CITY OF LARKSPUR, CALIFORNIA
GENERAL PLAN

CHAPTER 7, HEALTH & SAFETY

CONTENTS

Chapter 7. Community Health and Safety

This chapter covers safety, as prescribed by Safety Element provisions of the Government Code, Section 65302(g); and noise, as covered by Noise Element guidelines of the Government Code, Section 65302(f). It also includes air quality. The Bay Area Air Quality Management District (BAAQMD) has strongly urged cities to address air quality in their general plans.

Community health and safety involves the protection of the community from natural hazards such as floods, earthquakes, landslides, and fires. It also

involves protection from man-made hazards such as air pollution, noise, and hazardous materials. This chapter describes the scope of these hazards, as well as the actions that the City can take to eliminate or reduce the probability of these hazards leading to a major disaster. The overall purpose of this chapter is to--

Protect the community from injury, loss of life, and property damage resulting from natural disasters and hazardous conditions.

EMERGENCY PREPAREDNESS

In the event that a disaster does occur, Larkspur must be prepared to respond. Quick action can reduce injuries and damage. Larkspur has an Emergency Plan for natural disasters, technological incidents (such as hazardous materials accidents), and nuclear defense operations. The Plan establishes an emergency management organization with the City Manager as the Director of Emergency Services and the department heads as the Emergency Management staff. Each department head has a specific assignment in a major emergency. Depending on the magnitude and type of disaster, the City may have to work closely with other levels of government. These relationships are also spelled out in the Plan.

The Plan describes how various disasters might affect Larkspur. It defines scenarios for responding to a major earthquake, a major transportation accident (airplane crash or highway accident involving multiple casualties), wildland fire, flood, landslides, and hazardous materials incident. Although the effects of these disasters may vary, the emergency responses would be similar in many cases.

Preparedness Goals, Policies, and Programs

Goal 1: Increase public awareness of flooding, seismic, landslide, fire, and other natural hazards, and of methods to avoid or mitigate the effects of these hazards.

Goal 2: Prepare to make a planned, coordinated response to a disaster.

Policy a: Maintain an updated emergency response plan.

Policy b: Identify essential emergency facilities and make provisions to ensure that they will function in the event of a disaster.

Policy c: Strive to educate the community about environmental hazards, measures which can be taken to protect lives and property, and methods for responding to various disasters.

Policy d: Cooperate with other public agencies to store, organize, distribute, and administer emergency medical equipment, supplies, services, and communications systems.

Action Program [1]: Continue to update the City's emergency plan.

Action Program [2]: Identify specific facilities and lifelines critical to effective disaster response, and evaluate their abilities to survive and operate efficiently immediately after a major disaster.

Action Program [3]: Evaluate the structural integrity of the Bon Air Bridge to withstand earthquakes, and assess the feasibility of increasing its weight-carrying capacity.

Major transportation links (highways and bridges), gas, electric, and water lines, ambulance and paramedic services, emergency broadcast services, and power substations are critical. The bridges over Corte Madera Creek will be critical to maintaining ties between north and south Larkspur.

Action Program [4]: Designate alternative facilities for post-disaster assistance in the event that primary facilities become unusable.

Part of an emergency plan is identification of those facilities that will be relied upon in the event of catastrophe. Critical facilities in (or near) Larkspur are Marin General Hospital, the two fire stations, and the police station which includes the Emergency Operations Center. Public facilities such as schools and auditoriums may be designated as alternative facilities.

Action Program [5]: Correct known structural deficiencies.

Avoidance of hazards is another form of preparedness. By establishing and enforcing appropriate land use, design, and construction standards, and avoiding or minimizing development in areas having a history or threat of natural hazards, Larkspur can reduce its losses.

Goal 3: Avoid development in areas prone to natural hazards.

Policy e: Allow land uses in areas prone to natural hazards only with appropriate mitigation.

Action Program [6]: Continue to regulate development to assure the adequate mitigation of safety hazards on sites having a history or threat of slope instability, seismic activity (including liquefaction, subsidence, and differential settlement), flooding, or fire.

Hazard mitigation measures, specific to the type of hazard, are discussed in the following sections on flooding, seismic and geologic hazards, fire, hazardous materials, air pollution, and noise.

FLOODING

Flood hazards fall into three categories: *natural flooding, mud and debris flows*, and *dam inundation*. Larkspur has experienced *natural flooding* when Corte Madera and Larkspur Creeks have overflowed during extreme rainfall. Larkspur has also suffered major damage from *mud and debris flows* on steep hillsides, particularly in recent years. The inability of the topography and drainage system to handle torrential rains has exacerbated these flooding problems (*Flood Insurance Study for the City of Larkspur,* Federal Emergency Management Agency, 1983, page6). Larkspur is not likely to be affected by flooding from dam failure. A new spillway and other remedial work have reinforced the Phoenix Lake dam, the nearest dam upstream from Larkspur

(The dam was buttressed on the downstream side in 1970, to survive a "design earthquake." In 1988, the spillway was built and lowered six feet. Any flood damage resulting from flood inundatio would largely be confined to areas northwest of Larkspur-i.e., to the narow Ross Valley down to and including the College of Marin and the College park subdivision (18 homes). From there downstream, the canyon widens into a broad alluvial flood plain where dam flood waterss would rapidly dissipate. Source: Dana Raxon, Marin Municipal Water District, August 1989 and May 14, 1990).

Significant flood damage occurred in 1955, 1958, 1973, and 1982. The flood of late December 1955 caused serious damage in the Heather Gardens neighborhood where many families had to be evacuated by rowboat. Torrential rainfall in April 1958, and two back-to-back storms in January 1973, also caused severe flooding in Larkspur.

The January 1982 storm was the worst in the state since 1955. In Marin County, 12 inches of rain fell in 36 hours. Unlike the earlier floods in Larkspur, the greatest loss of property was due to mudslides - or more accurately, debris avalanches which start suddenly and move quickly. Four homes, two in Madrone Canyon and two in the Murray Park area, were destroyed, as well as eight apartments at Skylark. Public and private damage was estimated at $3 million (Carolyn Campbell, Public Works Director, City of Larkspur, 1989).

Larkspur consistently receives greater rainfall amounts than the majority of Marin County because it is in the shadow of Mount Tamalpais. Kentfield, which is upstream from Larkspur, has the highest average annual rainfall in the Bay Area--52.5 inches. The lower areas of Larkspur receive about 38 inches a year. Also, the nature of the soil in Larkspur is such that very little water percolates into the ground, and runoff is high (*Storm Drain Master Drain Study, City of Larkspur*, May 1988).

