ELEMENT VIII

Public health and safety

VIII. Public Health and Safety

Purpose and Authority

The Public Health and Safety Element has been prepared in compliance with the legislative requirements for the mandatory Safety and Noise elements of the General Plan. The Safety Element became a mandatory part of the General Plan in 1975 when the State Legislature adopted SB 271 (Chapter 1104). The initial legislation focused on the adoption of policies relating to fire safety, flooding, and geologic hazards. In 1984 the State revised the Legislation (AB 2038; Chapter 1009) expanding the list of safety element issues and combining the Safety Element and Seismic Safety Element into a single document. The focus of the Safety Element is to adopt policies that will "... reduce death, injuries, property damage, and the economic and social dislocation resulting from natural hazards."

This element also addresses noise issues. Government Code Section 65302(f), requires that a Noise Element be prepared as part of a community's General Plan to identify and appraise noise problems in the community. The Government Code includes the following requirements for noise elements:

- The 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 roads, railroads and other vehicular sources. It shall also evaluate stationary noise sources, including those associated with industrial and commercial operations.

- Noise contours shall be shown and stated in terms of community noise equivalent level (CNEL) or day-night average level (Ldn). 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.

This element is designed to provide the input necessary to assist the Town of Loomis in achieving balanced planning decisions. It recognizes the importance of the public safety, and the need to integrate safety concerns, including noise concerns, with other local issues.

Safety

This portion of the element addresses the major safety issues of concern in Loomis, including seismic and geologic hazards, flooding, fire hazard, and hazardous materials. Goals and policies addressing these issues follow the description of each. Detailed background information on the issues addressed in this Safety Element can be found in Section 7 of the Technical Background Report.

Critical facilities are those that must remain operational after an emergency event, in order for the community to respond effectively. Examples of critical facilities include hospitals, fire stations, electrical power plants, and community facilities. Schools are often important staging and evacuation areas. There are relatively few critical facilities in Loomis; the nearest hospitals, for example, are in Roseville and Auburn. Figure 8-1 shows the location of critical facilities in Loomis.

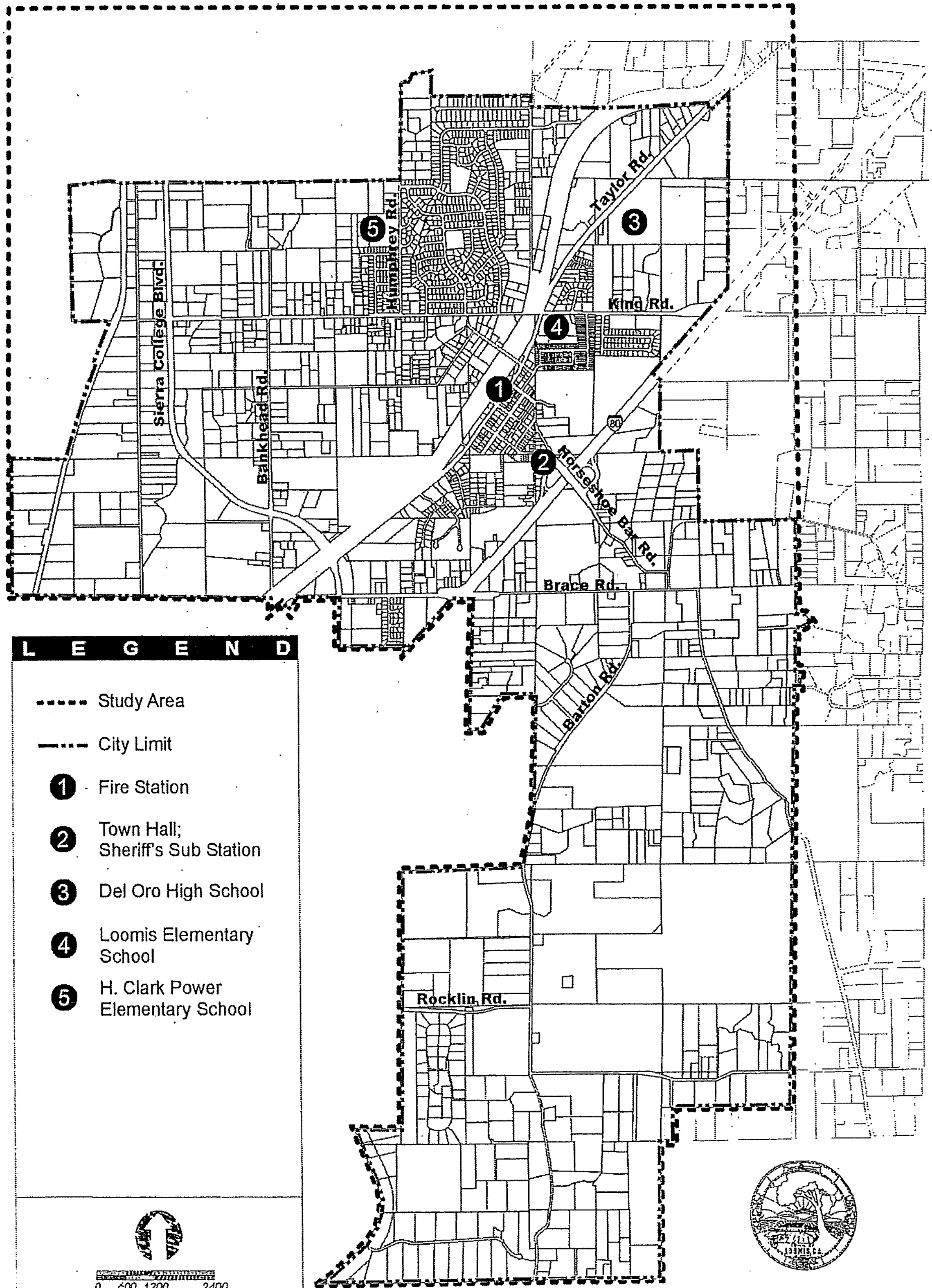


Figure 8-1
Critical Facilities

July 2001

A. Seismic and Geologic Hazards

The information in this section provides a preliminary indication of the degree of potential risk associated with various seismic and geologic hazards. This assessment should be used as a general guide to indicate when further study may be needed. It should not be used as the sole basis for project approval or denial.

Regional Faulting

The major fault systems in the region tend to occur along the interface between differing geologic materials. The nearest major fault system near Loomis is the Foothills Fault System, which traverses Amador, El Dorado, and Placer counties in a path more than 350 kilometers long and several kilometers wide. Two segments of this system are relatively close to Loomis: the segment of the Bear Mountain Fault Zone (Spenceville Fault) between Folsom and Auburn, and the Melones Fault Zone, about 15 miles to the east.

No active faults are known to exist in Placer County, and no Alquist-Priolo Special Studies Zones are designated in the County. The nearest known active fault that has been mapped is the Dunnigan Hills Fault, well to the northwest of the Town across the Central Valley. However, investigations performed for the proposed Auburn Dam indicate that the Foothill Fault System may be undergoing reactivation in the vicinity of Folsom Lake and may be capable of producing a magnitude 6.5 Richter Scale event (Woodward-Clyde Associates; Tierra Engineering). In 1975, a magnitude 5.7 earthquake was recorded on the Cleveland Hills Fault within the Foothill Fault System near Oroville, in a region thought at the time to be relatively free of seismic events of this severity. Consequently, even though the Bear Mountain and Melones faults have not ruptured in the past 200 years, they are considered potentially active. The last seismic event recorded in the area with a magnitude of 4.0 or greater was in 1908, with an epicenter between Auburn and Folsom, possibly associated with the Bear Mountain Fault.

Within the planning area, an inactive inferred fault was mapped across the area's southern boundary (Livingston, 1974). The potential for seismic events originating from this fault is considered low.

Seismic Hazards

The underlying geologic foundation of the region is a relatively unbroken granitic batholith that extends along the Sierra Nevada. During seismic events, this material tends to react as a uniform block, which has the effect of reducing ground movement, acceleration, and the likelihood of ground rupture. Consequently, the California Division of Mines and Geology (CDMG) classifies the region as a low severity earthquake area. Typical seismic hazards include surface rupture, groundshaking, and various types of ground failure. The potential for these hazards to exist in the planning area is described below.

- **Surface rupture.** Surface rupture during earthquakes is typically limited to those areas immediately adjacent to the fault on which the event is occurring. Because the planning area contains no active faults, the likelihood of surface rupture in the area is considered low.

- **Groundshaking.** The most serious direct earthquake hazard is the damage or collapse of buildings caused by groundshaking, which, in addition to property damage, can cause injury or death.

Groundshaking is the vibration that radiates from the epicenter of an earthquake. The severity of groundshaking and its potential to cause damage to buildings is determined by several factors:

- The nature of the underlying soil and geology;
- The location of the epicenter of the earthquake;
- The duration and character of the ground motion;
- The structural characteristics of a building; and
- The quality of workmanship and materials used in buildings.

Groundshaking is the primary seismic concern for Loomis. Portions of Loomis are located on alluvial deposits, which can increase the potential for groundshaking damage. As earthquake waves pass from more dense rock to less dense alluvial material, they tend to reduce velocity, but increase in amplitude. Ground motion lasts longer on loose, water-saturated materials than on solid rock. As a result, structures located on these types of materials may suffer greater damage. "Poor ground" can be a greater hazard for structures than close proximity to the fault or the earthquake's epicenter. Figure 7-2 in the General Plan Update Technical Background Report shows the geology of the area. The potential for groundshaking may be considered highest on the alluvial deposits along the creeks and ravines in the northern portion of Loomis.

Groundshaking is described in terms of ground acceleration of gravity or through the use of the Modified Mercalli Scale, which is a more descriptive method involving 12 levels of intensity denoted by Roman numerals (Table 8-1). Modified Mercalli intensities range from I (not felt), to XII (total damage). Based on information from the California Division of Mines and Geology (Robert H. Sydnor, Senior Engineering Geologist, RG 3267, CHG 6, CEG 968, CPG 4496), the maximum probable groundshaking within the planning area that would be expected is VI on the Modified Mercalli Scale. Typical structural damage from groundshaking of this magnitude would be minimal if dwellings are constructed in compliance with applicable Uniform Building Code (UBC) requirements. The typical effects of such groundshaking could include cracked chimneys, moved furniture, and broken glassware inside structures. However, historic records suggest a low probability of these maximum events occurring in Loomis.

Table 8-1 - Modified Mercalli Intensity Scale

Modified Mercalli Intensity	**I**	**II-III**	**IV**	**V**	**VI (Loomis)**	**VII**	**VIII**	**IX**	**X**
Perceived Shaking	Not felt	Weak	Light	Moderate	Strong	Very Strong	Severe	Violent	Extreme
Damage Potential	None	None	None	Very Light	Light	Moderate	Moderate to Heavy	Heavy	Very Heavy
Peak Acceleration (g = gravity)	<0.0017 g	0.0017 - 0.014g	0.014g - 0.039g	0.039g - 0.092g	0.092g - 0.18g	0.18g - 0.34g	0.34g - 0.65g	0.65g - 1.24g	>1.24g
Peak Velocity (cm/sec)	<0.1	0.1 to 1.1	1.1 to 3.4	3.4 to 8.1	8.1 to 16	16 to 31	31 to 60	60 to 116	>116

Source: Robert H. Sydnor, Senior Engineering Geologist, RG 3267, CHG 6, CEG 968, CPG 4496, California Division of Mines and Geology, 2000.

