24-hour day, obtained after addition of five decibels to sound levels in the evening from 7 p.m. to 10 a.m. and after addition of 10 decibels to sound levels in the night from 10 p.m. to 7 a.m.
Ldn	Day-Night Average Level. The average equivalent A-weighted sound level during a 24 – hour day, obtained after the addition of 10 decibels to sound levels in the night after 10 p.m. and before a.m. (CNEL and Ldn represent daily levels of noise exposure averaged on an annual or daily basis, while Leq represents the equivalent energy noise exposure for a shorter time period, typically one hour.)
A-Weighted Level	The sound level in decibels as measures 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 response of the human ear and gives good correlation with subjective reactions to noise.
Noise Contours	Lines drawn about a noise source indicating equal levels of noise exposure. CNEL and Ldn are the metrics utilized herein to describe annoyance due to noise and to establish land use planning criteria for noise.
"General Plan Guidelines," by Governor's Office and Planning and Research, p. 244. The State of California, 2003	

Legal Requirements and Standards

Federal, state, and local jurisdictions dictate a multitude of standards for noise levels, locations, and impacts on land use designations. The State Government Code Section 65302(f) requires that the Noise Element identify, analyze, and provide mitigating measures for mobile and stationary noise sources. In particular, the following sources are recognized as producers of noticeable amounts of noise:

- Major roadways
- Minor roadways
- Passenger and freight rail operations; this includes above and underground facilities
- Commercial, general aviation, safety services, airplane and helicopter activity facilities, as well as fly over zones and ground-based maintenance activities
- Local industrial plants

The formulation of noise contours are required to be produced with calculations of CNEL and Ldn levels. The noise contours ought to be driven by an accepted methodology and applied to both major and minor producers identified in the Existing Conditions section of the Noise Element. These noise contours shall be utilized for forming a more holistic approach to land use patterns that minimize unnecessary and harmful noise exposure within the City. The Noise Element shall also put forth possible solutions to existing and foreseeable noise issues within the City.

State Standards

According to the State Government Code Section 65302(f), significant noise is found at the following facilities:

- Traffic on major roadways and highways
- Railroad operations
- Airports
- Certain industrial activities
- Fixed noise sources

Table 9.2 is a reference guide to intensities of decibels. Within the City, the main sources of noise are the transportation routes. California Department of Transportation categorizes land use activities by noise impacts. In California, a substantial noise increase is considered to occur when the project's predicted worst-hour design-year noise level exceeds the existing worst-hour noise level by 12 dBA or more. An increase by 10 dBA is perceived as a doubling in loudness. The 12 dBA standard was extrapolated by the California Department of Transportation (Caltrans) and is approved by the Federal Highway Administration (FHWA).

Table 9.2 Intensity and Decibel Scale	
Source	**Intensity Level (dBA)**
Instant Perforation of Eardrum	160 dBA
Military Jet Takeoff	140 dBA
Threshold of Pain	130 dBA
Front Rows of a Rock Concert	110 dBA
Walkman at Maximum Level	100 dBA
Vacuum Cleaner	80 dBA
Busy Street Traffic	70 dBA
Normal Conversation	60 dBA
Whisper	20 dBA
Rustling Leaves	10 dBA
Threshold of Hearing	0 dBA
California Department of Transportation, 2011 References for typical noise levels.	

Activity categories are described in Table 9.3. Categories A, B, C, and E are evaluated to determine whether traffic noise impacts are predicted to occur. Special consideration is given to time and frequency of use at these land use locations. Category 'A' level designations serve a recognized important public need. Consultation with FHWA is required on a case-by-case basis for noise abatement. B-level designations require that each dwelling unit be counted as a single noise receptor. All 'C-level' designation receptors are required for particular circumstances of each land use (in this category). Please refer to the California Department of Transportation's Traffic Noise Analysis Protocol (2011) document for C-level details. Parcels designated as category D require each building to act as a separate receptor. E-level activity areas shall each be counted as a single receptor. F&G-levels are "no impact criteria", but a generalized receptor should be placed within 100 ft. of the outside travel lane of the closest roadway. When development is proposed, the "G" designation is re-assigned and will continue through environmental clearance.

