LIA's

Public Safety Element
Noise Element
Scenic Highway Element

CITY OF BLUE LAKE GENERAL PLAN

July, 1975

OSCAR LARSON AND ASSOCIATES
and ENVIRONMENTAL RESEARCH CONSULTANTS

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August 15, 1975

City Council
City of Blue Lake
P. O. Box 458
Blue Lake, California 95525

Gentlemen:

The following report is the Public Safety, Noise and Scenic Highway Elements of the Blue Lake General Plan. It incorporates the changes generated from review by the public and the City staff.

We are confident that the implementation of the recommendations in the Public Safety Element will make Blue Lake a safer community. The Noise Element alerts the community to the potential for increased noise levels and indicates what can be done if noise becomes a problem. The Scenic Highway Element considers the options open to the community for protecting and enhancing the scenic attractions in the Blue Lake area.

Oscar Larson & Associates, Environmental Research Consultants and Resource Planning Associates wish to thank you for the opportunity to assist the City of Blue Lake in the preparation of these General Plan Elements. We very much appreciate the assistance given by the City staff and the input provided by citizens who took an interest in this planning project.

Very truly yours,

OSCAR, LARSON & ASSOCIATES

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TABLE OF CONTENTS

SCENIC HIGHWAY ELEMENT

LIST OF PLATES

PUBLIC SAFETY, NOISE AND SCENIC HIGHWAY ELEMENTS INTRODUCTION

Planning Requirement and Guidelines. State Law (Section 65302.2) provides that every city and county in the state prepare and adopt a seismic safety element, a noise element, a safety element and a scenic highway element as part of the General Plan for the jurisdiction. The state law also provides that the Council on Intergovernmental Relations develop guidelines for each of these elements. These guidelines are advisory in nature and are intended to be flexible to meet the varying needs and characteristics of the different cities and counties in the State. This report is intended to satisfy the requirements of the state law and the intent of the CIR guidelines.

Combined Elements. The CIR guidelines suggest that if the subject matter of general plan elements are similar or closely related, combining them may be appropriate. Because of the interrelationship between the Seismic Safety Element and the Safety Elements they are combined under the heading of the Public Safety Element. While this expands the subject range somewhat, it ties together most of the factors that cause or are related to major emergencies or risks to public safety. The subjects considered are the common concern of public safety agencies such as the police department, fire district, and public works department.

The Planning Area. The boundary of the Blue Lake Planning Area is extended beyond the city limits to encompass most of the existing or potential development that is or will be closely related to the city. One criteria was the service area limits described in the adopted sewer plan.[1] Development in outlying areas will eventually require sewers, and in order to connect to the system, property must be within the city limits. The potential sewer service area is included so that Blue Lake's planning and development policies will not need to be revised to consider the needs and problems associated with areas likely to annex in the future.

Another criteria was the area considered in the existing land use and circulation elements of the Blue Lake General Plan. Essentially the area covered by the Public Safety, Noise and Scenic Highway elements includes the area covered by the previous elements and adds additional area to the north.

Affected Agencies. As the primary unit of general local government serving the largest portion of the population in the planning area and the most intensely developed area, the City of Blue Lake is responsible for adopting and implementing these General Plan elements. The County of Humboldt is the responsible unit of general government providing police protection, building construction regulation, road improvements and other governmental services

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[1] Wastewater Collection, Treatment and Disposal, for Mid-Humboldt County Urban Planning Program, Baruth and Yoder, July 1971.

in the unincorporated areas. It is anticipated that the county will carefully consider the criteria and the standards contained in these elements and cooperate with the City of Blue Lake in their application to the County's portion of the Blue Lake planning area. The County of Humboldt is providing law enforcement and building inspection services inside of the city limits under contracts with the city.

The Blue Lake Fire Protection District and the Blue Lake Elementary School District are special districts serving the planning area. They will be involved in implementation of some of the recommendations contained in the Public Safety and Noise Elements. A few agencies at the state, federal, and local level are affected indirectly or play a secondary role in implementing the recommendations. These agencies are noted where they are affected.