Older buildings constructed before building codes were in effect are most likely to suffer damage in an earthquake. Many of Loomis' buildings are one or two stories high, and of wood frame construction, which is considered relatively resistant to earthquake damage. However, buildings made of unreinforced masonry are highly susceptible to damage from severe groundshaking. Several unreinforced masonry structures currently exist in Loomis, particularly in the downtown area. Some buildings include brick facades, which are highly susceptible to damage (and falling) in the event of an earthquake.

- **Ground failure.** In addition to structural damage caused by groundshaking, there are other ground effects caused by such shaking. These ground failure effects include liquefaction, subsidence, lurch cracking, and lateral spreading. The potential for these hazards to occur in Loomis is discussed below.

- **Liquefaction.** Liquefaction in soils and sediments can occur during earthquake events, when material is temporarily transformed from a solid to a liquid (gelatinous) by increases in interpore pressure. Earthquake-induced liquefaction most often occurs in low-lying areas with soils composed of unconsolidated, saturated, clay-free sands and silts, but can also occur in dry, granular soils or saturated soils with some clay content. Liquefaction also occurs in areas overlain by unconsolidated fill, particularly artificial fill.

  The presence of several unconsolidated and saturated soils throughout the area indicates a moderate liquefaction potential, particularly on the alluvial soils found along the low-lying ravines and creeks (see Figure 8-2).

- **Subsidence.** Subsidence is the compaction of soils and alluvium caused by groundshaking. It occurs irregularly and is largely a function of the underlying soils. Depending on the event, the amount of compaction can vary from a few inches to several feet. In Loomis, the potential for subsidence is greatest in areas underlain by alluvium or other soft water-saturated soils. However, no significant subsidence problems have been identified in the planning area.

- **Lurch cracking and lateral spreading.** Lurch cracking refers to fractures, cracks and fissures produced by groundshaking, and may occur far from an earthquake's epicenter. Lateral spreading is the horizontal movement of soil toward an open face of a stream bank or the side of a levee. Steep-sided artificial fill embankments are most susceptible to damage. The potential for these hazards is greatest on steep-sided alluvial soils where the groundwater table is high. In Loomis, this would include areas adjacent to Antelope Creek, Secret Ravine, and Sucker Ravine.

Other Geologic Hazards

- **Landslides.** Landslides may be triggered by oversaturated soils (after heavy rains) or by earthquakes. Landslide potential is highest in steeply-sloped areas, particularly those areas underlain with saturated and unconsolidated soil. The steepest slopes in Loomis are those west of Antelope Creek, just west of Sierra College Boulevard. Some slopes exceed 30% in this area. However, the underlying geology of the area is generally mehrten volcanics and granite, solid foundation materials not highly susceptible to landslides. The southeasternmost portion of the planning area also exhibits locally steep slopes (15-25% slopes are common). Again, the underlying materials are typically stable volcanics or granite, and landslide potential would be minimized to some extent. Most other portions of Loomis are relatively level or gently sloping, and thus not highly susceptible to landslides.

- **Erosion.** Soils in the planning area, some of which are on steep slopes and are loosely textured, generally exhibit moderate erosion potential, particularly when exposed on embankment faces and slopes. The effects of erosion range from nuisance problems, such as increased siltation in storm drains, to extreme cases where watercourses are downcut and gullies develop that can eventually undermine adjacent structures or vegetation.

- **Seiche.** Seiches are earthquake-generated waves within enclosed or restricted bodies of water. However, because no sizable lakes or reservoirs are present in the planning area, there are no seiche hazards in the Town of Loomis.

B. Flood Hazards

Effects of Flooding

Flooding can cause widespread damage to affected areas. Buildings and vehicles can be damaged or destroyed, while smaller objects can be buried in flood-deposited sediments. Floods can also cause drowning or isolation of people or animals. In addition, floodwaters can break utility lines, interrupting services and potentially affecting health and safety, particularly in the case of broken sewer or gas lines.

The secondary effects of flooding are due to standing water, which can result in crop damage, septic tank failure, and water well contamination. Standing water can also damage roads, foundations, and electrical circuits.

FEMA 100-Year Flood Hazard

Flooding has historically been a relatively minor hazard in the Loomis area, primarily due to its relatively elevated location within the Dry Creek watershed. The lower portions of the Dry Creek watershed have historically been hit hard by flooding, particularly in the Roseville area (where tributaries of Dry Creek converge) and in the flatlands in the Rio Linda area.

The National Flood Insurance Study of the Federal Emergency Management Agency (FEMA) produced the Flood Insurance Rate Map (FIRM) for the Town in 1998. The map identifies special flood hazard areas in the community, focusing on areas that could be inundated in the event of a 100-year flood. (Statistically, a 100-year flood has a 1% chance of occurring in any given year, and has a 24% chance of occurring during the period of a typical 30-year mortgage.) The map shows the locations of 100-year and 500-year flood plains in the community, which are generally along Secret Ravine, Antelope Creek, Sucker Ravine, and their tributaries. Figure 8-2 shows the FEMA 100-year flood zone in the community.

Local Flooding Concerns

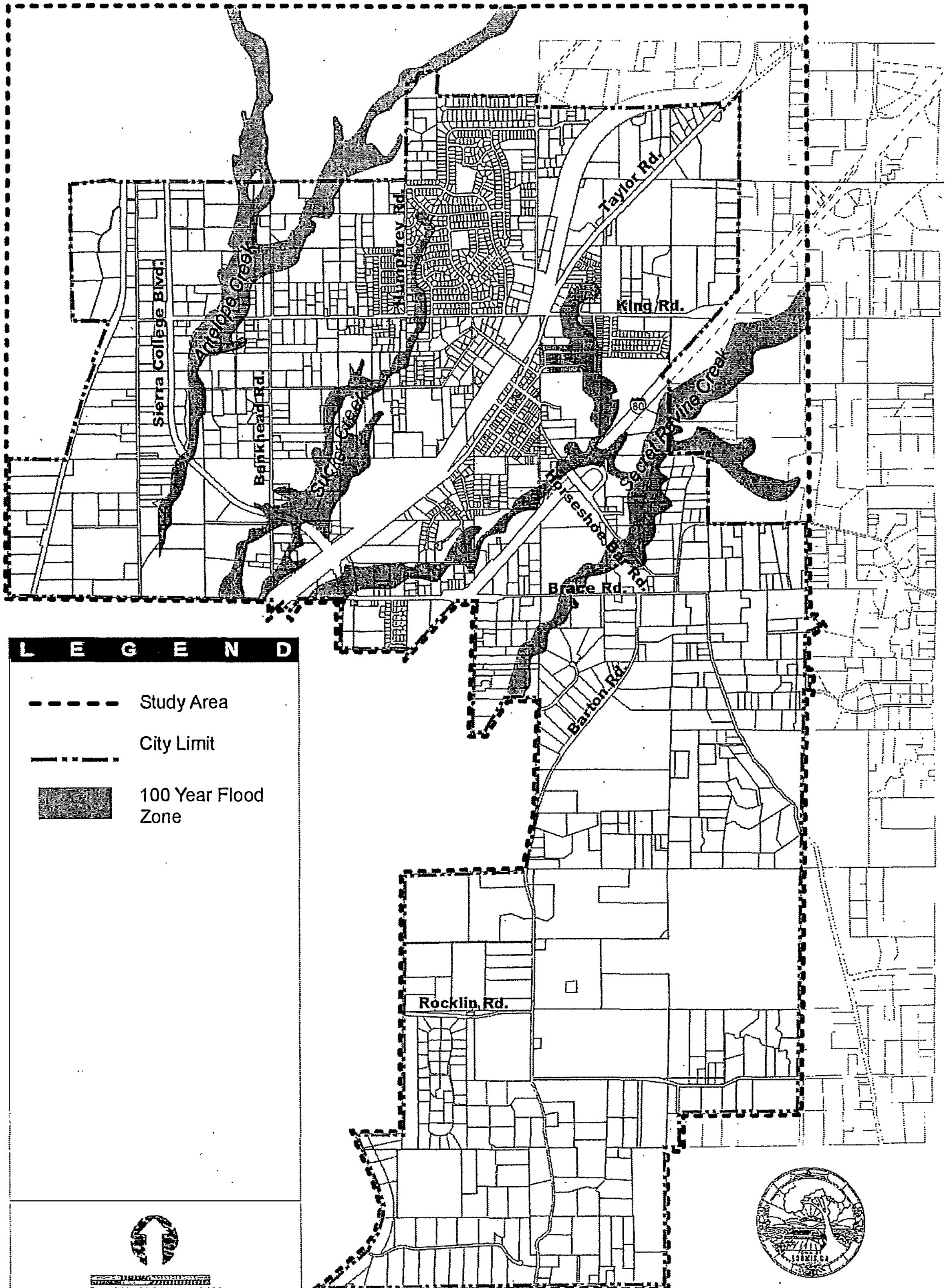
Inadequately-sized culverts and bridges can create impediments to the passage of high water flow in streams and gullies. Undersized infrastructure typically result in short-term back-ups behind the culvert or bridge, with pooling water in such areas, in effect, an unintended detention basin. Areas of potential concern in Loomis could include culverts under Interstate 80; the Horseshoe Bar Road crossing over Secret Ravine; the railroad and Taylor Road crossing of Sucker Ravine; and various crossings of Antelope Creek and its tributaries, at King Road, Sierra College Boulevard, and Del Mar Road. Various culverts and storm drains throughout the Town are also subject to potential flooding in the event that they become clogged with debris during heavy rains.

The Town of Loomis Specific Plan EIR identifies drainage problems associated with the culvert under the southbound freeway ramp of Interstate 80 into a poorly maintained swale near South Walnut Street. Other similar deficiencies are likely elsewhere, though none have been specifically identified in the available literature. During the heavy rain season of 1995, localized flooding was experienced on some low-lying properties near Secret Ravine and Antelope Creek, causing floor damage in some cases. In general, flooding occurred because of downstream blockages within flood channels or culverts.

Flood maintenance is an ongoing problem throughout Placer County. In Loomis, many of the major drainages are located on private property, and the Town generally does not have access to conduct maintenance operations to keep channels clear of debris. There is no clear responsibility regarding maintenance of drainages on private property (Town or property owners), though newer developments are required to include easements to facilitate maintenance. Nevertheless, this does not address existing deficiencies, which are experienced throughout the community.