Large areas of Larkspur south of Corte Madera Creek are within the 100-year flood zone, meaning that there is a probability of their being flooded once every 100 years (or a one percent chance of being flooded in any one year). The boundaries of the 100-year flood zone are shown on Figure 7-1.

Figure 7-1
100-Year Flood Zone
[to be inserted]

Most of the flood zone is so designated because of the potential for flooding during a 100-year high tide, rather than from excessive rainfall.

Flood Control and Storm Drainage Improvements
In 1968, the Army Corps of Engineers began to dredge, straighten, and line Corte Madera Creek with concrete. By 1972, the project had been completed from the mouth of the creek to the Town of Ross, a distance of about 3.5 miles (Flood insurance Study). However, Ross opposes placing the creek in a concrete channel, and work on the last phase, through the town, has been stalled. Until the last phase has been completed, Larkspur will not be adequately protected from freshwater flooding. Even then, the improvements will not provide protection from tidal flooding.

The portion of Larkspur Creek (also known as Arroyo Holon) between Monte Vista Avenue and about Meadowood Drive has been diverted to a culvert. A 1989 study also recommended an earthen berm and a concrete floodwall be constructed along a section of the creek near Meadowood Drive.

In 1988, Larkspur undertook a Storm Drain Master Plan Study of the older portion of Larkspur - the area south of Corte Madera Creek and west of Highway 101. Historically, most of Larkspur's flooding has occurred in this area. Also, certain areas adjacent to Corte Madera Creek have experienced significant settlement over the years, exposing them to increased flooding (Storm Drain Study).

Most of the storm drain system in the study area is 30 to 40 years old. The system evolved piecemeal as it was gradually extended upstream to serve new development and as problems occurred. A significant portion of the system has settled and deteriorated, causing maintenance and flooding problems. Also, because much of it is located on private property, the system lacks adequate capacity to convey runoff.

The study recommended a series of improvements (trash racks, catch basins, use of concrete pipe, and annual inspections of open channels on private property) to reduce flooding problems. It also concluded that more pumping stations will be needed to protect against high tides inundating low-lying developed land.

Flooding problems east of Highway 101 and south of Corte Madera Creek have been somewhat alleviated by the installation of a new storm drain system and pump station. However, it is still necessary to sandbag the low-lying area near the creek because of tidewater flooding. Flood walls and a tide gate are needed to provide permanent protection.

Rise in Sea Level

Recent scientific studies indicate that sea level is rising at an accelerated rate. A global climate change caused by the accumulation of "greenhouse" gases in the atmosphere (carbon dioxide, methane, and chlorofluorocarbons) is projected to raise the temperature of the earth's atmosphere, melting some of the earth's glaciers and polar ice caps. If recent historic trends continue, global sea level should increase between four and five inches in the Bay in the next 50 years and could increase approximately one and one-half to five feet by the year 2100.

Although the phenomenon is not fully understood, the rising sea level has implications for Larkspur and other cities along San Francisco Bay. Tidal circulation could change and wave action could increase. Drainage would be impeded, and ground water could be contaminated. The Bay Conservation and Development Commission, which regulates land use along the Bay, recommends that local governments take the predicted rise into consideration in land use planning and development review (Marin General Plan, Environmental Hazards Element, Draft Technical Reposrt #1, *Flood Hazards: Existing Conditions and Recent Studies*, Feb. 1988; and Amendment 3-88 to *"San Francisco*

Bay Plan," Bay Conservation and Development Commission).

Flood Hazard Goals, Policies, and Programs

Goal 4: Protect Larkspur from the risk of flood damage.

Policy f: Seek to have the Corte Madera Creek flood control improvements completed upstream from Larkspur.

Action Program [7]: Work with the Marin County Flood Control District, the Army Corps of Engineers, and the Town of Ross to develop and implement an improvement plan that protects against flooding.

Policy g: Work with other cities in the Ross Valley to develop a comprehensive master plan for flood control and management of Corte Madera Creek.

The Kentfield/Greenbrae Community Plan recommends that the Corte Madera Creek master plan consider flood heights under present and future conditions and under various flood frequency intervals (10, 30, 50, and 100-year floods). The influence of future urbanization and rising sea level should be evaluated. The plan should also consider the possibility of retention structures on parking lots, roofs, etc., curtailment of development, and planting and maintenance of vegetation to enhance bank stability, aesthetic values, and recreational opportunities.
Policy h: Regulate land uses in flood-prone areas and allow development in those areas only with appropriate mitigation.
This policy, in meeting the general goal of protecting Larkspur from flood damage, has two specific objectives: one is to protect property; the other is to maintain an adequate cross-section for the discharge of flood waters.

A map of possible inundation resulting from a failure of the dam at Phoenix Lake has been prepared by the Marin Municipal Water District (MMWD). (The dam was buttressed on the downstream side in 1970, to survive a "design earthquake." In 1988, the spillway was built and lowered six feet. Any flood damage resulting from flood inundatio would largely be confined to areas northwest of Larkspur-i.e., to the narow Ross Valley down to and including the College of Marin and the College park subdivision (18 homes). From there downstream, the canyon widens into a broad alluvial flood plain where dam flood waterss would rapidly dissipate. Source: Dana Raxon, Marin Municipal Water District, August 1989 and May 14, 1990).The map is available to the public at the City Planning and Public Works departments and the MMWD offices.

Action Program [8]: Establish standards for minimum grades and minimum finished floor elevations that take into consideration the rising sea level during the expected life of the project.

Based on historic trends, the 100-year maximum high tide is projected to reach an elevation of 6.4 feet NGVD (National Geodetic Vertical Datum) along Corte Madera Creek, but other factors (wave runup, siltation, and the predicted rise in sea level) can be expected to raise it higher. Because of these factors, Larkspur has raised its minimum standard for finished floor elevations from 8 to 9.4 feet.
Policy i: Continue to upgrade the City's drainage system.

Action Program [9]: Implement the recommendations of the 1988 Storm Drain Master Plan study.

Action Program [10]: Construct flood walls and a tide gate in the area east of Highway 101.

Action Program [11]: Balance required protection measures with the need to protect environmental resources, and do so in such a way as to integrate design improvements with the protection of natural resources.