Construction sites are required by the Lake County General Plan to implement noise-reducing mitigation measures during construction projects when "sensitive" receptors are located within 500 ft. of the site. Problems arise from construction during time-sensitive periods, particularly early morning and evening. The Federal Transit Administration has published a guidebook to assess acceptable noise levels during various stages of construction. These conditions shall be considered in addition to the existing noise conditions of the site, length of construction period, and affected surrounding land uses.

Table 9.3 Activity Categories and Noise Abatement Criteria (Receptors)			
Activity Category	**Activity Leq**	**Evaluation Location**	**Description of Activities**
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 continue to serve its intended purpose.
B	67	Exterior	Residential
C	67	Exterior	Active sports areas, amphitheatres, auditoriums, campgrounds, cemeteries, day care centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio stations, recording studios, recreation areas, schools, television studios, and trails.
D	52	Interior	Auditoriums, day care centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, schools, and television studios.
E	72	Exterior	Hotels, motels, offices, restaurants/bars, and other developed lands, properties, or activities not included in A-D or F
F			Agriculture, airports, bus yards, emergency services, industrial, logging, maintenance facilities, manufacturing, mining, rail yards, retail facilities, shipyards, utilities (water resources, water treatment, electrical), and warehousing.
G			Undeveloped lands that are not permitted
California Department of Transportation Traffic Noise Analysis Protocol, 2011			

Clearlake's noise ordinance restricts noise in designated land use areas. Under the Federal Noise Control Act of 1972 and the California Noise Control Act of 1973, it is the responsibility of local and state governments to identify noise sources and standards. In order to achieve the goals created by the OPR guidelines, the State of California established standards for acceptable noise exposure levels according to land use categories. Depending on the land use, the normal acceptable noise level ranges between 50 & 60 dBA. These levels are represented in Table 9.4.

Table 9.4 Maximum Allowable Noise Exposure by Land Use							
Land Use	**Noise Level (CNEL)**						
	45-50	**51-55**	**56-60**	**61-65**	**66-70**	**71-75**	**>76**
Residential – Low Density Single Family, Duplex, Mobile Homes							
Residential – Multiple Family, Group Homes							
Motels/Hotels							
Schools, Libraries, Churches, Hospitals, Extended Care Facilities							
Auditoriums, Concert Halls, Amphitheaters							
Sports Arenas, Outdoor Spectator Sports							
Playgrounds, Neighborhood Parks							
Golf Courses, Riding Stables, Water Recreation, Cemeteries							
Office Buildings, Business Commercial and Professional							
Industrial, Manufacturing, Utilities, Agriculture							

Interpretations	
	Normally Acceptable. Specified land use is satisfactory, based on 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 insulation features have been included in the design.
	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. Outdoor areas must be shielded.
	Unacceptable. New construction or development should not be undertaken.

Lake County General Plan, 2008

B. EXISTING CONDITIONS

1. Noise Producers

Stationary Sources

Stationary sources of noise tend to operate between eight and ten hours per day. This includes industrial land uses, roadway segments with continued use, and other parcels which contain a significant number of noise producing qualities (such as a car garage or animal shelter).

Industrial and Commercial

Industrial and commercial land uses in the City are located primarily along State Route (SR) 53 and Lakeshore Drive. A commercial cluster was identified in the community meetings around the Wal-Mart shopping center a source of noise. This includes the activities regularly occurring as a result of the land use, such as shopping and car start up, among others. Delivery truck activity is also a contributing factor to the area's noise levels. Multiple axel heavy vehicle trucks deliver to the national chain stores in the area. SR 53 is identified as the only truck route within the City. The clustering of commercial uses combined with poor transportation infrastructure makes certain areas susceptible to an increase in traffic noise. The areas surrounding the Wal-Mart and the Safeway were identified as locations that fit this description.

Residential

Residential land use activities have the potential to act as noise sources. In particular, animal nuisances and motor vehicle operation and maintenance in driveways cause minimal, but unwanted, noise. These activities are concentrated in the residential areas in the Avenues and the Streets on the northern portion of the City.