Relation to Existing General Plan Elements. The recommendations in a Public Safety, Noise or Scenic Highway study should, under ideal circumstances be part of the basic information used to develop the Land Use, Circulation and other consolidating elements of a General Plan. However, the consolidating elements were prepared several years ago. Preparation of the Public Safety, Noise, and Scenic Highway Elements at a later date raises the possibility that the data and proposals could uncover problems in the existing plans or conflict with existing policies. Where conclusions in the Public Safety, Noise or Scenic Highway Elements raise questions about land use designations or other aspects of existing general plan elements, these questions are noted and the Planning Commission is asked to consider resolving the issue either as part of a general updating of the existing elements or as specific amendments. In most cases the elements herein amplify and support the existing elements and should be helpful to the Planning Commission and the building inspectors in their permit issuing functions. Important considerations in public improvement and maintenance programs are also noted.

Citizens Input. Citizen input has played an important part in the assessment of problems and development of mitigating measures. Interviews with a select group of local residents and a meeting to discuss the preliminary findings with them have provided valuable background information. Their assessment of the important problems in the community, and their reactions to the issues covered in the three elements provided the perspective needed to determine which problems should be given emphasis and which solutions were the most likely to be effective under local conditions.

Where there was general consensus among the citizens' committee members their preference has been given considerable weight. Many of the choices were between continuing with the "no action" policy or recommending a specific "action" policy. There were few instances where multiple action proposals were considered feasible. The citizens tended to refrain from recommending action policies which involved expanding governmental bureaucracy, property tax increases, or placing responsibilities, which could be considered onerous, on private parties. This generally conservative approach often contrasted with the consultant's efforts to uncover every

possible problem and identify an acceptable solution. The outcome is an attempt at a balanced outlook, not so conservative that legitimate public concerns go unsatisfied, and not so optimistic as to presume that every possibility, however minor, should be considered and resolved.

Report Format. Rather than follow a formal outline that covers each item mentioned in the CIR guidelines, the focus has been shifted to problem identification and the development of feasible solutions. The text of each element is confined to brief elaboration of problems that have been identified and a series of recommendations aimed at correcting significant problems. Most of the relevant technical information is located in the appendices at the end of the element.

Environmental Impacts. The Guidelines for Implementation of the California Environmental Quality Act of 1970, as amended through February 18, 1975, include the adoption of elements of a General Plan as projects subject to the Act and thus to the Guidelines (Section 15037 a 1, Section 15060). Beyond this, the Guidelines are open to interpretation as to whether individual elements of the General Plan must have an Environmental Impact Report or whether a Negative Declaration can be used, especially in this instance, when the elements consist of environmental information and adjustments in administrative policy which taken as a whole will have very little, if any, significant impact on the environment.

The general plan guidelines adopted by the Council on Intergovernmental Relations seem to suggest that an Environmental Impact Report is required, but go on to qualify the application of the CEQA guidelines with the statement, "Given the nature of the document as a long range set of policies and principles, it is not always practical to apply each of the seven points noted in the CEQA with the same degree of specificity that is applied to a specific project. The general plan environmental analysis should take a broader scope than the analysis which is done on a specific project which has specific, well defined limits."

The environmental review procedures adopted by the City of Blue Lake under CEQA provides that the City determine whether or not the project "may involve significant environmental impacts". To provide the City with the necessary data for its initial determination, an environmental assessment has been incorporated into the text of the elements. Important environmental information provided in Appendix A and D regards geologic and noise considerations respectively. Further, the impacts associated with the recommendations are also addressed (please refer to the italicized text). When the assessment covers general impacts relating to more than one recommendation the discussion is located in the introductory section. Specific impact assessments are provided following those recommendations which interject unique considerations not covered by the general introductory assessment, or the appendices.

PUBLIC SAFETY ELEMENT

Content. The Public Safety Element is a composite of the Seismic Safety Element and the Safety Element. According to the state guidelines the Seismic Element should consist of "an identification and appraisal of seismic hazards such as susceptibility to surface ruptures from faulting, to ground shaking, to ground failures, or to the effects of seismically induced waves such as tsunamis and seiches." The seismic safety element includes "an appraisal of mudslides, landslides, and slope stability as necessary geologic hazards that must be considered simultaneously with other hazards...".