Action Program [12]: Require site plans to locate structures outside or above the 100-year flood zone wherever possible.

SEISMIC AND GEOLOGIC HAZARDS

The geology of Larkspur plays a major role in assessing the city's exposure to seismic and geologic risks.

Three major groups of geologic materials underlie Larkspur. Sedimentary rock of the Franciscan Formation is the bedrock beneath the ridges and slopes forming Larkspur's northern and southern boundaries and Bon Air Hill. See Figure 7-2.

Figure 7-2
Geology
[to be inserted]

A large part of the Franciscan Formation underlying Larkspur is *Franciscan melange,* a mix of rock types embedded in crushed rock materials. Melange has highly erratic slope stability characteristics.

Fingers of alluvial stream deposits (clay, sand, silt, and gravel) extend down the hillsides in swales and creek beds to gently sloping alluvial fans and floodplains. These soils were eroded from the steep slopes and transported by flooding streams. The older area of Larkspur (Downtown and the nearby residential neighborhoods) lies in a wide flat alluvial valley. Occasional erosion-resistant hills or knolls such as Palm Hill and some of its small neighbors protrude above the otherwise flat plain.

The third type of geological material is Bay mud, which lies in a broad band between Magnolia Avenue on the south and Sir Francis Drake Boulevard on the north (excluding Bon Air Hill). The older Bay mud reaches a thickness of 40 feet at the mouth of Corte Madera Creek. Bay mud is an unconsolidated jelly-like material that is both highly compressible, and subject to lateral flow when loads are placed on it (Information on geology was obtained from *Geologic Report and Selected Geologic Aspects of Larkspur,* James C. Bangert, 1974; Preliminary Geologic Map of Marin (and other) Counties, United States Geological Survey, 1974; and Marin County General plan, Environmental Hazards Element, Draft Technical Report #3, *Seismic and Geologic Hazards in Marin County,* August 1988).

Seismic Hazards

A seismic *hazard* is the effect of an earthquake such as surface faulting,

ground shaking, ground failure, or tsunami or seiche (tidal waves). All of these must be addressed in the general plan.

Larkspur is not at risk from *surface rupture*. The San Andreas fault, which is the only active fault in Marin County, lies eight miles to the west of the city. The Hayward fault, also active, lies 13 miles to the east.

Larkspur *is* at risk from *ground shaking* - underground vibrations or waves generated by the breaking and snapping of rocks along a fault line during an earthquake. Most damage associated with past - and future - earthquakes is from ground shaking. Ground shaking causes direct damage to buildings, roads, and utilities. The greatest losses solely from ground shaking may occur where tall structures are built on thick, relatively soft, saturated sediments, and the least where they are built on firm bedrock (Marin County Tecgnical Report #3). Ground shaking can also trigger liquefaction, landslides, and tsunamis, indirectly affecting these same facilities.

Larkspur is also at risk from *ground failure*, in the form of liquefaction, settlement, and landslides. Liquefaction is a process by which water saturated clay-free sands or silts are transformed from a solid to a liquid state. Areas susceptible to liquefaction in Larkspur are those underlain by saturated, loosely compacted granular materials such as old stream beds (alluvium) [Geologic Report].

Settlement is the drop in elevation of a ground surface caused by settling or compacting of the underlying material. The most severe and damaging settlement is most likely to result from liquefaction and landsliding. Settlement may occur without seismic activity, as discussed under Geologic Hazards.

Landslides, the jarring loose of basically unstable hillside materials, are another type of ground failure. Landslides induced by earthquakes will occur generally in the same marginally stable areas as landslides induced by other forces, such as rainfall.

A *tsunami* is a large ocean wave generated by an earthquake in or near the ocean. A tsunami would be expected to reach approximately 10 feet in the Bay near Larkspur. The wave run-up would generally be confined to the area east of the railroad crossing on Corte Madera Creek. Tideland areas and filled ground near or below sea level could be inundated. A *seiche* is an earthquake-generated wave in an enclosed body of water, such as a lake, reservoir, or bay. Similar run-up and inundation would be expected from a seiche (Larkspur Seismic Safety Element, 1973).

Figure 7-3
Seismic Hazards
[to be inserted]

divides Larkspur into three seismic hazard categories based on the underlying geology. Areas with the least earthquake stability are composed of artificial fill, Bay mud, and landslide and stream deposits. The thick,

loose soils of Bay mud tend to amplify and prolong the shaking. Areas of moderate stability are composed of sandstone, shale, and melange. The most stable areas are underlain by hard sandstone.

Effects of Earthquakes

Earthquakes are measured in terms of magnitude and intensity. The measure of magnitude, the Richter scale, is more commonly recognized. It assigns a number to the calculated energy release of an earthquake which is independent of the earthquake's observed effects. The Modified Mercalli Intensity (MMI) scale assigns a Roman number (I to XII) based on a description of the physical effects of earthquakes. The intensity can vary with the magnitude of the earthquake, the distance from the site to the faults, and with geologic materials.

The intensity of the maximum possible earthquake in Larkspur would vary depending on geologic conditions in each location. Bay muds would experience the greatest intensity of shaking, and corresponding severe damage to nearly all structures (MMI XI). The alluvium areas would experience a lesser intensity of shaking with destruction of most masonry and frame structures (MMI X) [ibid.]. The Franciscan rock areas would experience the least shaking, resulting in general damage to foundations and frame buildings (MMI IX).

The ability of buildings to withstand earthquakes depends on when they were built and their structure type. Buildings built before 1933 did not have to meet building code regulations relating to earthquake resistance. Since then, codes have been updated several times, and newer buildings are increasingly more resistant to damage. Generally, older wood frame structures may perform relatively well, while unreinforced masonry buildings (usually brick, stone, or concrete block with no reinforcement) probably do not meet current seismic safety standards, and may not withstand a major earthquake. In conformance with state legislation passed in 1985, Larkspur has identified 15 unreinforced masonry buildings scattered through the area south of Corte Madera Creek. Although several are located downtown, most downtown buildings, including City Hall, are wood frame. State law requires that cities must adopt a mitigation program for buildings of unreinforced masonry.