Recreation

Recreational areas are identified as stationary sources of noise. This includes open spaces such as Redbud Park and Austin Park as well as the lakefront activity areas. The Lake itself acts as a recreational site and source of constant ambient noise as well as noise associated with motorboat operation, both of which directly impact the parcels adjacent to the lakefront.

Ambient noise is defined as the base sound level that an area is exposed to. It is the level at which noise studies are based, and is a part of the overall noise level. Ambient noise can be defined by constant low noise sources within the community, such as running water from a stream, electrical box electrification sound, and the Lake.

Construction

Construction sites frequently involve an increase in noise levels, particularly during the demolition and infrastructure replacement phases. The transportation of heavy equipment to and from sites do affect the traffic noise levels along major routes as well as noise produced at the site. Typical hourly average construction-generated noise levels are about 81 dBA to 88 dBA measured 50 feet from the center of the site. Sensitivity is dependent on time of day,

location, and surrounding land uses. Figure 9.1 depicts significant noise producing land uses by land use type.

Mobile Sources

Much of the noise in the City is emitted from traffic traversing the two main roads: SR53 and Lakeshore Drive. Car and motorcycle traffic along these routes are identified by the public to be the primary noise producers. These sources move from origin to destination and interfere with noise levels during the three phases of travel: origin, travel right of way, and destination. Recreational use of the Lake emits mobile sounds from motorboats, bass fishing activities, and other various movements on the Lake (and lakefront).

The City does not have any railroad right of way. Nor does the City operate an airport in any capacity. The closest locations of these facilities are described in the Circulation Element. Potential aircraft flyover activity is recognized as a potential but un-documented form of ambient and/or significant noise. Figure 9.2 shows the noise contour map developed to better understand the existing estimated noise levels that are a result of the existing traffic along the main transportation corridor.

2. Noise Receptors

Noise Sensitive Land Uses

The Office of Planning and Research identifies sensitive noise receptors that must be taken into account when distributing land uses:

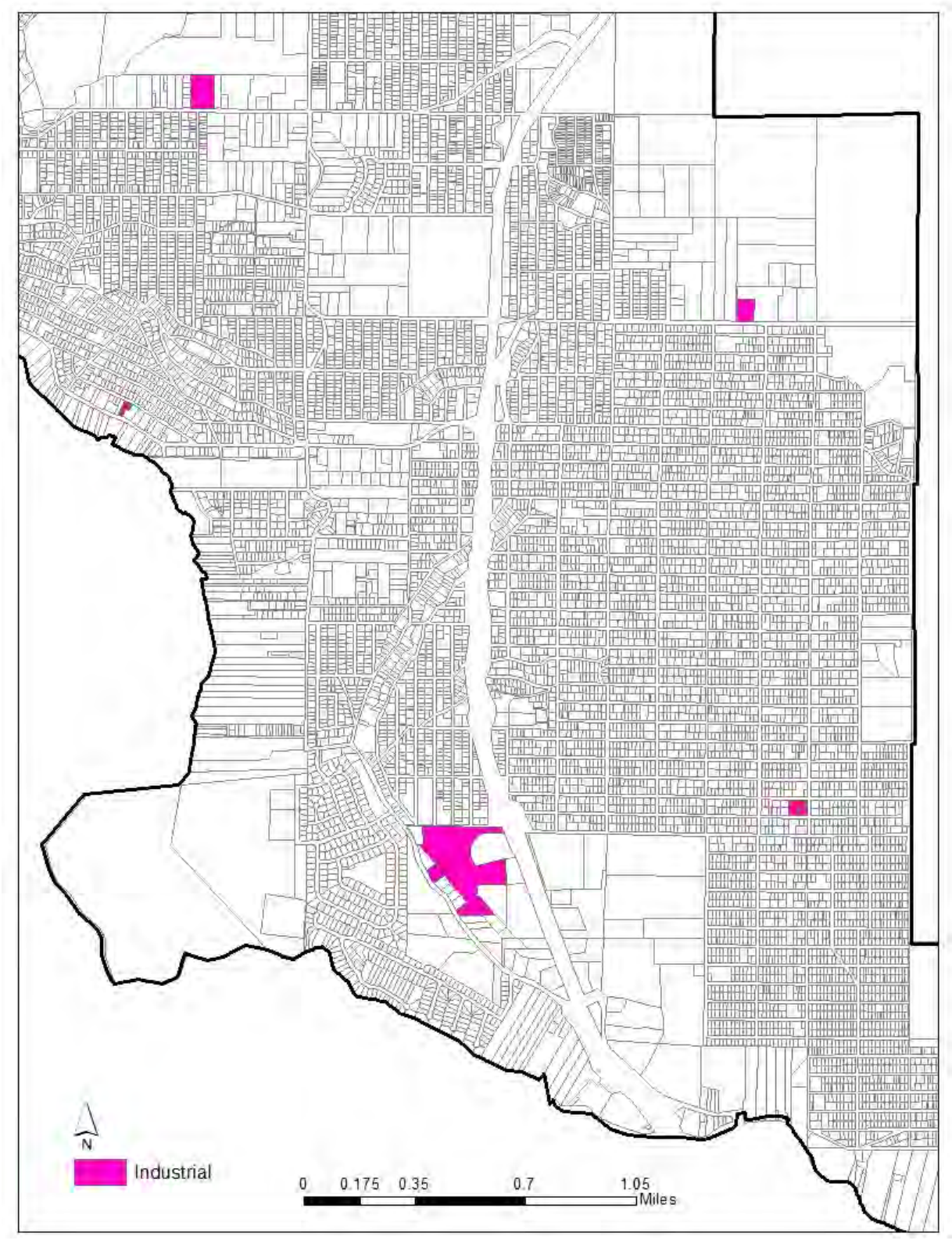
- Hospitals / medical facilities
- Convalescent homes
- Schools
- Churches
- Sensitive wildlife habitat
- Residential Neighborhoods

Sensitive land uses in Clearlake are identified as follows:

- Residential neighborhoods such as Lily Cove, the Avenues, and northern Street network
- Burns Valley Elementary School, Pomo School, and Highlands Academy
- Meadowood Nursing Center, Orchard Park Emeritus Senior Living Center
- St. Helena Hospital and associated centers
- Praises of Zion Baptist Church, Neighborhood Christian Fellowship, among others