Dam Inundation

Loomis is not in the dam inundation area for any major stream or river in the region. There are no dams or reservoirs (except small local detention facilities) upstream of Loomis on any tributary of Antelope Creek or Secret Ravine. Loomis is not subject to potential damage from dam inundation.



Town of Loomis

Figure 8-2
FEMA 100-Year Flood Plain

Source: FEMA, June 1998

C. Wildland and Urban Fire Hazard

Loomis faces two types of fire hazards that threaten lives and property: urban and wildland fires. Wildland fires may also result in the loss of natural vegetation, loss of agricultural crops, and soil erosion. The threat posed by each type of fire hazard is described below.

Wildland Fires

The outbreak and spread of wildland fires within the planning area is a potential danger, particularly during the dry summer and fall months. The buildup of understory brush, which under natural conditions would be periodically burned off, provides fuel to result in larger more intensive fires.

Various factors contribute to the intensity and spread of wildland fires: humidity, wind speed and direction, vegetation type, the amount of vegetation (fuel), and topography. Most wildland fires are the result of arson or simple carelessness.

The topography, climate, and vegetation of Loomis area are conducive to the spread of wildland fires. It contains extensive grasslands and oak woodlands in rolling terrain. The area is subject to hot, dry summers, with frequent wind gusts. Fortunately, prolonged summer heat spells often induce the delta breeze, a moist, cooling wind that temporarily reduces the high fire hazard condition common during that time of year.

Although small grass fires are common in the planning area, they have historically been limited in size by prompt emergency response. No major wildland fires that threatened lives and property have been recorded in the Loomis area in recent years.

Urban Fires

Urban fires are primarily those associated with structures and the activities in and around them. Most urban fires are caused by human activity. Over the years, development standards have become more stringent to reduce the frequency and severity of such events. Building codes now require fire walls for adjacent structures. Local ordinances often prohibit the use of fire-prone materials, such as shake-shingle roofs. Electrical standards have also changed to reduce fire risk inside structures. Smoke detectors are now commonly required.

Urban fire hazards are greatest in areas containing older buildings that do not meet current building codes. Loomis contains many such structures, even though the Town requires that such buildings be brought up to code when made aware of such buildings. Many older homes (and barns) in the rural portions of the community still have substandard electrical fixtures and do not otherwise meet code.

Utility facilities also present a potential urban fire hazard. Earthquakes or floods may rupture buried gas lines, while high winds or accidents could cause overhead electric lines to break. Either condition could result in a fire. Catastrophic earthquakes could cause widespread urban fires, as multiple gas and electrical lines could be broken or disrupted. However, the potential for earthquakes of this magnitude striking Loomis is low (see Section 8.2.2, *Seismic Hazards*).

Once an urban fire starts, fast emergency response is critical to ensure that the fire does not spread. Urban fires by their nature occur in areas with a high density of human occupation and property. The threat to life and property is high.

While Loomis has had urban fires, most have been small and easily contained. No catastrophic fires have been recorded in recent history, particularly since emergency response and building codes have been improved.

D. Hazardous Materials

Hazardous materials are defined as those that are a potential threat to human health, having the capacity to cause serious illness or death. This section discusses the types of hazardous materials typically found in the planning area.

Household Products

By far the most common hazardous materials are those found or used in the home. Waste oil is a common hazardous material that is often improperly disposed of and can contaminate surface water through runoff. Other household hazardous wastes (used paint, pesticides, cleaning products and other chemicals) are common and often improperly stored in garages and homes throughout the community. Because of their prevalence and proximity to residents, household products constitute the most pervasive health hazard facing residents of the community.

Mine Tailings

Historic mining operations often left dredge tailings, or discarded rock and material, either near the mine site in the case of dredge or hardrock mining, or washed downstream as a result of upstream hydraulic mining. Dredge mining was common in the 19th century along the creeks in the Loomis area, and dredge tailings can still be found. Hydraulic operations have scarred hillsides in Loomis, one notable example being on the proposed Loomis Hills Estates development site, where a 60-foot high, 1,000-foot long cliff provides evidence of such operations (Town of Loomis, *Sherwood Park Draft EIR* (Loomis Hills), 1998).

Mine tailings can be contaminated with mercury or cyanide, both of which are used in the process of gold refining. However, most gold was not refined in the immediate Loomis area and the potential for such contamination in dredge materials is considered low.

Agricultural Pesticide Use

Loomis includes many agricultural operations. Orchards in particular are often sprayed with various pesticides, which can contaminate the soils. Denuded vegetation can suggest evidence for soil contamination. Potential contaminants can include DDT, lead and arsenic. In such areas, it is prudent to conduct soil testing (and conducting soil clean-up steps, if necessary) before allowing more intensive development.

Asbestos

Asbestos is a highly crumbly material often found in older buildings, typically used as insulation in walls or ceilings. It was formerly popular as an insulating material because it had the desirable characteristic of being fire resistant. However, it can pose a health risk when very small particles become airborne. These dust-like particles can be easily inhaled, where their microscopically sharp structures can puncture tiny air sacs in the lungs, resulting in long-term health problems.

Loomis contains many older structures with the potential to contain asbestos. Pre-1979 construction often included asbestos and it should be assumed that the demolition of older structures in the Town may present this hazard. Proper asbestos abatement and disposal procedures should be undertaken whenever the demolition of older structures is considered.

Hazardous Materials Transport

The Union Pacific Railroad and Interstate 80 are major transcontinental transportation routes that pass through Loomis. Trains and trucks commonly carry a variety of hazardous materials, including gasoline and various crude oil derivatives, and other chemicals known to cause human health problems. When properly contained, these materials present no hazard to the community. But in the event of an accident or derailment, such materials may be released, either in liquid or gas form. In the case of some chemicals (such as chlorine), highly toxic fumes may be carried far from the accident site.

Although standard accident and hazardous materials recovery procedures are enforced by the state and followed by private transportation companies, the Town of Loomis is at relatively high risk because of its location along interstate rail and highway corridors.

Hazardous Waste Management Plan

Counties are required by state law to prepare hazardous waste management plans. Placer County's plan addresses the treatment, storage and disposal of such materials. The primary goal of the plan is to protect public health by promoting the safe use and disposal of hazardous waste. To accomplish this, the plan provides for the reduction of hazardous waste through source reduction, recycling, and on-site handling and treatment methods. Public education and community involvement are key features for achieving this goal.

E. Issues, Goals, Policies and Implementation Measures

Issues

- *The rural nature of the community and presence of large open space parcels increases the Town's risk of wildland and fire hazards at the urban edge.*
- *A number of properties along local creeks have been flooded during winter storms, despite flood preventative measures.*
- *Potential for hazardous material spills.*

Goals

1. To reduce risks associated with natural and man-made hazards through compliance with State and Federal safety programs.
2. To reduce the risks associated with wildland and urban edge fires in the Town's rural areas.
3. To reduce the potential for and damage resulting from storm flooding hazards within the community.

4. To reduce the risks associated with potential seismic activity, including groundshaking, liquefaction, and landslides.

Policies

1. Loomis shall enforce building codes and other Town ordinances having an effect upon fire hazards and fire protection. The Town shall maintain adequate street widths and turning radii to accommodate fire protection equipment. New development shall ensure adequate water pressure and volume for fire fighting.

2. Engineering analysis of new development proposals shall be required in areas with possible soil instability, flooding, earthquake faults, or other hazards, and prohibit development in high danger areas.

3. Loomis shall comply with Placer County's Emergency Response Plan, as well as revise the Town Emergency Plan to address Town-specific issues.

4. No new structures or additions to existing structures shall be permitted in areas identified by the federal Flood Insurance Rate Maps (FIRMs) or the Town Engineer as being subject to innundation in a 100-year or more frequent flood event. Exceptions may be granted for public facilities and utilities. New development shall also be prohibited in the future 100-year flood zone, based on buildout conditions as determined by FEMA and FIRM maps. Development will be required to adhere to Placer County Flood Control District policies and the Dry Creek Watershed Control Plan.

5. New development near stream channels shall be designed so that reduced stream capacity, stream bank erosion, or adverse impacts on habitat values are avoided.

6. Further channelization and/or banking of creeks or streams within the planning area shall be discouraged, unless no other alternative is available to minimize flood risk. Setbacks from flood sources shall be the preferred method of avoiding impacts.

7. Site-specific recommendations of the Town's Drainage Master Plan, upon completion, shall be applied to individual development projects as appropriate.

8. Loomis shall cooperate with Federal, State, and local authorities to ensure that loss due to seismic activity and other natural and man-made disasters is minimized.

9. Loomis shall encourage compliance with State requirements for unreinforced masonry buildings and seismic safety.

10. Loomis shall continue to train and equip Town personnel to cope with emergency disaster situations, including hazardous material incidents.

11. A Street Address Ordinance shall be adopted to assist effective emergency response by requiring adequate street address identification.

12. Application materials for residential subdivisions proposed within or near oak woodlands shall include Wildland fire protection plans showing how vegetation clearance will be maintained around structures while preserving oak trees.

13. Town policies concerning the use, storage and transportation of hazardous materials, and regarding underground or above ground storage tanks, should reflect the Placer County Environmental Health Division and the State Regional Water Quality Control Board policies and requirements.

14. As individual developments are proposed, the Environmental Health specialist responsible for the project will review lists of hazardous materials provided by the applicant as part of the project description to determine consistency with the State Health and Safety Code. A site visit may be necessary to determine compatibility to surrounding areas. Whether the hazardous material impacts of a project are significant shall be decided on a case-by-case basis and depends on:

    - Individual or cumulative physical hazard of material or materials.
    - Amounts of materials onsite, either in use or storage.
    - Proximity of hazardous materials to populated areas and compatibility of materials with neighboring facilities.
    - Federal, State, and local laws, and ordinances, governing storage and use of hazardous materials.
    - Potential for spill or release.
    - Proximity of hazardous materials to receiving waters or other significant environmental resource.

15. The storage, handling and disposal of potentially hazardous waste must be in conformance with the requirements set forth in California Administrative Code, Title 22, Division 4, Ch. 30, and California Health and Safety Code, Division 20, Chapter 6.5.

Implementation Measures

1. Loomis should adopt a Town Emergency Plan, and review it for needed revisions every five years.

2. The Town shall identify and inventory its unreinforced masonry buildings.

3. The Town shall implement a program of retrofitting existing unreinforced masonry buildings. The program shall include:

    - Requirements for upgrading unreinforced masonry buildings.
    - Incorporation of concepts and provisions of the State Code for historic buildings, to provide additional flexibility for preservation of historic buildings while protecting them from significant earthquake damage.
    - A time schedule for enforcement with all upgrading completed during that time.
    - Signs shall be posted and maintained on unreinforced masonry buildings to warn residents of the potential hazard.

4. Appropriate means of economic relief for commercial buildings that are constructed of unreinforced masonry, shall also be considered, such as: preservation of non-conforming zoning rights for in-kind replacement of commercial buildings, and community redevelopment programs for the coordinated upgrading of seismic, economic, and general design characteristics of affected commercial areas.