A major earthquake (8.3 magnitude on either the San Andreas or Hayward Fault), in addition to damaging buildings, can be expected to topple the Highway 101 freeway overpass at Sir Francis Drake Boulevard and buckle pavement on Highway 101 and Magnolia Avenue through Larkspur. The earthquake could set off landslides along Sir Francis Drake Boulevard leaving Greenbrae separated from the rest of Larkspur for up to 24 hours (Scenario developed under the Earthquake Preparedness Program of the California Division of Mines and Geology). Bon Air Road and Doherty Drive could also collapse from liquefaction and settlement. Utility lines carrying water, gas, and sewage could be ruptured by landslides and sudden settlement. If Fires break out, emergency response teams could encounter serious difficulties in fighting them if water lines are broken and landslides

block access roads.

Seismic Hazard Goals, Policies, and Programs

Goal 5: Reduce risks of personal injury and property damage associated with seismic activity.

Policy j: Establish acceptable levels of risk and life safety standards, and see that buildings are built to, or brought up to, those standards.

Action Program [13]: Require that all unreinforced masonry buildings are seismically upgraded to protect against loss of life.

Action Program [14]: Alert owners of homes built prior to a specified date (related to early codes) that building frames should be bolted to foundations.

Action Program [15]: Establish a basic seismic safety notification process through resale inspections.

Action Program [16]: As soon as legally permissible, adopt new versions of the Uniform Building Code which contain updated seismic requirements.

The Uniform Building Code (UBC) is periodically updated, but there may be a lag between the time the Code language is re-written and the time when it is adopted by the local jurisdiction. Immediate local adoption will help ensure that the most current standards are applied to new buildings.

Action Program [17]: Require geotechnical engineering investigations for (a) buildings proposed to be constructed in "high" seismic hazard areas potentially subject to severe ground shaking and ground failure (Bay mud, stream and landslide deposits) as shown on Figure 7-3, and (b) critical structures or structures made of materials other than wood frame.

The required geotechnical investigations should include a site-specific characterization of anticipated strong ground motion, which would include the estimated peak horizontal ground acceleration, the duration of strong shaking, and the site period. A structural engineer should then review the seismic data to determine whether the minimum UBC criteria will be adequate.

Policy k: Seek to preserve existing historic buildings under any new standards that are adopted.

Geologic Hazards

Geologic hazards exist in Larkspur in the form of landslides, debris flows, subsidence, and differential settlement. Landslides, the principal geologic hazard in Larkspur, occur on the hillsides forming the city's boundaries. Subsidence and differential settlement have occurred along Corte Madera Creek in areas underlain with Bay mud.

Natural conditions which affect slope stability are steepness of the slope, characteristics of the soil, degree of water saturation, and seismic activity. Human activities that can contribute to landslides include steep cuts in the slope, improper placement of fill on slopes, concentrating surface runoff,

and overwatering.

During the winter storms of 1982, landslides (debris avalanches) in Larkspur produced over 10,000 cubic yards of soil, rock, and debris (Hillslope Processes and Urban Planning, Paul J. Seidelman and Jeffrey D. Borum, 1983). Slope movements resulted in several million dollars in damage to homes, roads, and other improvements (see Flooding, page 125). After that, the City undertook a study of the nature, extent, and magnitude of slope stability hazards in a 300-acre area of undeveloped land on the city's southwestern slopes. The results of the study ("Hillslope Processes in Urban Planning") can be generalized to the other hillside areas in the city.

The report found that land surfaces in the study area had been shaped predominantly by erosion processes which could be expected to continue to actively change the landscape. Areas underlain by melange (described earlier) tended to produce more landslides. Physical disturbances of the ground resulting from land use activities have exacerbated slope stability problems in some areas. These activities include siting structures and road improvements on - or in the path of - landslides, and the improper design, use, or installation of retaining wall structures, drainage facilities, and cut slopes.

The report includes detailed maps showing landslide and slope movement locations in the study area.

Because debris avalanches result from a sudden failure of natural or human-modified slopes and travel at high speeds, it is difficult to provide advance warning to those in the path of the flow. However, local residents could be warned when heavy rainfall and total storm precipitation indicate increased landslide potential.

Subsidence and differential settlement have occurred in Larkspur near Corte Madera Creek. Differential (or uneven) settlement may occur in poorly consolidated soils during earthquake shaking or over time. Settlement may be the result of poorly engineered fill, or of building on soils which are too weak to assume the load. In 1974, construction of several condominium developments on Corte Madera Creek had to be halted when cracks up to one inch wide were discovered in outside walls (Geologic Report).

When settlement occurs over a large area it is called subsidence. Subsidence may result in flooding as ground levels are lowered (see section on flooding).

Figure 7-4
Slope Stability
[to be inserted]

shows four slope stability zones for Larkspur. Zone 1 includes areas of artificial fill over Bay mud or stream deposits. Although generally stable, they are prone to settlement. Zone 2 (flat or gentle slopes in valleys and along ridges) is the most stable. Zone 3 is similar to Zone 2 except that

slopes are steeper and they are underlain by rock and slope deposits. Zone 4 (landslides, and quarry walls and highway cuts prone to rock falls) is the least stable. It should be emphasized that the zones are generalized.

In 1982-83, more detailed geologic studies were made of two areas west of Magnolia Avenue. These two areas - called out on Figure 7-4 by solid boundary lines - are evaluated and extensively discussed in "Hillslope Processes and Urban Planning, Larkspur, CA," by Seidelman Associates, Lafayette, California, 1983, available in the City of Larkspur Planning Department.

Geologic Hazard Goals, Policies, and Programs

Goal 6: Limit the exposure of existing and future structures to risk from landslides, debris flow, and subsidence, and minimize the potential for damage.

Policy l: Provide property owners with information to assist them in addressing their risk from landslides and debris flows.

Action Program [18]: Make available to developers (and to owners of residences) in areas of steep slopes with seasonal and intermittent drainages, the City's geotechnical reports on and information regarding the potential hazards from debris slides and flows, and encourage them to seek professional advice from registered engineers or certified engineering geologists on how to lessen potential risks.

Action Program [19]: Develop a program to protect existing structures located in high risk areas by promoting the use of debris fences (to deflect debris flows around structures) or other mechanisms.

Action Program [20]: Provide residents with information about the geotechnical hazards of heavy rainfall in areas of landslide potential, and the need to evacuate.

Action Program [21]: Provide property owners with standard public drainage designs that may be retrofitted to existing homes.

Action Program [22]: For development in hillside areas, establish, by ordinance, standards for foundations and retaining walls that meet or exceed the current state of the art in structural and civil engineering practice. The standards shall include:

(a) A retaining wall that provides support for the footings of a structure must have the same life expectancy as that of the supported structure.