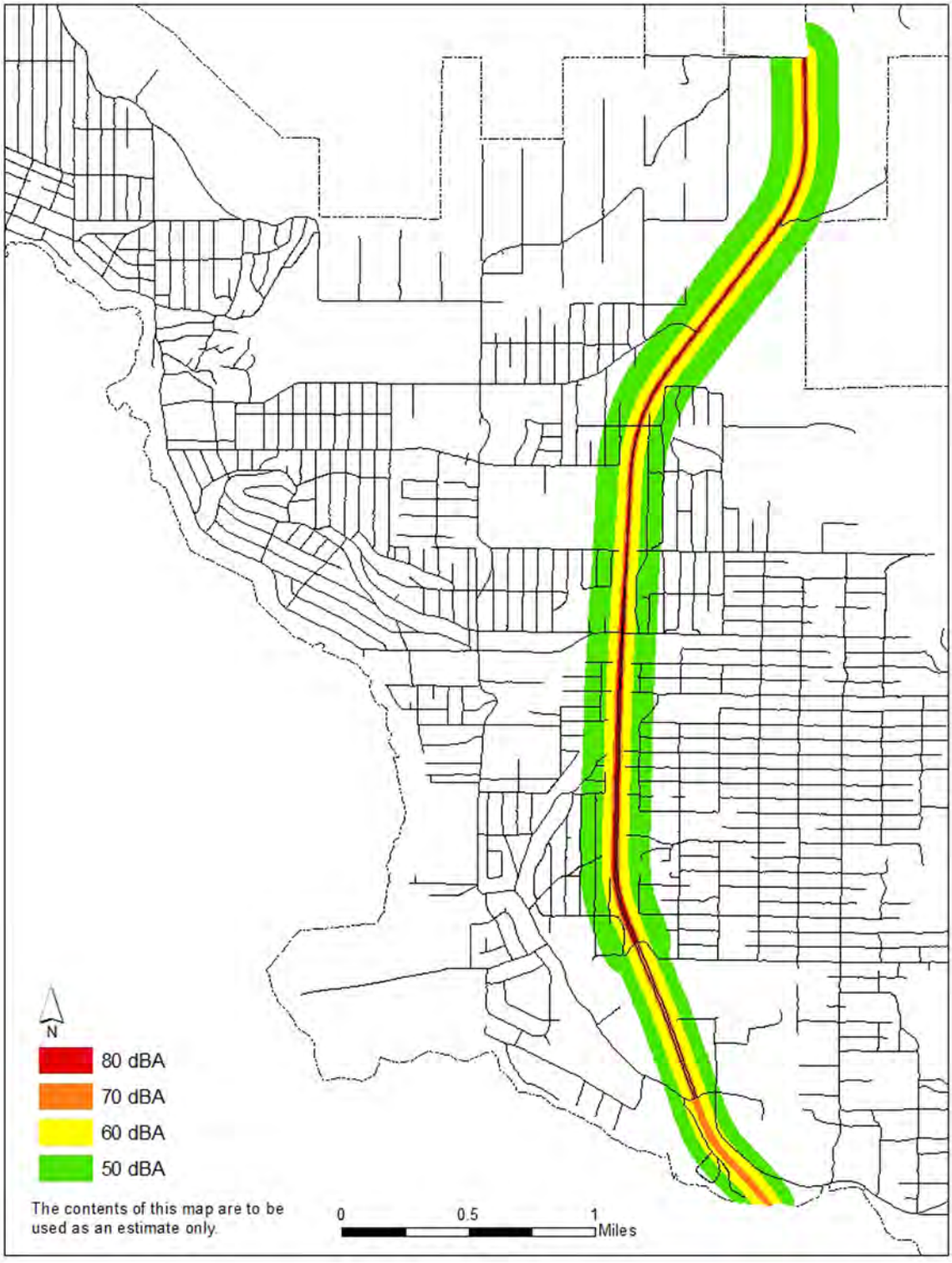
These land uses warrant a softer noise level for a constant or extended period of time. Church services and cemeteries are sensitive to the extended duration of noise associated with traffic or auto body shop activities. Figure 9.3 highlights the sensitive land uses in the City.

Figure 9.1 Stationary Noise Sources



Cal Poly Land Use Inventory, 2012

Figure 9.2 Mobile Noise Sources



Cal Poly Planning Team, FHWA Transportation Noise Model (TNM) 2.5, Caltrans Data Branch

C. EMERGING DIRECTIONS

Existing conditions identify a variety of main noise sources: traffic, animal nuisances, and lake activity. Future development plans should reflect the careful consideration of land use choices and sensitivity demands of such choices. The compatibility of land uses is important to plan for current and future noise issues. Appropriate land uses should be located adjacent to the main traffic corridors of SR 53 and Lakeshore Drive. By grouping commercial uses together, noise levels can be contained to corridors and specific areas.