Purpose. The Government Code identifies the purpose of the Safety Elements as "the protection of the community from fires and geologic hazards including features necessary for such protection as evacuation routes, peak load water supply requirements, minimum road width, clearances around structures, and geologic hazards mapping in areas of known geologic hazard." The intent of both of these elements is to reduce loss of life, injuries, damage to property and economic and social dislocation.

Hazards. When structures and land uses are situated close together and are utilized and occupied for a variety of purposes the number of possible hazards that could result in damage or destruction of property or injury to the occupants increases dramatically. Both the individual property owner and local government have become involved in various attempts at hazard reduction or the provision of emergency services. Public agencies have assumed responsibility for protection of private property in extreme hazards or where hazards affect many properties or citizens. At the same time the city is responsible for the use and maintenance of publicly owned property, such as streets, public buildings, and parks. Since it is difficult to totally remove all risks from the environment, property owners and the city protect themselves from economic loss by purchasing insurance policies. The greater the risk that is covered the higher the insurance premium. So it behooves both property owners and the city to reduce the risks whenever possible for both humanitarian and economic reasons.

The following series of goals characterizes the general intent of the city and the fire district:

1. To assist private property owners in maintaining safe living, working, and playing conditions by requiring inclusion of safety factors in new structures and land uses, by encouraging reduction of hazards on existing properties through proper maintenance, by maintaining adequate law enforcement and fire supression capability, and by participating with property owners in various types of public works projects aimed at reducing hazards when general public benefit will result.

2. To make public facilities as safe as possible.

3. To achieve the lowest possible fire rating for the city.

4. To cooperate with other agencies to maximize emergency response capability.

5. To minimize the loss of life and property damage in the event of disaster by providing essential services and organizing efficient community response.

Giving substance to these goals requires more precise definition of how far the city should go to achieve these goals. Legal obligations, liability, available resources, and general community attitudes must all be considered. Lack of resources is almost always a critical factor. When the decision hinges on community interests the type of risk involved should be carefully identified.

Risk Assessment. Risks can be classified as avoidable, acceptable and unacceptable. Avoidable risks are those that can be corrected without increased expense, or are risks that people voluntarily assume as part of their work or recreation for its intrinsic stimulation. An acceptable risk is not taken out of choice, but the level of risk is judged minor and not worthy of the extra effort and expense needed to eliminate it. Unacceptable risks are those where the threat to property or persons is judged worthy of action on the part of the property owner or the appropriate public agency.

The intent of the Public Safety Element is to identify any instances where avoidable risks can be reduced by public agencies at little expense and to identify courses of action to reduce unacceptable risks. The recommendations presented herein address the avoidable risks that were uncovered and the unacceptable risks that the City Council feels can be reduced by the suggested actions. Those risks that are not addressed are either considered acceptable or it was determined that the existing response to the risk is all that can be justified of a public agency under the circumstances.

Format. The various aspects of public safety are considered under the following headings: Seismic Hazards, Flooding Hazards and Drainage Problems, Fire Hazards, Traffic and Pedestrian Hazards, and a section on Storage Hazards, Attractive Nuisances and Other Hazards. The last section contains the contingency planning considerations related to disaster preparedness. The italicized paragraphs together with the information provided in the appendix represents the environmental assessment required by the California Environmental Quality Act. Plate 3 shows the location of many of the safety hazards identified in the planning area.

Environmental Assessment. The recommendations of this element are mainly directed at the establishment of policies that will mitigate the impacts of natural hazards on existing structures or that will regulate future construction and installations to reduce the likelihood of adverse impacts due to natural or man-made disasters. Many of the specific actions, or

projects that are suggested include permit procedures, structural repair work or field studies which as individual projects would be exempt as ministerial projects from the EIR requirements of CEQA 70 (Sections 15073a). However, as a routine planning policy, each recommendation was considered for its direct and indirect impacts upon the air, water, earth, the plants and wildlife as well as upon the economic and social well-being of the community and its residents. Each recommendation was considered in terms of unavoidable impacts, possible mitigation measures, short term uses, long term productivity and its resource and energy requirements. Alternatives are discussed if pertinent. The few remaining projects, though calling for a commitment of resources, are also safety maintenance measures akin to the emergency actions exemplified by Section 15071c of the CEQA guidelines as amended to 18 February 1975.