5. The highest and most current professional standards for seismic design shall be used in the design of Critical, Sensitive and High-Occupancy Facilities, so that the seismic design of the facilities will not become substandard within a few years.

6. The Town Engineer shall establish a central repository for the collection and compilation of geologic and soils engineering information related to faults and fault zone studies, groundwater levels, soils characteristics, susceptibility to landslides and liquefaction, and other data as appropriate.

7. Loomis shall inventory structures damaged by floods as floods occur.

8. The Town shall work with property owners to maintain floodplains critical to the safety of neighboring properties.

9. The Town Engineer shall develop a hazards map of the town, with sufficient detail to be useful for engineering purposes.

10. The Town should monitor bridges, over and underpasses, and walls in the Town public right-of-way to ensure safety.

11. The Town shall require, prior to approval of a project located in a seismic hazard zone, a geotechnical report defining and delineating any seismic hazard.

12. The Town shall develop standards and restrictions such as the limits on the types of allowable development, development intensity/density standards, and subdivision design policies for sites subject to seismically-induced landslides or liquefaction, or potential fault rupture areas for identified active and potentially active faults.

13. The Town shall develop standards and restrictions within identified floodplains or areas subject to inundation. These might include subdivision design, setback requirements, and development intensity/density standards.

14. The Town should work with property owners to clear chronically debris-clogged culverts and channels on an annual basis to minimize upstream flooding potential.

15. A program to require the installation of fire sprinklers in new and existing structures should be considered.

16. An equitable cost recovery program should be designed and implemented to reimburse the Town for emergency response and investigation.

17. A fire safety plan shall be required of all new businesses and multi-family occupancies.

18. The Town Engineer shall establish procedures for processing projects which involve the use, storage, transport, handling and/or disposal of hazardous materials/wastes. These procedures shall include provisions for the involvement of the Department of Environmental Health Services (permits, site plan review, etc.), submittal of additional information (such as a Business Plan, Waste Minimization Plan, risk assessment, etc.) and processing timeframes.

19. All discretionary project applications shall include information involving the proposed use, storage, handling, transport and/or disposal of hazardous materials/wastes and any previous use, storage, handling and/or disposal of hazardous materials/wastes.

20. The Town shall develop a list of land uses or businesses that typically use, store or generate hazardous materials/wastes, to be used as a screening tool during the environmental review process.

21. Emergency preparedness exercises should be conducted at least once every two years, to test and upgrade disaster response plans. Disaster planning scenarios and emergency response plans shall include contingencies for:

    - Seismically-induced collapse of 10 buildings or more, including some essential facilities, and numerous unreinforced masonry buildings;
    - Sporadic ground failure due to liquefaction or landslides, with major disruption of streets and utilities in some areas, and serious damage to homes and businesses;
    - A major release of hazardous materials from a simulated road or rail accident.
    - A major flood event.
    - A major wildland fire.

22. The Town shall adopt an ordinance requiring that State or Federal electric or magnetic exposure levels, if established, are to be followed. In the absence of these exposure standards, no residential structures or residential yards, schools, active parks, or recreational facilities are to be built within the utility corridor right-of-way. In addition, the following setback guidelines adopted by the California Department of Health Services shall be adhered to: 100 feet from 100-110 kV lines; 150 feet from 220-230 kV lines; and 250 feet from 345 kV lines.

Noise

The Noise Element Guidelines provided by the California Governor's Office of Planning and Research require that major noise sources be identified and quantified through the preparation of generalized noise contours for current and projected conditions. Significant noise sources in the Loomis area include traffic and railroad operations. Industrial operations are an additional, but less intrusive, noise source in Loomis, except to those residents located near the few such operations. There are no airports in the area that could be a source of noise.

A. Overview of Noise and Sound Measurement

Noise is usually defined as "unwanted sound." It consists of any sound that may produce physiological or psychological damage and/or interfere with communication, work, rest, recreation, and sleep.

Sound intensity is measured in units called decibels (dB). When this basic unit is adjusted to correct for the relative frequency response of the human ear, the resulting unit is the "A-weighted" decibel (dBA). A-weighting de-emphasizes low frequencies to better correlate with the response of the human ear to sound. The zero on the dBA scale is based on the lowest sound level that the healthy, unimpaired human ear can detect. Unlike linear units (inches or pounds), the decibel scale is logarithmic. When measured on this scale, therefore, sound intensity increases or decreases exponentially with each decibel of change. While 10 decibels is 10 times more intense than one decibel, 20 decibels is 100 times more intense and 30 decibels is 1,000 times more intense. The decibel scale increases as the square of the change in sound pressure energy. A sound as soft as human breathing is about 10 times greater than zero decibels. The decibel system of measuring sound provides us with a simplified relationship between the physical intensity of sound and its perceived loudness to the human ear.

Because of the physical characteristics associated with noise transmission and reception, a doubling of noise energy normally results in about a three dBA increase in noise levels while a 10 dBA increase in noise level is generally required to perceive a doubling of noise. A one to two dBA change in ambient noise levels generally is not audible even to sensitive receptors.

Sound levels corresponding to typical noise sources are provided in Table 8-2. The decibel level of a sound decreases exponentially as the distance from the source of that sound increases. For a single point source, sound level decays approximately six decibels for each doubling of distance from the source. Noise originating from a linear, or "line" source, such as a traffic or rail corridor, will typically decrease by about three decibels for each doubling of distance, provided the surrounding environment is "hard" (free from "soft," sound-absorbing objects such as vegetation). Noise from a line source in an environment that is relatively flat and well-vegetated will decrease by about 4.5 decibels for each doubling of distance.

The time of day when a sound is emitted is an important factor in determining whether or not it is considered a nuisance. Sounds that may be barely noticeable at midday may be seriously disruptive at midnight. A number of measurement scales that attempt to account for this time factor have been developed. Two of the more commonly used scales of this type are the Community Noise Equivalent Level (CNEL) and the day-night sound level (Ldn). The Ldn, which was developed by the U.S. Environmental Protection Agency, is a 24-hour average sound level in which a 10 dBA penalty is added to any sounds occurring between the hours of 10:00 p.m and 7:00 a.m. The CNEL scale, which is used in California Airport Noise Regulations, is similar except that an additional 5 dBA penalty is added for the evening hours from 7:00 p.m. to 10:00 p.m.

Table 8-2 - Relative Loudness of Typical Noise Sources

Relative Loudness	dB(A)	Common Indoor Noise Levels	Common Outdoor Noise Levels
	120	Rock Band	
32	110		Chain Saw at 2 Feet
16	100		Gas Lawnmower at 3 feet
8	90	Food Blender at 3 feet	2-Engine Prop Takeoff (1000')
4	80	Garbage Disposal at 3 Feet	Diesel Truck at 50 feet 1-Engine Prop Takeoff (1000')
2	70	Vacuum Cleaner at 3 feet	Automobile at 50'
1	60	Conversation at 3 feet	Heavy Traffic at 300'
1/2	50	Large Business Office Quiet Office	Quiet Urban Daytime
1/4	40		Quiet Rural Nighttime
1/8	30	Library	
1/16	20		
1/32	10	*Threshold of Hearing*	
0	0		

B. Noise Compatibility Standards

State and Federal Standards

The California Department of Health, Office of Noise Control, has established noise compatibility guidelines for various land uses (Table 8-4). The compatibility table illustrates the range of community noise exposure in terms of what is considered "normally acceptable," "conditionally acceptable," "normally unacceptable," and "clearly unacceptable." For the most sensitive uses, such as single family residences, 60 dBA Ldn is recommended as the maximum normally acceptable level for outdoor areas around the structure, which is the level below which no special sound attenuation measures are required. These guidelines are recommended by the State to assist communities in determining whether or not noise poses a conflict with land development.

The following are other pertinent federal and state noise guidelines:

- Article 4 of the California Administrative Code (California Noise Insulation Standards, Title 25, Chapter 1) requires noise insulation in new hotels, motels, apartment houses, and dwellings other than single-family detached housing to provide an annual average noise level of no more than 45 dBA CNEL. When such structures are located within a 60 dBA CNEL (or greater) noise contour, an acoustical analysis is required to assure that interior levels do not exceed the 45 dBA CNEL annual threshold.

- The Federal Housing Administration establishes a 65 dBA Ldn standard for outdoor activity areas adjoining residential dwellings, and a 45 dBA Ldn standard for the interior of single family residences. If exterior levels are between the 65 dBA Ldn standard and 75 dBA Ldn, acoustical analysis is required to insure that the interior standard is met. Residential development is unacceptable where exterior noise levels exceed 75 dBA Ldn.

Local Standards

Loomis' exterior standard for noise sensitive structures under the General Plan update is 65 dBA Ldn, with an interior standard of 45 dBA Ldn. Table 8-3 illustrates these standards for various noise sensitive land uses, which are more stringent than the FHA standards described above. The standards shown in Table 8-3 are most appropriately applied to land uses adjacent to continuous noise sources, such as roadway traffic noise. However, standards based on 24-hour weighting are not adequate to address certain noise sources, particularly industrial noise sources, which occur infrequently but at potentially higher intensity.

For this reason, the General Plan update includes standards to address noise events of a shorter duration, particularly in rural residential areas that are otherwise normally quiet. These standards, based on State recommendations and shown in Figure 8-4, apply to land uses within close proximity to land uses or other activities that can produce high noise levels of a shorter duration. These could include certain industrial activities, and kennel facilities.