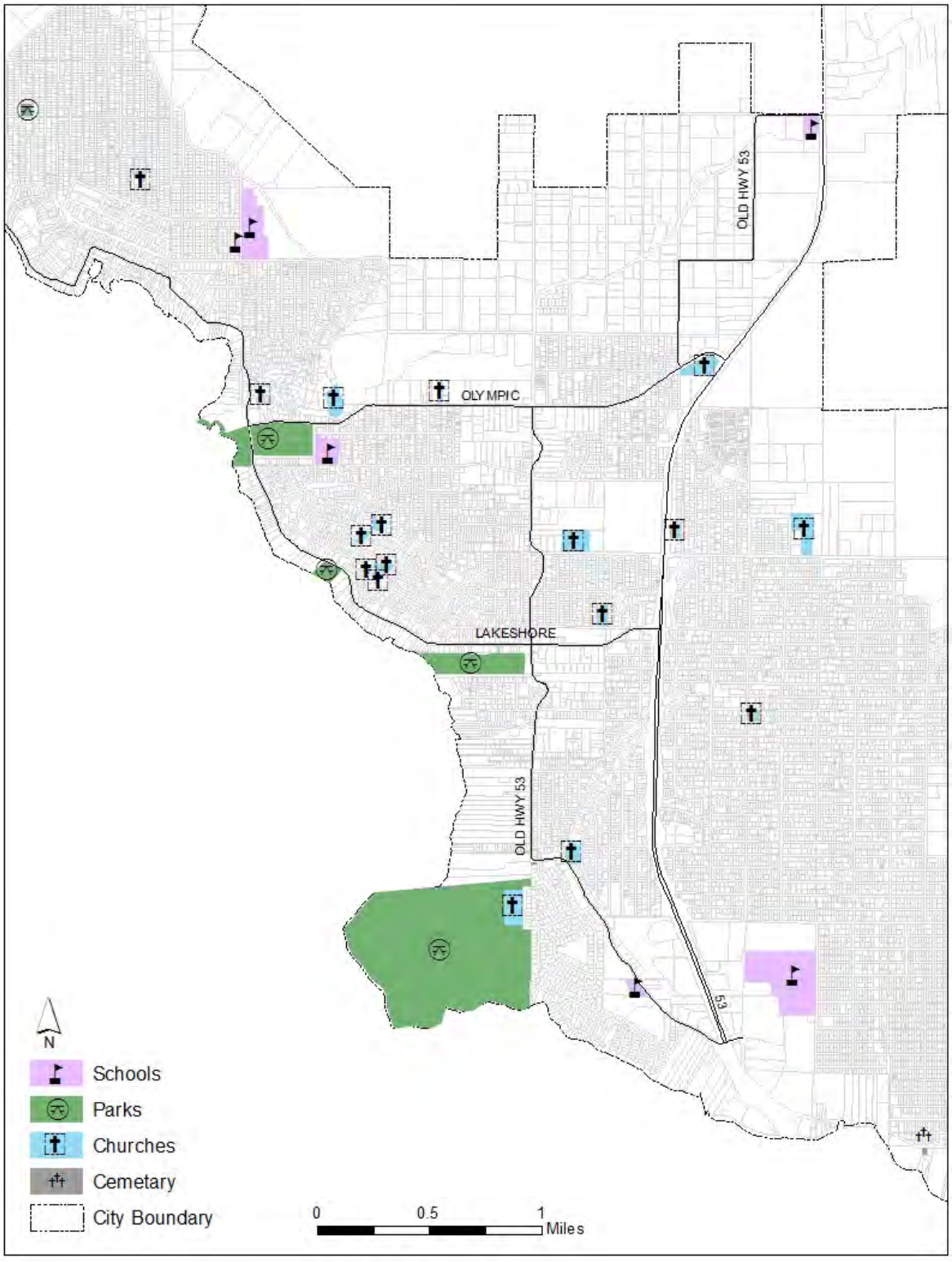
The General Plan recognizes the Lakeshore Drive Corridor Plan as well as various other initiatives to guide Clearlake to its future. The Noise Element aims to coordinate with these plans to mitigate noise levels in the future.

Two community meetings held during preparation of the background report produced the following observations:

- Noise is prominent in the Wal-Mart commercial center as well as the Safeway commercial center.
- Animals, radios, and dirt bikes are perceived as the primary sources of neighborhood noise.
- Some community members identified lake activities as a significant source of noise near waterfront residence properties.

Noise abatement is measured by a change of at least 5 dBA in noise levels, the availability of landscaped berms and sound walls. Open space can also be utilized as a noise buffer. Clearlake's ability to identify and mitigate noise can result in the maintenance of quiet lakeside community neighborhoods and a small town rural character.

Figure 9.3 Noise Sensitive Land Uses



Cal Poly Land Use Inventory, 2012

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