SEISMIC HAZARDS

Earthquakes. The western portions of Humboldt County, and adjoining offshore areas, are regions of moderate to high seismicity. Plate 1 shows the location of major faults. Except for the Cape Mendocino area, no obvious patterns emerge tying earthquakes to particular faults or shear zones. The only known historical surface rupture associated with a fault in the area was in 1906 along the San Andreas Fault in southern Humboldt County, at Shelter Cove and Upper Mattole. The frequent earthquakes south and southwest of Ferndale are taken to indicate modern activity along the Cape Mendocino-False Cape shear zone.

Elsewhere in the area no faults can be demonstrated to be unequivocally active, but several should be viewed with considerable suspicion. Recognizing that the data is sparse the approach identified in the appendix has been used to estimate the maximum probable earthquake (the strongest earthquake likely to occur on a given major fault during any 100-year period). The magnitude of such an event is estimated at 6.4 (Richter scale), and could occur at any one of the four faults in the northern Humboldt County seismic area. The four faults in the southern seismic area are far enough away so that no serious damage stemming from movement on them is anticipated in the Blue Lake planning area.

From this estimate of magnitude it is possible to predict the maximum and repeatable bedrock accelerations that would be felt in the Blue Lake planning area from any of the four northern faults. The maximum bedrock acceleration estimates range from .24 to .75 and the repeatable strong bedrock acceleration estimates range from .16 to .49 g.[1] Higher intensities would be expected in areas underlain by river alluvium, unstable landslide terrain or fill. The higher figures are due to the location of the Falor-Korbel Fault zone which passes through the Blue Lake planning area. This zone consists of four northwest trending faults -- two of them, the Korbel and Falor, being just outside the planning area on the northeast and southwest respectively, and two smaller faults immediately northeast of Blue Lake (see Plate 3). Since three of the four published epicentral locations for the 1954 "Humboldt Bay" earthquake place it within or closely adjacent to this zone, there is a high likelihood that one or more of the faults in the Falor-Korbel zone is active. The other three major fault zones in the northern Humboldt County area are considered potentially active.

The repeatable strong ground acceleration estimate is the factor engineers include in their structural design considerations. A formula in the Building Code determines how much building weight should be considered in the foundation design, anchoring, and wall reinforcement. The minimum acceleration factor in the Building Code is .1. For a masonry building this means that the design must account for 1.13 times the building weight. If a .2 acceleration factor is substituted, the formula produces a design load of 1.26 times the weight of the building, and a .3 factor equals 1.4 times the weight of the building.