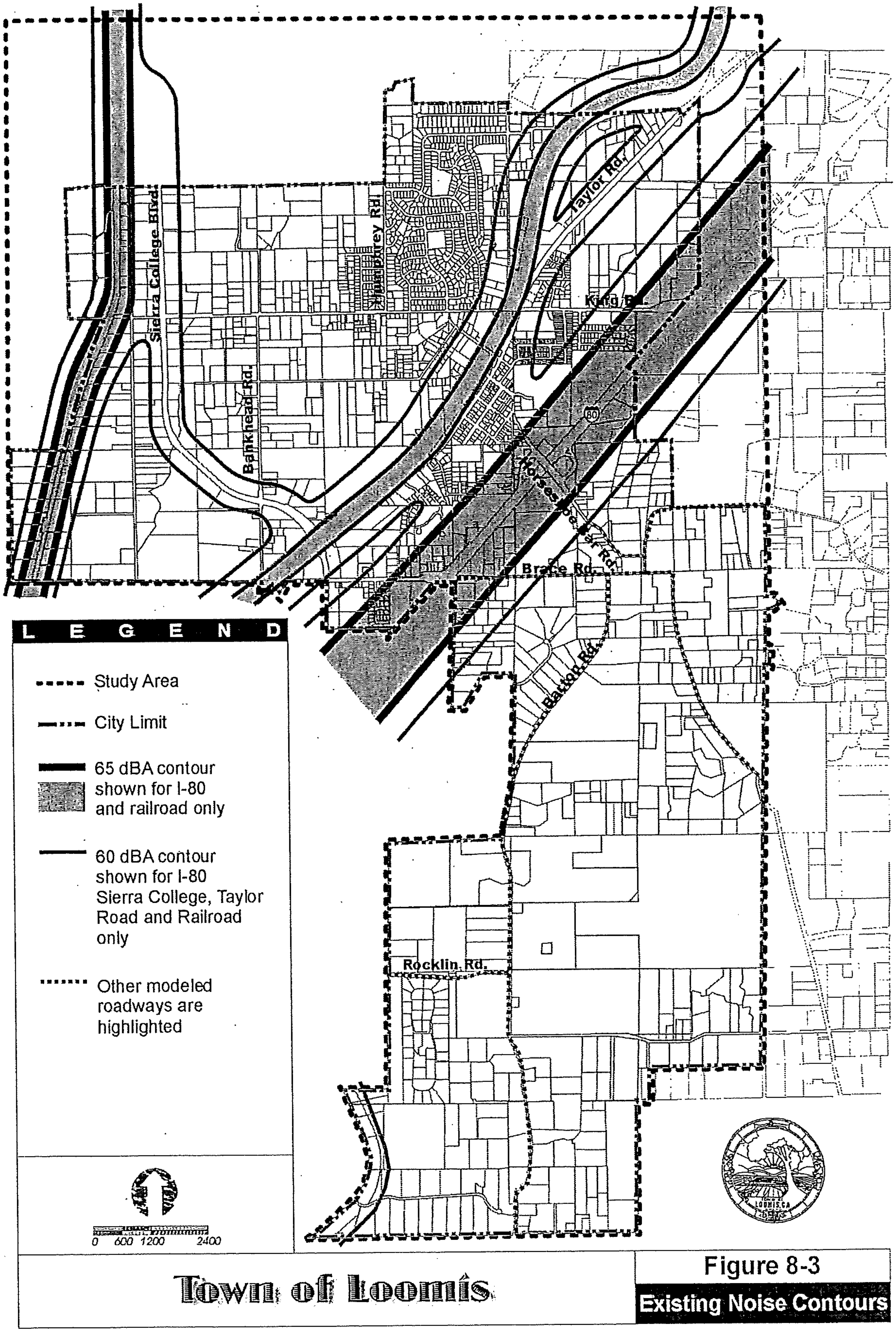
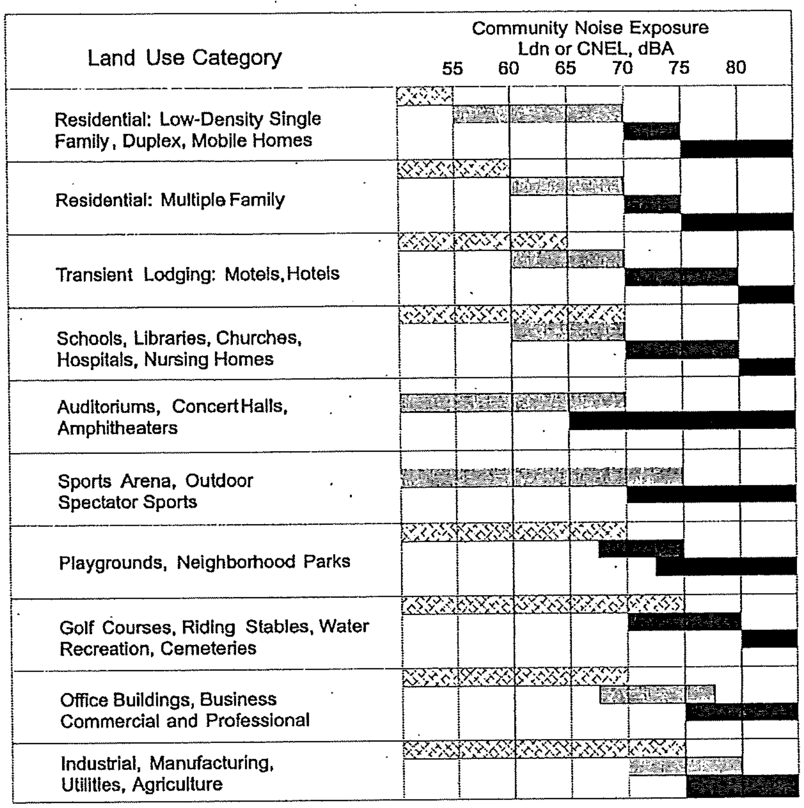


Figure 8-3
Existing Noise Contours

Figure 8-4 - Noise Compatibility Standards



INTERPRETATION

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 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 should generally not be undertaken.

Table 8-3 - Maximum Allowable Noise Exposure

Noise Sensitive Land Use	Outdoor Activity Areas[1]	Interior Spaces	
	dBA L_{dn}	dBA L_{dn}	dBA L_{eq}
Residential	65	45	--
Transient Lodging	65	45	--
Hospitals, Nursing Homes	65	45	--
Theaters, Auditoriums, Music Halls	--	--	35
Churches, Meeting Halls	65	--	40
Office Buildings	--	--	45
Schools, Libraries, Museums	--	--	45
Playgrounds, Neighborhood Parks	70	--	--

[1] Where the location of outdoor activity areas is unknown, the exterior noise levels standard shall be applied to the property line of the receiving land use.
[2] Where it is not possible to reduce noise in outdoor activity areas to 65 dB Ldn/CNEL or less using a practical application of the best-available noise reduction measures, an exterior noise level of up to 70 dB Ldn/CNEL may be allowed provided that available exterior noise level reduction measures have been implemented and interior noise levels are in compliance with this table.

Table 8-4 - Noise Standards for Short Duration Events Near Residential Areas

Noise Sensitive Land Use	Duration of Sound (minutes per hour)	Standard	
		Day/Evening (7am – 10pm) dB	Night (10pm – 7am) dB
All Residential	30 - 60	50	40
	15 - 30	55	45
	5 - 15	60	50
	1 - 5	65	55
	Less than 1 minute	70	60

[1] If the offensive noise contains a steady, audible tone (such as a screech or hum), or is a repetitive noise such as hammering, or contains speech or music, the standard limits shown shall be reduced by 5 dB.
[2] Source: State of California Model Community Noise Control Ordinance.

C. Existing Noise Sources and Sound Levels

Noise modeling techniques and measurements were used to develop generalized Ldn or Leq noise contours in the planning area for existing conditions. This method uses source-specific data including traffic mixture, speed limits and traffic volumes, all of which were obtained from either Caltrans, or Fehr & Peers Associates. The modeling methods used here follow recommendations by the State Office of Noise Control. Noise contours along roadways were modeled using the Federal Highway Administration's Highway Traffic Noise Prediction Model (FHWA-RD-77-108, 1978), with California vehicle noise emission levels (CALVENO) developed by Caltrans.

The resulting noise contours (Figure 8-5) are based on average annual conditions. Local topography and intervening structures at specific locations would alter the contours, which should be considered generalizations. Table 8-5 shows the model results for the distance to the 60, 65 and 70 dBA Ldn contours associated with traffic on major roads traversing the Town.

Table 8-6 serves as a guide when applying traffic noise exposure contour information to areas with varying topography. The table is used by adding the correction factor to the predicted noise level for a given location. The factors included in this table present conservative (worst-case) results, and complex situations should be evaluated by an acoustical consultant when the potential for a significant noise impact exists.

- **Roadways.** Roadway traffic is the primary source of noise in the Loomis community. Interstate 80 carries by far the most traffic through the area, and is consequently the major noise contributor. The 60 dBA Ldn contour from I-80 ranges from 1,650 to 1,750 feet from centerline. However, this distance is likely much less than modeled, because of topographic attenuation (see Table 8-6) and intervening buildings.

  Taylor Road and Sierra College Boulevard are the only other roadways that carry sufficient traffic to produce audible noise at a significant distance. The 60 dBA Ldn contour for these roads typically ranges from 200 to 400 feet, and less where there are intervening structures. Horseshoe Bar Road, King Road and Rocklin Road carry moderate traffic (4,000-5,000 ADT), but not enough to produce far-reaching noise contours. The noise model predicts that the 60 dBA Ldn contour would be less than 100 feet from the center of those roadways. Figure 8-5 and Table 8-5 provide more detailed information.

Table 8-5 - Existing Traffic Noise Levels

Roadway Segment	Traffic (ADT)	Distance to Ldn Contour from Centerline (feet)		
		70 dB	65 dB	60 dB
Interstate 80 Sierra College Blvd. to Horseshoe Bar Rd.	84,000	379	816	1,757
Interstate 80 Horseshoe Bar Rd. to Penryn exit	78,000	360	776	1,672
Sierra College Boulevard Interstate 80 to Taylor Road	12,300	84	181	390
Sierra College Boulevard Taylor Road to Bankhead Road	9,300	70	150	324
Sierra College Boulevard n/o King Road	6,100	53	113	244
Taylor Road e/o Sierra College Blvd.	10,500	58	126	271
Taylor Road s/o King Road	13,800	51	110	238
Horseshoe Bar Road Interstate 80 to Brace Road	5,300	-	40	86
King Road w/o Swetzer Road	5,300	-	40	86
Rocklin Road w/o Barton Road	4,500	-	36	77
Barton Road n/o Rocklin Road	1,700	-	-	40
Laird Road s/o High Cliff Road	1,900	-	-	44

Source: Traffic volumes from Caltrans and Fehr & Peers (1998).

Table 8-6 - Traffic Noise Adjustments for Topography

Topographic Situation	Distance from Roadway Centerline (feet)		
	<200	200-400	>400
Hillside overlooks roadway	no change	+1 dB	+3 dB
Roadway Elevated (>15 feet)	-5 dB	-2 dB	no change
Roadway in cut/below embankment	-5 dB	-5 dB	-5 dB
Dense vegetation (100 feet or more thick)	-5 dB	-5 dB	-5 dB

Source: Brown-Buntin Associates, Inc., 1994.

Field measurements were taken adjacent to each of the roadways shown in Table 8-5 as a means of verifying the modeled noise levels. (1) These 20-minute samples were taken at distances varying from 50 to 100 feet from the roadway centerlines where possible, during a typical weekday non-peak afternoon period. In general, there was some variation from the FHWA model, but typically less than 10 percent (see model runs in attached appendix). This variation can be accounted for by several factors, including the duration of field samples, the time of day that measurements were taken, and the day of the week of sampling. Other variables that might have affected field measurements include the weather, which could affect the expected traffic volumes. In general, the field measurements verified the predicted noise levels along community roadways.

- **Rail Traffic.** The Union Pacific Railroad operates two rail lines through the Town. The westbound rail line parallels Taylor Road, and cuts through the center of the community. The eastbound line travels northward, along the western edge of the planning area, about 1.5 miles west of downtown Loomis.