(b) A series of stepped or terraced retaining walls should be designed and approved by a qualified engineer even when the height of the individual walls is less than the standard that requires review.

(c) A soils engineer or engineering geologist will be required to provide

field supervision of the drilling and concrete pouring operations for pier foundations to insure the exclusion of loose debris from the pier holes, insure adequate pier depth, and confirm soil conditions.

(d) Foundation plans for hillside structures utilizing pier foundations in soil depths of six feet or greater shall be designed to structural and soils engineering calculations based upon passive pressures and shall demonstrate to the satisfaction of the City that the pier will satisfactorily resist shearing.

Policy m: Ensure that new development in hillside areas takes place only in areas that are relatively free from the threat of landslide and other forms of ground failure.

Action Program [23]: Require approval of a use permit for building additions or new development in areas with an average percent of slope equal to or greater than 25 percent.

Action Program [24]: Employ the following standards for assessing the acceptability of new construction in hillside areas and those adjacent areas with a potential risk from landslides and debris flows.

(a) Areas subject to recent slope movement or within the paths of debris flows are not suitable for the development of occupied structures. Further disruption of these high risk areas will only be permitted by the City for roads, utilities, and other similar facilities after intensive geologic studies have determined that mitigation measures are practical and their costs warranted.

(b) Generally, parcels with an average slope of 65 percent or greater (or that portion of a parcel with a slope of this magnitude) that show evidence of having been formed by landslide processes in the past are not suited for the development of occupied structures.

(c) Sites underlain by deep-seated landslides and landslide debris deposits may only be developed with occupied structures if detailed geotechnical investigations demonstrate that any soils creep and future deep seated slide processes will, in the City's opinion, be satisfactorily mitigated.

(d) High energy flow paths are not suitable for the development of occupied structures. These flow paths are steep seasonal drainages that have been a path for debris flows in the past.

(e) The development of new occupied structures within debris flow dissipation areas, which are those areas in the vicinity of the mouths of high energy flow paths, will be permitted only if adequate mitigation measures are provided.

Action Program [25]: Require site-specific geologic and geotechnical reports for new construction in hillside areas and areas subject to settlement or subsidence.

Action Program [26]: dopt standards for geologic and geotechnical reports that outline the type and extent of investigation required for various stages of the development process, for various geologic and soils conditions, and for the type of land use and structure proposed.

(a) Proposed development should include detailed plans for drainage facilities. These plans should incorporate a hydrologic and, where appropriate, a geomorphic evaluation of existing drainage courses and City drainage facilities that will be impacted by the project. The evaluation should demonstrate the adequacy of these systems. After adequacy is demonstrated, the drainage facilities should be connected to City storm drains.

(b) In hillside areas and at the mouths of seasonal and intermittent streams, a geologic report should be required as a part of the site development review process for all structures proposed for human occupancy and situated where geologic hazards may directly or indirectly influence the design, location, and safety of the structure. A geotechnical report should be required where soil engineering and/or geologic conditions may affect the design, location, and safety of a structure proposed for human habitation.

FIRE HAZARDS

Two categories of fire hazard exist in Larkspur: structural fires, which can damage the home or workplace, and wildland fires, which can quickly explode out of control in the city's hillside chaparral, grassland, and forested areas.

Larkspur maintains two fire stations: the main station next to City Hall downtown and a second station just off Sir Francis Drake Boulevard. Larkspur's 16-person crew (five firefighters per shift) is supplemented by an automatic aid agreement with the Corte Madera and Kentfield fire departments, and a mutual aid agreement with San Rafael. There is also a 25-person volunteer force.

The Fire Department tries to maintain a six-minute response time, although some hillside neighborhoods are up to seven (Madrone Woodlands) and eight minutes (highest part of Sunrise Lane) away.

Larkspur's fire prevention activities include annual inspections of all businesses, public structures, and apartment buildings. Also, owners of vacant lots annually are required to clear their property of excessive vegetation. In addition, the Fire Department reviews building permit applications to ensure that new construction meets Building and Fire Code requirements relating to fire safety.

Wildland Fires

About 50 percent of the land area in Larkspur is at risk from wildland fires (Larkspur Emergency Plan, Hazard Summary for Major Wildland Fire). Some of the land is open space, but developed hillsides are also at risk. (See Figure 7-5). Like the rest of Marin County, Larkspur's periodically arid climate, combined with extensive areas of grass and brush-covered open space and

variable topography, create an ever-present threat of wildland fire. Extreme weather conditions, such as high temperatures, low humidity, and strong winds may cause an ordinary fire to expand into one of massive proportions. A high fuel load, resulting from years of accumulation, contributes to the problem. Steep slopes allow lowland fires to preheat vegetation before climbing hillsides, increasing the rate of fire spread and impeding firefighter access.

Figure 7-5
Fire Hazard Areas
[to be inserted]

Many homes located in high risk fire areas were built of combustible building materials or with stilt and pole construction. The latter allows suspended floor areas to trap heat, increasing opportunities to ignite the homes.

Besides the loss of property and natural vegetation from a wildland fire, firefighting efforts could scar the land through bulldozing, road cutting, and use of fire retardant chemicals. Erosion and landslides may occur on the denuded slopes during the rainy season.

Fire Goals, Policies, and Programs

Goal 7: Protect Larkspur residents and property from fire hazards.

Goal 8: Minimize the risk of wildland and structural fires, and ensure adequate fire protection.

Policy n: Provide fast and efficient fire suppression service to Larkspur residents.

Action Program [27]: Establish performance standards such as desired response times for police, fire, and other public services.

Policy o: Maintain an aggressive fire prevention program.

Action Program [28]: Continue to inspect all businesses, public buildings and apartment buildings annually for fire and building code violations.

Action Program [29]: Continue to require that all vacant lots annually be cleared of excessive vegetation.

Action Program [30]: Continue to require smoke alarms and Class C or better fire retardant roofs for all new construction.

Policy p: Establish more stringent fire protection standards for private development in high risk fire hazard areas.

Areas considered to be significantly at risk for a high-loss fire are Madrone Canyon, Madrone Woodlands, hillside areas of Greenbrae, Northridge, King

Mountain, and the eastern side of Palm Hill.
Action Program [31]: Require that automatic sprinkler systems be installed in new residences in areas with difficult access and/or poor water supply.

Action Program [32]: Require that brush be cleared for a distance of 30 feet from residences in high fire-hazard areas.