  Noise measurements were conducted on both lines to determine the contribution of freight and passenger rail operations to the noise environment. The goal of the noise measurements was to determine the typical sound exposure levels (SEL), accounting for travel speed, warning horns, locomotive noise, and other factors contributing to noise generation. The average SEL for the four observed freight trains was 108.7 dB at a distance of 100 feet from the track centerline; for the two passenger trains, the average SEL was 94 dB. Measurements were taken for trains moving in both directions, and taken near roadway crossings (Boulder Ridge Road, west of Del Mar Avenue; and Webb Street, south of King Road) where train whistles were blown.

  According to Union Pacific officials, the number of trains traveling through Loomis fluctuates, but typically includes 8 to 14 trains per day (Union Pacific, 2000). This number is consistent with a 1996 Surface Transportation Board ruling that limits the number of trains passing through Reno, Nevada, to 15 as a condition of the recent Union Pacific/Southern Pacific merger (Mike Furtney, Union Pacific, 1998). For the purpose of this analysis, the worst case (14 trains) is assumed, evenly distributed between east and westbound freight. The analysis also assumes that each train is pulled by an average of 3 to 4 engines, and carries an average of

1 Existing noise conditions were measured through noise monitoring using an ANSI Type II sound level meter (Larson Davis 720). Sound levels were recorded on November 9, 1999 along the roadways shown in Table 8-5. Noise monitoring at rail and industrial facilities was conducted with the same equipment.

about 100 cars. About half the trains traverse the community at night, with whistles blown at all at-grade crossings. The average train speed is estimated to be about 50 miles per hour.

Amtrak operates two eastbound and two westbound passenger trains daily that pass through Loomis. All four passenger trains pass through the Town during the day or early evening.

To determine the distance to noise contours, it is necessary to calculate the Ldn for typical rail operations. This is accomplished by using the recorded SEL values and the known number of trains. The Ldn may be calculated as follows:

$$Ldn = SEL + 10\log N - 49.4 \text{ dB, where:}$$

SEL is the mean SEL of the event, N is the sum of the number of day and evening trains per day plus 10 times the number of nighttime (10pm to 7 am) trains per day, and 49.4 is ten times the logarithm of the number of seconds per day. Based on this information, the calculated noise contour distances from each rail line are shown in Table 8-7. These contours are depicted graphically in Figure 8-5. It should be noted that nearly all of the rail noise is a result of freight traffic. The amount of noise contributed by passenger trains is considered negligible.

Table 8-7 - Approximate Distance to Existing Rail Noise Contours

Train Source	Recorded SEL	Ldn, at 100 feet	Distance to Ldn contour (feet)		
			70	*65*	*60*
Union Pacific (freight)	108.7	75.2	-	-	-
Amtrak (passenger)	94.0	47.6	-	-	-
Combined Ldn	**n/a**	**75.2**	**223**	**480**	**1,035**

Assumes 7 freight and 2 passenger trains in each direction daily. 3.5 freight and no passenger trains at night. SEL recorded with noise meter at crossings at Boulder Ridge Road and Webb Street, with each train blowing its whistle during the crossing.

- **Stationary Noise Sources.** Industrial and commercial operations can be significant sources of noise, depending on the type and hours of operation. Stationary noise sources of concern typically include generators, pumps, air compressors, outdoor speakers, motors, heavy equipment and similar machinery. These are usually often associated with trucking companies, tire shops, auto mechanic shops, metal shops, shopping centers, drive-up windows, car washes, loading docks, gravel operations, athletic fields, and electric generating stations.

  Industrial Operations. In Loomis, loading docks are the most commonly cited stationary noise nuisance. Brown-Buntin Associates estimated that typical loading dock operations generate a noise level of 60 dB Leq at a distance of 50 feet for a busy one-hour period (ESA, Turtle Island Draft EIR, 1996). This noise level includes tractor-trailer truck traffic arriving, departing and idling.

  Many facilities of this type exist in Loomis, particularly within heavy commercial or industrial areas west of Taylor Road, particularly north of King Road. Areas where residential uses abut industrial uses are particularly susceptible to loading dock noise. The most prominent examples of this in Loomis include the homes along Kathy Way, which are located just west of an extensive industrial area, and homes near Brace Road, between Interstate 80 and Sierra College Boulevard.

A 1999 acoustical study for a proposed industrial facility at the corner of Swetzer Road and Jetton Lane concluded that the primary sources of noise would be loading operations and associated truck traffic (Western Planning and Engineering, 1999). Such operations (usually about 20 minutes in duration, occurring infrequently throughout the day) would produce an Leq of 50 dBA within 150 feet of the operations. Noise resulting from operations within such a facility would have a lesser impact on neighboring areas.

It should be noted that noise at individual facilities can vary greatly depending on the nature of the facility. It is not possible to characterize all facilities based on what is experienced at a few locations. Unlike roadway noise, which is a continuous noise source that can be accurately modeled, it is not possible to develop meaningful noise contours that could provide useful planning tools in the context of a Noise Element. Instead, it is more appropriate to identify areas where such facilities either currently exist or are likely to in the future. Generally speaking, these areas include land designated for industrial uses, typically near residential areas. The standards shown in Table 8-4 (which address short-term noise events) should be used to determine the compatibility between individual facilities and nearby homes. Please refer to Figure 8-5 for the location of where such standards are most appropriately employed.

Noise Monitoring. Additional noise monitoring was conducted in February 2000 at several locations near other industrial facilities in the community, including the lumber manufacturing plant along Taylor Road and at several locations along Swetzer Road. Noise monitoring was conducted as far as possible from the roadways themselves, owing to the limitations of the site. Typically, monitoring stations were from 50 to 150 feet from the nearest roadways. In general, ambient roadway noise dominated the measurements, particularly for locations along Taylor Road, particularly near Interstate 80. Swetzer Road carries substantially less traffic than either Taylor Road or Interstate 80, and thus noise reading along that roadway provide a generally better reflection of adjacent industrial activities. However, a Union Pacific rail line runs parallel to Swetzer Road. Although no trains passed during noise sampling, it is reasonable to conclude that passing trains would dominate the noise environment at this location.

In general, the results of noise monitoring at industrial locations were inconclusive. Truck activity associated with industrial operations appeared to be the greatest contributing factor to the noise environment. Ambient noise levels of 50 to 55 dBA Leq were recorded at all locations along Swetzer Road. Along Taylor Road, ambient noise levels were typically 60-65 dBA Leq. The variation can in part be accounted for local conditions, the varying proximity of monitoring locations to roadways, and activities on the sites. No unusual noise sources were noted or recorded during monitoring activities. Truck activities at each site, including braking and horn noises, appeared to be the primary contributors to the onsite noise environment.

It should be noted that the Town cannot reasonably model or characterize all industrial facilities in the community within the context of the Noise Element. There is too much variation from site to site to provide a meaningful analysis of this issue. Instead, the Noise Element provides the direction for the locations where detailed acoustical studies should be conducted (see Figure 8-5). The following paragraphs present the results of other noise studies at industrial facilities, intended in part to corroborate the information presented for facilities in Loomis.

Corroborative Studies. In other detailed studies conducted for industrial facilities near major roadways, the results have been similar. For example, continuous noise sampling was conducted over a two-day period for a 1999 study of an equipment rental yard near U.S. 101 in Ventura County (Quinn Noise Study, Rincon Consultants, 1999). That study found that the ambient hourly Leq was relatively stable during the daytime hours of 6:00 am to 7:00 pm, ranging from 65.3 to 67.1 dBA. Sound levels gradually dropped during the evening hours from a high of 64.6 dBA during the 7:00 pm hour to 63.2 in the 9:00 pm hour, and continued to drop during the nighttime hours to a low of 57.0 dBA during the 3:00 am hour. This is similar to what might be experienced within several hundred feet of Interstate 80 in Loomis.

The noise generation of concern at most industrial facilities is the loading of and pass-by through of heavy equipment delivery trucks. In the Quinn study, measurements of a typical heavy-duty truck that would be used as a delivery vehicle showed the sound level during idling was 70.3 dBA at 25 feet from the centerline of the source, dropping to about 58 dBA at 100 feet from the source. This is less than the ambient background noise levels at the Quinn site location, which suggests roadway noise was a greater concern than industrial noise. That study presents a similar condition to what might be expected at industrial facilities near Taylor Road or Interstate 80.

Other Stationary Noise Sources. Several other facilities in the community may also present stationary noise. Such facilities include dog kennels, commercial operations, high school football games, and other public gathering involving music or loudspeakers. A 1999 acoustical study for a proposed dog kennel at 3994 Del Mar Avenue found barking dogs at that facility would produce a noise level of about 51.5 dB at the nearest residence (a distance of about 400 feet). Based on the standards shown in Table 8-4, dog barking at this location was found to exceed the 50 dB standard, and mitigation was recommended (1-5 minute duration, with a 5 dB penalty for the repetitive quality of the barking).

Other dog kennels in the community would likely have similar noise characteristics. However, because of flexibility in land use controls, it is impossible to predict where other kennels may locate in the future. Thus, it is impossible to produce meaningful noise contours for this activity.

High school football games and other activities (such as band practice) are occasionally staged at the Del Oro High School football stadium. The most adverse noise impacts are experienced during the fall months because of football season. Because events generally occur in the evening, between 7:00 pm and midnight, and attract large crowds, the impacts from this type of event are expected to be significant. Noise could be generated during these events from multiple sources at varying degrees throughout the season and throughout the duration of each event. Examples of these sources include crowd participation, music being played by the band, air horns and the announcement of the event over the loud speaker.

To estimate the noise impacts of a stadium in the area, a noise survey was conducted by Brown-Buntin and Associates, in 1988 and 1992, at three high school stadiums in Bakersfield. The measurements were taken at a distance of 400 feet from the center of the stadium. Table 8-8 shows the average noise levels from the three Bakersfield stadiums at the reference distance of 400 feet. All of the stadiums had playing fields at the same elevation as the surrounding ground with bleachers. An assumption that there is a 6 dB reduction for every doubling of distance from a point source of noise was made and this information was interpreted to establish the noise contour lines for the stadium. Based on this data, Table 8-9 shows the estimated noise contours around the stadium. In general, only residential areas within 537 feet of the stadium experience noise levels that exceed the Town's 60 dBA Ldn standard.

Table 8-8 - Reference Noise Levels At 400 Feet From Typical Football Stadiums

Leq	L_{50}	L_{25}	$L_{1.7}$	L_{max}
63	61	64	71	75

Source: Brown-Buntin Associates, Inc.; measurements near West High School, Bakersfield High School, and Garces High School stadiums, 1988, 1992, as cited in DEIR New Ceres High School Site Acquisition and Development Project, Michael Paoli and Associates.

Table 8-9 - Estimated Distance to Noise Contours of Del Oro High School Football Stadium

Daily Noise Level (Ldn)	Distance
L_{dn} – 60 dBA	537 feet
L_{dn} – 55 dBA	950 feet

Modeled, based on 63 dBA Leq cited in the previous table.

- **Sensitive Receptors.** Noise exposure goals for various types of land uses reflect the varying noise sensitivities associated with those uses. Residences, hospitals, schools, guest lodging, libraries, churches and parks are most sensitive to noise intrusion and therefore have more stringent noise exposure targets than manufacturing or agricultural uses that are not subject to such impacts as sleep disturbance.

The relative sensitivity of various land uses is illustrated in the state's noise compatibility guidelines, shown previously in Figure 8-4.

Community Noise Survey. Appendix A of the *Guidelines For the Preparation and Content of the Noise Element of the General Plan* requests that a community noise survey be included as part of the element. The Guidelines do not specify the form of the survey. Typically, when a "survey" is included in a Noise Element, it generally means that the existing noise environment of the community has been characterized in broad terms. Sample noise measurements for the various noise sources affecting a community also help fulfill the intent of the community noise survey. In this Noise Element, noise measurements have been conducted for road, rail and stationary noise sources as discussed in previous portions of this element.

In addition, a Noise Element can contain a brief record of recent complaints or known noise nuisances that affect the community. In general, the primary noise issues cited by the community in workshops for the General Plan update are Interstate 80 and the rail lines (see the Background Technical Report). Industrial and other stationary noise sources have historically been cited by community members, typically through occasional complaints to the Town. As a recent example, an acoustical analysis was performed for a proposed expansion of a dog kennel (All Pets Boarding Kennels) on Del Mar Avenue, in part because of community concerns. Other acoustical analyses for various facilities have been performed for similar reasons. Industrial facilities that have been noted by various members of the community as potential noise concerns include the Pool Diggers Excavation Company (3348 Swetzer Court) and the proposed PrePlastics facility at the corner of Swetzer Road and Jetton Lane. In general, the industrial facilities along the Swetzer Road area have been noted as a potential noise source by the community. Similarly, some of the older industrial facilities along Taylor Road, including the lumber manufacturing plant along that roadway, have been noted as community concerns.

D. Future Noise Levels

Future noise levels in the community are based on an anticipated increase of traffic and rail operations, as well as industrial noise or nuisance noise that may result from land development in the community. Traffic increases may be predicted based on cumulative buildout of the Town and surrounding communities. Please refer to the Circulation Element for this information. Increases in rail operations are based on communication with rail officials at Union Pacific and Amtrak. Future industrial-related noise would be more difficult to predict, because not all industrial uses produce substantial noise. In some cases, non-industrial uses could produce nuisance noise that could affect nearby noise-sensitive uses, typically homes. The likely noise levels from each noise source is discussed below.

- **Roadways.** Continued land development in Loomis and neighboring communities will result in traffic increases on major roadways. Such increases will result in increased noise levels on area roadways. As is currently the case, Interstate 80 would be by far the greatest contributor to overall roadway noise in the community. However, much of this increase may be attributed to future development outside the community, especially in the cases of Interstate 80 and Sierra College Boulevard. Assuming no barrier attenuation, areas within about 0.4 miles of the freeway would be subject to noise levels in excess of 60 dBA Ldn without mitigation. Areas within about 0.2 miles of Sierra College Boulevard would also be subject to noise levels that exceed the adopted standard. Table 8-10 and Figure 8-5 show projected noise levels and contours within the Town, based on projected buildout under the Land Use Element.

- **Rail traffic.** The Union Pacific Railroad currently has no plans for expanding its existing facilities. However, the number of rail operations is likely to increase. Based on recent input from Union Pacific officials, by 2020 the number of daily train operations are anticipated to increase from the current 8 to 14 trains to as many as 14 to 24. About 5 to 8 of these trains (roughly one-third) would operate during nighttime hours (10pm to 7am). This analysis assumes the worst case, that is 24 trains, with 8 at night, or 12 trains (4 at night) in each direction. The composition of future trains would be similar to what currently exists, about 3 to 4 engines with an average of 100 freight cars. Because the composition of freight trains would remain similar to existing trains, measured SEL for existing trains can be used to estimate future noise levels along rail lines.

  Amtrak has not indicated any expanded service plans for this rail corridor. However, to account for a possible expansion of passenger train service, this analysis assumes that two additional trains may use the rail line, one of which could operate at night. This would bring the total number of operations to six trains (three in each direction), five of which would pass through the Town during the day or early evening.

Table 8-10 - Projected Traffic Noise Levels at Regional Cumulative Buildout

Roadway Segment	Traffic (ADT)	Distance to Ldn Contour from Centerline (feet)		
		70 dB	65 dB	60 dB
Interstate 80 Sierra College Blvd to Horseshoe Bar Rd.	132,000	512	1,102	2,375
Interstate 80 Horseshoe Bar Rd. to Penryn exit	119,900	480	1,034	2,227
Sierra College Boulevard Interstate 80 to Taylor Road	47,300	206	444	957
Sierra College Boulevard Taylor Road to Bankhead Road	34,800	168	362	780
Sierra College Boulevard n/o King Road	24,900	134	290	624
Sierra College Boulevard Bankhead Road to King Road	18,700	111	239	516
Taylor Road e/o Sierra College Blvd.	23,100	99	213	458
Taylor Road s/o King Road	17,800	61	131	282
Taylor Road e/o King Road	11,700	46	99	213
Horseshoe Bar Road Interstate 80 to Brace Road	17,000	40	87	188
King Road w/o Swetzer Road	12,000	32	69	149
Rocklin Road w/o Barton Road	18,300	42	92	197
Barton Road n/o Rocklin Road	7,200	-	49	106
Laird Road s/o High Cliff Road	4,800	-	38	81

Source: Projected traffic volumes from Caltrans and Fehr & Peers (1999); see Appendix for model runs. Includes the effects of regional cumulative development in neighboring communities.

Based on the methodology to calculate existing rail noise, the calculated future noise contour distances from each rail line are shown in Table 8-11. These contours are depicted graphically in Figure 8-5. It should be noted that nearly all of the rail noise will be a result of freight traffic. The noise contributed by passenger trains is considered negligible.

It should also be noted that a substantial noise increase is not anticipated, even though the number of future operations is expected to increase substantially. This is because the number of nighttime operations is not expected to increase significantly over existing numbers. Nighttime operations are heavily weighted in the calculation of rail noise levels.

Table 8-11 - Approximate Distance to Future Rail Noise Contours

Train Source	Recorded SEL	Ldn, at 100 feet	Distance to Ldn contour (feet)		
			70	*65*	*60*
Union Pacific (freight)	108.7	76.1	-	-	-
Amtrak (passenger)	94.0	55.7	-	-	-
Combined Ldn	**n/a**	**76.1**	**256**	**551**	**1,186**

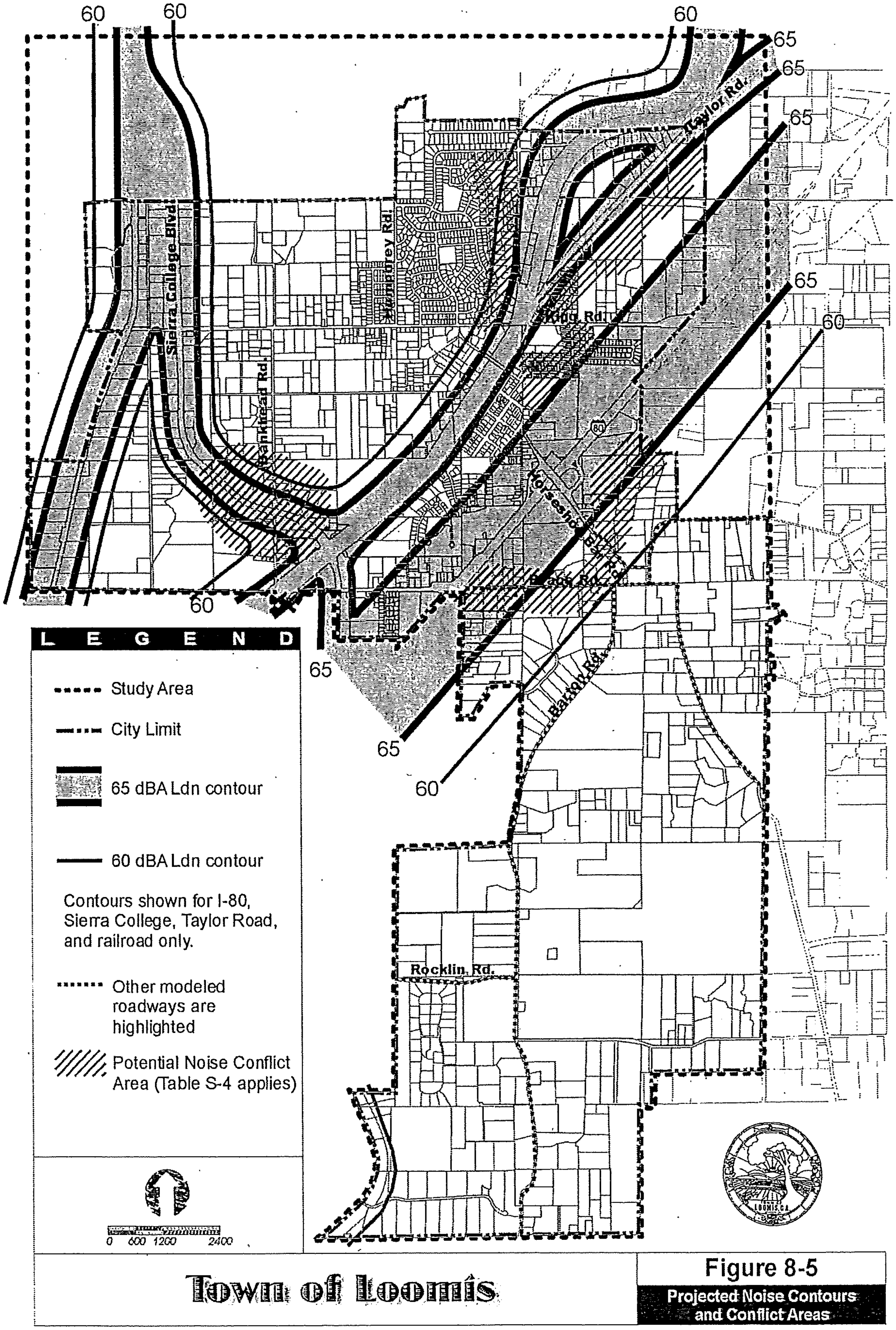
Assumes 12 freight and 3 passenger trains in each direction daily. 4 freight and 1 passenger trains at night. SEL recorded with noise meter at crossings at Boulder Ridge Road and Webb Street, with each train blowing its whistle during the crossing.

- **Stationary Noise Sources.** Future stationary noise sources in the community are likely to be similar to those that already exist. The updated General Plan would likely accommodate additional industrial or commercial activities that could result in an increase in stationary source noise activity. However, it is impossible to predict the magnitude and specific location of potential noise conflicts associated with future development. Instead, the Noise Element can only note where future noise conflicts may occur, based on the proposed Land Use diagram. Such areas are highlighted on Figure 8-5, and are briefly listed below:

  1. Residential/Industrial interface, between Swetzer Road and Arcadia Avenue;
  2. Residential/Commercial/Industrial interface along Taylor Road, north of King Road;
  3. Residential/Commercial interface south of Laird Street and David Avenue, north of I-80;
  4. Residential/Commercial interface near Sierra College Boulevard, north of Taylor; and
  5. Residential/Commercial interface along Brace Road and Secret Ravine Creek.