Action Program [33]: Establish landscaping guidelines that encourage the use of fire-resistant plants in high fire-hazard areas.

HAZARDOUS MATERIALS
Larkspur is a residential community, seemingly removed from the risk of accidental exposure to hazardous materials. However, hazardous materials are used, stored, and transported through Larkspur every day. Several manufacturing processes in the area east of Highway 101 use hazardous materials. Neighborhood gas stations and dry cleaners also use explosive products and solvents, and almost every household keeps some hazardous materials on hand (insecticides, paint, etc.).

Marin County's Hazardous Waste Management Plan shows that:

- In 1986, Marin County generated about 7,700 tons of hazardous waste.
- Of this, 85 percent of the wastes were generated by 1,400 "small quantity" generators.
- Marin households contribute about 5 percent of the total waste stream.
- Waste oil is the largest constituent of Marin's hazardous waste stream, and solvents are the second largest constituent.
- Marin County's overall waste stream may nearly double by the year 2000 if source reduction is not implemented.

  In addition to hazardous materials used and stored in Marin County, significant risk is posed by trucks carrying flammable liquids and gases, corrosives, explosives, and oxidizers along Highway 101. An accidental release of any of these products could result in a serious threat to life and property, as well as secondary effects of fire, explosion, or public health risk (Larkspur Emergency Plan, Hazard Summary for Hazardous Materials Incident).

In the event of a major hazardous materials accident, Larkspur can request assistance from the San Rafael Hazardous Material Response Team under a joint-powers agreement. For flammable or combustible liquid spills, the City may request assistance from the Chevron Oil refinery. There are also limited resources for cleaning up on-site flammable or combustible liquid spills at the Larkspur Ferry terminal.

Handling of hazardous materials is regulated by several State and federal agencies. Commercial use and storage of hazardous materials is subject to the provisions of the California Occupational Health and Safety Act (CALOSHA), the Uniform Fire Code, the Uniform Building Code, and other

state and federal legislation. Transport of hazardous materials and wastes is regulated by the U.S. Department of Transportation and the California Highway Patrol Motor Carrier Division, the U.S. Environmental Protection Agency, and the State Department of Heath Services (DOHS). Counties have been designated by the DOHS as the enforcement agencies for many of the hazardous materials regulations. The Marin County Environmental Health Department regulates both underground and above-ground storage facilities within Larkspur.

The Marin County Hazardous Waste Management Plan - which provides guidance at the local level - is included by reference in the Larkspur General Plan. The County Plan was prepared under a state directive (the Tanner bill) which required cities and counties to find ways to minimize hazardous waste through source reduction and recycling at various stages. The Plan also addresses enforcement of standards and regulations, emergency response, safe transportation, and prevention and clean-up of contaminated sites. More than 100 implementation measures are recommended.

Hazardous Material Goals, Policies, and Programs

Goal 9: Protect Larkspur from accidental exposure to hazardous materials from spills, leaks, vapor releases, and improper or illegal storage and disposal.

Policy q: Limit the use and storage of hazardous materials in Larkspur to commercial and industrial areas.

Action Program [34]: Designate zone districts where hazardous materials can be used and stored.

Action Program [35]: Closely monitor and enforce regulations concerning the use and handling of hazardous materials.

Action Program [36]: Require transporters of hazardous materials to notify the City before moving such materials along City streets.

The types and amounts of materials requiring such notification will be specified by the City. The City also should identify areas where various types of hazardous chemicals and materials can be used and stored. Small quantities of certain types of chemicals (such as dry cleaning solvents) may be used in neighborhood commercial areas, while other types of chemicals and materials should be more strictly controlled.

AIR QUALITY

Poor air quality is a persistent environmental problem. Despite great improvements in the past 20 years, the San Francisco Bay Area still experiences unacceptably high air pollution levels. The Bay Area is designated a "nonattainment" area for ozone and carbon monoxide, meaning these pollutants exceed federal standards. Auto emissions are the primary source of air pollution in the Bay Area (Unless otherwise noted, the information in

this section was obtained from the Bay Area Air Quality Management District's booklet, *Air Quality and Urban Development Guidelines for Assessing Impacts of Projects and Plans*, Nov, 1985, and revised draft of Chapter 10, May 1988).

Although ambient air quality in Marin County is excellent, due to largely favorable meteorological conditions (Marin Countywide Plan Draft Environmental Quality Element, January 1989, page 2-10), vehicle travel by Marin residents and workers probably contributes to the worsening conditions in other parts of the Bay Area. The Larkspur General Plan can contribute to improved regional air quality through its policies and programs to reduce the number of single-occupant auto trips.

Regulatory Agencies and Standards

Air pollutants are regulated at the federal, state, and regional level. The federal Clean Air Act of 1970 set standards for various pollutants. In 1977 it was amended to require states that would not attain air quality standards by 1982 (as in the Bay Area) to adopt vehicle inspection and maintenance programs and transportation control measures.

The State of California has adopted its own air quality standards which, for some pollutants, are more restrictive than the federal standards. The Sher and Cortese bills place greater emphasis on transportation control measures to reduce auto emissions.

The Bay Area Air Quality Management District (BAAQMD) does regional air quality planning, regulates stationary sources, and operates a system of 17 air quality monitors throughout the Bay Area to track local and regional air quality conditions. The only Marin County monitor is located at 534 Fourth Street in San Rafael. Readings from this monitor are the primary source of information about air quality in the county.

The table below summarizes federal and state ambient air quality standards for the major pollutants.

Figure 7-6
Federal and State Ambient Air Quality Standards

Pollutant	Averaging Time	National Standard	California Standard
Carbon Monoxide (CO)	8-Hour	9.0 ppm	9.0 ppm
Ozone (0_3)	1-Hour	0.12 ppm	0.10 ppm
Nitrogen Dioxide (NO)	Annual 1-Hour	0.05 ppm	0.25 ppm
Sulfur Dioxide (SO_2)	Annual 24-Hour	0.03 ppm 0.14 ppm	 0.05 ppm
Total Suspended Particulates (TSP) (P.M. < 10)	An Geom. Mean 24-Hour		30 ug/m^3 50 ug/m^3

ppm = Parts per million; ug/m^3 = micrograms per cubic-meter;
P.M. < 10 = Particulate matter less than 10 microns in diameter.

Standards for emissions from wood burning stoves may be forthcoming because wood burning stoves produce large amounts of particulate matter. However, at the time of adoption of this Plan, the California Energy Commission had not adopted such standards. Some California communities require fireplaces and wood-burning stoves to meet Oregon or Colorado certification standards.

Sources of Pollutants, and Health Risks

Emissions from motor vehicles are the primary source of carbon monoxide, ozone precursors (the chemicals that react to form ozone in the presence of sunlight), and nitrogen dioxide. Large industrial plants, primarily oil refineries, are the major source of sulfur dioxide. Combustion, factories, construction, grading, and demolition create particulate matter (smoke, dust, aerosols, and metallic oxides). Particulate matter of 10 microns or less in size is of greatest concern because it is more easily inhaled.

The regulated pollutants can cause cardiovascular disease and acute and chronic respiratory disease. In addition, ozone can irritate the eyes, reduce visibility, and damage vegetation. Certain population groups, including children, the elderly, the acutely ill, and the chronically ill - especially those with cardiovascular diseases - are particularly sensitive to high concentrations of pollutants. These groups, and the locations and facilities where they spend a substantial amount of time, are referred to as "sensitive receptors." In Larkspur, sensitive receptors include all residential neighborhoods as well as public and private schools (Redwood High School, Hall Middle School, Larkspur/Corte Madera School where Marin Primary School is located, and St. Patrick's School), city parks, and private day care centers. (See Figure 5-2 for locations.) Marin General Hospital, schools, parks, and convalescent hospitals in Kentfield and Greenbrae are also "sensitive receptors."

Climate and Topography

Climate and topography are major influences on air quality. Marin County benefits from constant winds, a marine layer of fog which lifts in the morning hours during the summer, and heavy winter precipitation compared to other parts of the Bay Area. Wind direction is east-west, in alignment with the ridges (Corte Madera Ridge and Southern Heights Ridge in Larkspur). The combination of wind direction and topography allows for constant scouring of the ambient air, resulting in extremely high air quality most of the time. It also means that air pollution generated in Marin County is dispersed to other parts of the Bay Area, underscoring the regional nature of the problem (Marin County Environmental Quality Element Draft Technical Reort #1, *Air Quality Maintenance in Marin County,* January 1989, page 11).

Historic and Current Air Quality

Air quality in the San Francisco Bay Area has improved since the passage of the Clean Air Act in 1970, due mainly to emission controls on autos and to controls on stationary air pollution sources. Table 7-7 below shows the number of days on which federal or State standards were exceeded at the San Rafael Monitoring Station over the past 10 years. After three incidents in 1978, there were no days in which standards were exceeded until 1988.

Figure 7-7
Number of Days on Which Federal or State Standards Were Exceeded at the San Rafael Monitoring Station

Pollutant	1978	1980	1982	1983-1987	1988	
Carbon Monoxide (CO)	1	0	0	0	0	
Ozone (O_3)	2	0	0	0	1	(State)
Nitrogen Dioxide (NO_2)	0	0	0	0	0	
Sulfur Dioxide(SO_2)	0	0	0	0	0	
Total Suspended Particulates (TSP) (P.M. < 10)	0	0	0	0	2	

Although the table illustrates generally favorable air quality in Marin County, Marin produced an estimated 190 tons of air contaminants every day in 1982. When disaggregated by land use, transportation (vehicles, boats, *etc.*) was estimated to produce 160 tons or 84 percent of the total. Residential, industrial, construction, and agriculture each contributed between six and nine tons a day (Marin Countywide Plan Draft Environmental Quality Element, January 1989, page 2-10). Clearly, vehicle travel is the major source of air pollution in Marin County. Although carbon dioxide is not listed above, even a clean-burning engine emits about 5.6 pounds of carbon in the form of carbon dioxide for every gallon of gas it consumes (*The End of Nature,* Bill McKibben, 1989).

Air Quality Goals, Policies, and Programs

Goal 10: Ensure that air pollution levels do not threaten public health and safety.

Policy r: Seek to comply with State and federal standards for air quality.

Policy s: Seek to reduce auto travel and, thereby, the pollutants from auto emissions.

Since most readily available pollution control "hardware" has already been applied to stationary sources and motor vehicles, a reduction in auto travel may be the only way to improve air quality in the Bay Area. This could require fundamental changes in land use and travel patterns. Larkspur is almost built out, so significant land use changes are not likely to occur. However, the Larkspur Circulation Goals, Policies, and Programs strongly advocate a reduction in the number of single-occupant auto trips. Alternative modes of transportation, such as transit and bicycles, are encouraged, and a Transportation Demand Management ordinance is proposed. The Circulation and Land Use chapters also encourage mixed uses and neighborhood shopping centers to reduce auto trips.

Policy t: Ensure that traffic generated by new development is not the cause of state and federal air quality standards being exceeded in Marin County.

Action Program [37]: Require new development to mitigate impacts if the project causes a change in the level of air pollutants by a specified amount.

The City will work with the BAAQMD to identify other measures which Larkspur might impose.

NOISE

Noise is unwanted sound. Traffic is the main source of noise in Larkspur. Noise measurements taken in 1982 found noise levels to be highest near major traffic generators and quietest at locations remote from major traffic sources.

An understanding of the location and sources of noise in Larkspur is important to land use and transportation policies, and therefore the land use and circulation sections of the General Plan. "Sensitive" land uses (housing, schools, hospitals) should be located away from high noise levels, or, if that's not practical, protected from them. Since traffic is the major noise generator, policies that will increase or decrease traffic will affect the noise environment of adjacent land uses. Noise is also a factor in open space planning because noise can adversely affect the enjoyment of quiet activities in those areas.

Noise measurements were made at nine locations throughout the City in July 1982. Measurements taken in three general areas since then (for Environmental Impact Reports prepared in 1987 and 1988 for Creekside and the Landmark Building) show no measurable change. (All measurements have a one or two decibel margin of error.) Besides showing actual noise levels in various locations, these measurements were used to validate noise contours developed for the City's major arterials. The noise contours were modeled (not actually measured) using information on average daily traffic, peak and off-peak travel speeds, distribution of traffic by hour of the day, and the percentage of trucks on a given street.

The noise contours are shown in terms of the day/night average noise level (L_{dn}), which is the measurement commonly used in Environmental Impact Reports.

Noise contours were also modeled for 1990 (with a notation that they would be accurate at least through 1995).
See Figure 7-8.