  These areas are likely to experience noise conflicts as development occurs. Other localized areas of potential noise conflict may also exist, if there are non-conforming industrial uses near residential development. Development in all such areas, particularly those listed above, is subject to compliance with noise standards shown in both Tables 8-3 and 8-4, which address average daily noise levels and noise events of a shorter duration.

  It is not possible to project future stationary source noise levels associated with new development in these areas. Unlike roadway noise, which is a continuous noise source that can be accurately modeled, it is not possible to develop meaningful noise contours that could provide useful planning tools in the context of a Noise Element.


60
60
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65
65
60
Taylor Rd.
Sierra College Blvd.
Humphrey Rd.
Bankhead Rd.
King Rd.
Horseshoe Bar Rd.
Brace Rd.
Barton Rd.
Rocklin Rd.
80
LEGEND
Study Area
City Limit
65 dBA Ldn contour
60 dBA Ldn contour
Contours shown for I-80, Sierra College, Taylor Road, and railroad only.
Other modeled roadways are highlighted
Potential Noise Conflict Area (Table S-4 applies)
0 600 1200 2400
Town of Loomis
Figure 8-5
Projected Noise Contours and Conflict Areas

E. Issues, Goals, Policies, and Implementation Measures

Issues

- *Increased volumes of local and commuter traffic on Town arterial roadways and rail corridors create noise impacting residential frontage properties.*

Goals

1. To protect Town residents and workers from the harmful and annoying effects of noise.

2. To mitigate the effects of noise created by roadway traffic and non-residential land uses while discouraging the construction of sound walls.

3. To maintain and where possible enhance the quiet, rural ambiance of the Town.

4. To minimize the noise effect of railroad operations on residential uses and other sensitive land uses.

Policies

1. New commercial and industrial development in the Town shall be sited and designed to minimize the potential for harmful or annoying noise to create conflict with existing land uses.

2. Loomis shall encourage the mitigation of noise impacts in all new developments as necessary to maintain the quiet, rural ambiance of the Town.

3. An acoustical analysis shall be required for new residential structures located within the projected noise contour of 65 dBA Ldn, showing that the structures have been designed to limit intruding noise in interior rooms to an annual level of 45 dBA Ldn.

4. Individual noise exposure analysis shall be required for proposed development projects as part of the environmental review process, to ensure that the Town's noise standards are meet. The use of mitigation measures (noise buffers, sound insulation) may be required to reduce noise impacts to acceptable levels.

5. Loomis shall discourage the construction of sound walls to mitigate noise impacts, unless it is the only feasible alternative. New sensitive noise receptors shall not be permitted if the only feasible mitigation for noise impacts is a sound wall.

6. Where noise mitigation is necessary, the following order of preference among options shall be considered: distance from the noise source; muffling of the noise source; design and orientation of the receptor; landscaped berms; landscaped berms in combination with walls.

7. Use the land use/noise compatibility matrix shown on Figure 8-4 to determine the appropriate ness of land uses relative to roadway noise.

8. Work with Caltrans to install mitigation elements along freeways and highways adjacent to existing residential subdivisions or noise-sensitive uses to reduce noise impacts.

9. Provide for alternative transportation modes such as bicycle paths and pedestrian walkways to minimize the number of automobile trips.

10. Require that new equipment and vehicles purchased by the Town comply with noise performance standards consistent with the best available noise reduction technology.

11. Work with public transit agencies to ensure that the buses, vans, and other vehicles used do not generate excessive noise levels.

12. Consider the use of rubberized asphalt paving material for future road paving and re-paving. Studies have indicated that such paving material can result in a 3 to 5 dBA reduction in noise.

13. Consider the use of traffic calming devices to reduce traffic noise in residential areas, when supported by the residential community in question.

14. Work with the Union Pacific Railroad to properly maintain lines and establish operational restrictions during the early morning and late evening hours to reduce impacts in residential areas and other noise sensitive areas.

15. Require that automobile and truck access to industrial and commercial properties adjacent to residential areas be located at the maximum practical distance from the residential area.

16. Require that when no other feasible location for industrial or commercial use parking exists other than adjacent to residential uses, the parking shall be buffered from the residential uses by barriers.

17. Limit the use of leaf blowers, motorized lawn mowers, parking lot sweepers, or other high-noise equipment on commercial properties if their activity will result in noise which adversely affects residential areas.

18. Require that the hours of truck deliveries to industrial and commercial properties adjacent to residential uses be limited to daytime hours unless there is no feasible alternative or there are overriding transportation benefits by scheduling deliveries at night.

19. Require that construction activities adjacent to residential units be limited as necessary to prevent adverse noise impacts.

20. Future industrial or commercial development in areas determined to be near noise-sensitive land uses shall be subject to an acoustical analysis to determine the potential for stationary source noise impacts to neighboring land uses.

Implementation Measures

1. Establish exterior land use noise compatibility standards in the Zoning Ordinance for all new development based on the guidelines shown on Figure 8-4 and Table 8-3 of this Element.

2. Incorporate in the Zoning Ordinance requirements that limit maximum interior levels to 45 dBA Ldn in all new residential construction.

3. For new development within the generalized 65 dBA Ldn noise contour as shown in Figure 8-5 of this Element, project applicants shall fund site-specific noise studies to mitigate project impacts. The determination of whether a project site is within the 65 dBA Ldn contour is the responsibility of the Planning Department. The required noise analysis shall:

   a. Include field measurements by a qualified environmental scientist/acoustical engineer to determine a more precise location of existing and projected future noise levels (based on traffic projections included in the Circulation Element or as accepted by the Town); and
   b. Identify and commit to measures to mitigate noise impacts (by siting of structure outside of high noise levels, insulation, attenuation, walls or buffers, landscape, or other acceptable techniques) if within the 65 dBA contour.

4. When development is subject to high noise levels requiring mitigation, the following measures shall be considered and preference shall be given where feasible in the following order:

   a. Site layout, including setbacks, open space separation and shielding of noise sensitive uses with non-noise-sensitive uses.
   b. Acoustical treatment of buildings.
   c. Structural measures: construction of earthen berms and/or wood or concrete barriers.

5. Incorporate into the Zoning Ordinance standards that protect inhabitants from impacts of exterior noise, prevent the transference of interior noise to the outside, prevent transference of noise between residential units and individual businesses in multi-tenant buildings, and prevent transference of noise between commercial and residential uses in mixed structures. Standards for insulation, windows, building materials, walls and roofs shall be included.

6. Include in the Zoning Ordinance standards and requirements for parking structures and lots to prevent noise effects on-site and on adjacent noise sensitive uses. These could include the use of buffers containing landscape and/or sound walls, use of sound absorbing materials to minimize sound amplification and transmission, enclosure of the façade of parking structures facing a residence, limitation of the hours of operation of surrounding surface parking lots, and other appropriate techniques.

7. The Town shall review development proposals according to their potential noise impacts on abutting uses and impacts by abutting uses in accordance with the standards and requirements stipulated by this Element and incorporated into the Zoning Ordinance.

8. The Town shall consider the use of temporary noise barriers, limited hours of operation, limiting times of year for construction near schools to reduce construction-related noise.

9. The Town shall review the street layout of proposed residential subdivisions with the objective of reducing traffic volumes and through trips as a means to reduce noise levels. The use of road dips, diagonal parking, one-way streets, and other traffic controls and traffic calming devices shall be considered to reduce vehicular travel and speed, provided that engineering and safety standards are met. If determined to be feasible, rubberized asphalt paving material may be required for new roads.

10. Speed limits are legally set in accordance with the prevailing speed of traffic based on engineering studies. However, when feasible, consistent and necessary, the reduction of speed limits on arterials should be used to decrease ambient noise levels.

11. The Town shall evaluate the noise impacts of vehicles on adjacent residential properties as a part of the development and environmental review process for all commercial and manufacturing uses. Where vehicles would have the potential to create noise exceeding 60 dBA Ldn at an adjacent noise sensitive use, the inclusion of noise mitigation techniques such as the use of sound wall or enclosure of delivery areas shall be required.

12. To reduce noise associated with truck traffic, the Town shall implement the following noise reduction strategies:

    a. The Town and Caltrans should consider limitations on hours of operation and other truck operations that could be limited to reduce noise impacts.
    b. The Town should encourage the use of established designated truck routes that avoid residential areas and confine truck traffic to major thoroughfares. Designated truck routes must be followed.
    c. The Town shall post designated areas and times to prohibit the use of jake brakes along established truck routes adjacent to sensitive uses.

13. Support the efforts of the California Department of Transportation and local transportation agencies in developing noise reduction measures for Interstate 80, including sound barrier walls, if no feasible alternatives exist.

14. Maintain a data file documenting existing and future noise conditions, using the contour map contained in this Plan. As noise assessments are conducted for proposed projects or other noise studies are performed, the data base shall be updated. The noise data shall be updated entirely at least once every five years.

15. Work with railroad operators to determine when noise controls may be necessary due to the adjacency of railroad lines to residential uses.

16. The Town shall enforce the State Noise Insulation Standards (California Code of Regulations, Title 24) and Chapter 35 of the Uniform Building Code (UBC).

17. Future industrial or commercial development in areas determined to be near noise-sensitive land uses, as shown in Figure 8-4, shall be subject to an acoustical analysis at the discretion of the Planning Director, to determine the potential for stationary source noise impacts to neighboring land uses.

18. Where noise-sensitive land uses are proposed in areas exposed to existing or projected noise levels in excessive of the standards contained in Tables 8-3 and 8-4. The Town shall require an acoustical analysis as part of the environmental review process so that noise mitigation may be included in the project design. At the discretion of the Planning Director, the requirement for an acoustical analysis may be waived if all of the following conditions are satisfied:

    a. The development is for less than five single-family dwellings or less than 10,000 square feet of total gross floor area for office buildings, churches, or meeting halls;
    b. The noise source in question consists of a single roadway or railroad for which up-to-date noise exposure information is available. An acoustical analysis will be required if the noise source is a stationary noise source, or if there are multiple noise sources that could affect the project;

c. The projected future noise exposure at the exterior of proposed buildings or outdoor activity areas does not exceed 65 dBA Ldn;

d. The topography of the area is essentially flat; and

e. Effective noise mitigation, as determined by the Planning Director, is incorporated into the project design. Such measures can include, but are not limited to, the use of building setbacks, building orientation, noise barriers. If closed windows are required for compliance with interior noise level standards, air conditioning or a mechanical ventilation system will be required.

19. The Town shall develop standards for acceptable nuisance noise levels for both day and night.