Figure 7-8
1995 Noise Exposure Contours
[to be inserted]

The 1990-95 noise contours were based on projected future traffic, which is not significantly different from the future traffic projected under this General Plan in terms of how it affects the noise contours.

The locations of the contours do not take into account shielding provided by terrain, buildings, or intervening walls. The contours therefore represent "worst case" conditions. For example, the contours indicate a noise level of about 65 L_{dn} at Site 1 (Via la Cumbre), but the actual noise measurement was 56 L_{dn}. At this location, Highway 101 is depressed relative to the homes along Via la Cumbre, and the cut slope reduces the noise levels. The same phenomenon was demonstrated when noise measurements were taken for the Lincoln Terraces project. The noise measurement at the site closest to Highway 101 was lower than at others farther away because the location is shielded from traffic noise by the old quarry walls.

Exterior Noise Levels and Land Use Compatibility

Over the years many studies have been performed to determine how much noise is

acceptable for different land uses. Figure 7-9, "Land Use Compatibility Standards," shows the noise levels that are acceptable for various land use categories. The chart indicates that a land use can be made compatible with a range of noise levels if the necessary noise reduction features are included in its design. This table helps planners in making preliminary determinations about the suitability of a proposed project located in an area where there is information about the noise environment (e.g., from noise contours or noise measurements).

California Noise Insulation Standards require preparation of an acoustical report for multiple-family dwellings proposed in areas where the L_{dn} exceeds 60 dBA. The report must show how the project will be designed to reduce the noise level to at least 45 dBA in habitable rooms. Typical buildings with their windows open provide an exterior-to-interior noise reduction of about 15 dB. In areas where the exterior noise level exceeds an L_{dn} of 60 dB, other noise reduction measures must be employed (see *Construction Modifications* on page 151). No standards have been established for acceptable outdoor areas in multiple-family developments, but State Noise Element Guidelines recommend 60 dB as the upper limit for acceptable levels.

Figure 7-9
Land Use Compatibility Standards
[to be inserted]

Comparable State standards do not exist for commercial development. However, an interior noise level of 40 to 45 dB is generally considered acceptable for an office environment during working hours.

Besides traffic, other noise sources have been identified as common problems in Larkspur. Unmuffled or improperly muffled motor vehicles are some of the most annoying sources in any community. Not only are these vehicles annoying, they are illegal. Identification of unmuffled vehicles and/or vehicles with modified exhaust systems is easy, and it should be the routine procedure of the Police Department to cite all offenders.

Barking dogs, especially during the night, are particularly annoying. The Environmental Protection Agency has developed a training procedure which has been very successful in teaching dogs not to bark. It is included in Larkspur's 1982 Draft Noise Element as Appendix C.

The use of power tools can be controlled through a noise ordinance which, in part, restricts their use to certain hours of the day--8 AM to 10 PM during weekdays and 9 AM to 9 PM on weekends. A noise ordinance could also control amplified music, public address system, radios, and other electronic noise sources.

Early morning garbage pick-up can be a problem. The City should encourage the scavenger company to consider the purchase of quiet trucks when upgrading or expanding their fleet. Additionally, the City should review new projects to determine whether approval will result in earlier garbage pickups in existing neighborhoods.

Noise Goals, Policies, and Programs

Goal 11: Reduce the adverse effects of noise upon persons living or working in Larkspur.

Policy u: Ensure that all new living and work areas are developed with acceptable noise environments.

Action Program [38]: Maintain the following standards for noise levels in new residential developments.

a. Indoor noise levels should not exceed 45 dBA.
b. Outdoor noise levels should not exceed 55 dBA.

Noise can be reduced through site planning, architectural layout, noise barriers, and construction modifications.

Site Planning. By taking advantage of the natural shape and contours of the site, it is often possible to arrange buildings and other facilities to reduce and possibly eliminate noise impacts. Planned unit developments are particularly conducive to site planning techniques.

Architectural Layout. Bedrooms will be considerably quieter if placed on the side of the house facing away from a roadway. Similarly, balconies facing roadways should be avoided. Quiet outdoor spaces can be provided by creating a U-shaped development that faces away from the roadway.

Noise Barriers. Noise barriers must be massive enough to prevent significant noise transmission through them and high enough to shield the receiver from the noise source. While effective - because of their massiveness - noise walls are not appropriate in all locations. They work well along freeways and in larger developments. Access doors should be placed in the walls at regular intervals for use during emergencies.

Construction Modifications. In general, windows and doors are the acoustical "weak links" in a building. If other noise reduction measures are not sufficient, sealed windows on the noisy side of the building and an alternate means of ventilating the building may help. Beyond this, thicker window panes or double-glazed windows will be required. Doors should face away from the noise source. They should be solid-core and equipped with an appropriate acoustical door gasket.

Policy v: For non-residential projects, use the "Land Use Compatibility Standards," Figure 7-9, to evaluate their suitability in particular locations.

Action Program [39]: Require acoustical studies for all projects that would be exposed to noise levels in excess of those deemed normally acceptable, as defined in Figure 7-9.

Action Program [40]: Require thorough noise assessments in all environmental

analyses of major projects.

Goal 12: Reduce noise levels in areas where the existing noise exceeds "normally acceptable" levels, to levels compatible with land uses in those areas, as defined in Figure 7-9, "Land Use Compatibility Standards."

Policy w: Promote educational efforts that will encourage the citizens of Larkspur to improve their noise environments.

Policy x: Control unnecessary, excessive, and annoying noises within the city, where not preempted by federal or State control.

Action Program [41]: Adopt a noise ordinance.

Policy y: Enforce applicable federal and State laws.

Action Program [42]: Enforce the provisions of the California Motor Vehicle Code pertaining to vehicle noise emission.

Policy z: Support programs to reduce community noise levels where possible within the "normally acceptable" categories shown in Figure 7-9.

Action Program [43]: Work with neighboring communities to ensure compliance with Larkspur's land use and noise compatibility standards at the city's boundaries.

Goal 13: Prevent the escalation of noise levels in areas where noise-sensitive uses exist.

Policy aa: Analyze in detail the potential noise impacts of any actions the City may take that could significantly alter noise levels in the community.

Action Program [44]: Review all public works projects for potential noise impact.

Action Program [45]: Consider noise emission when purchasing vehicles, construction equipment, etc. This consideration shall be balanced against the required performance and cost.

Policy ab: Encourage creative solutions when potential conflicts arise between noise levels and land use.