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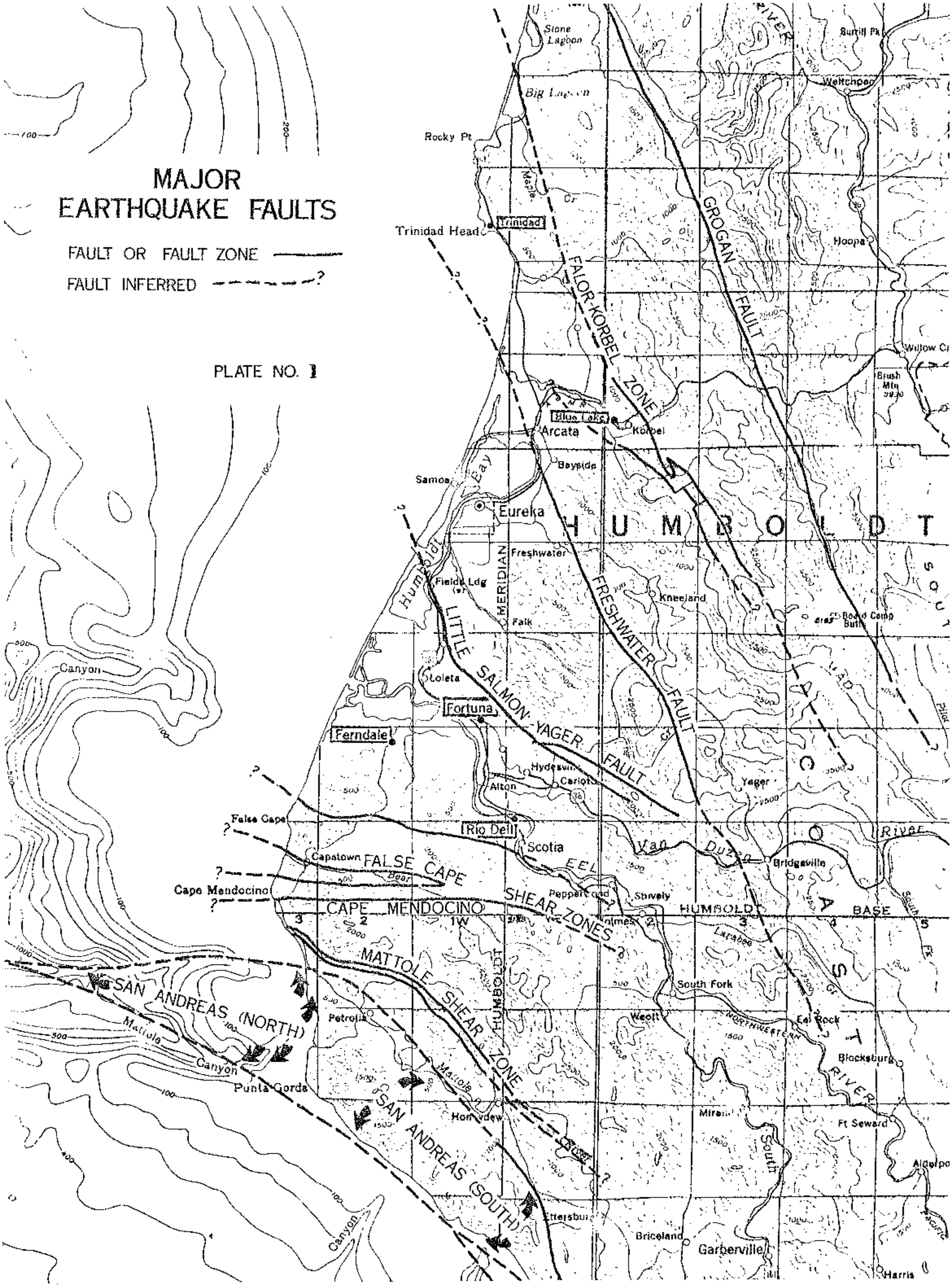
[1] %g is the instantaneous acceleration in any direction imparted to bedrock by the seismic shock wave. It is related numerically to the acceleration imparted to a freely falling object by the pull of gravity.

MAJOR EARTHQUAKE FAULTS

FAULT OR FAULT ZONE ———

FAULT INFERRED — — — — ?

PLATE NO. 1



An increase in the design load requires more reinforcement, more foundation tie-downs and other additives that increase the cost of the structure. Although the degree of cost increase varies according to the shape of the structure, the number of stories, etc., it is estimated that the construction cost for a one story concrete block building would increase approximately 5% if the acceleration factor was increased from .1 to .2. Above .2 the cost increases more than 5% for each increment because use of more elaborate structural methods is necessary.

To account for the 100-year earthquake event the acceleration figure would have to be increased to .4 or .5 which would make the cost of typical construction prohibitive. A .2 or .3 factor would provide reasonable assurance that a building would not collapse in a moderate earthquake. Although the walls might crack the damage would be repairable. The present .1 figure increases the chances of personal injury and damage which would require extensive reconstruction.

During the 1954 quake which registered 6.5 on the Richter scale the damage to frame dwellings and structures in the planning area consisted of broken chimneys, a few cracked walls and ceilings, dislocated merchandise and furniture. There were very few masonry buildings in 1954 and there are very few today. If frame structures built since then are equal in resiliency to those built before 1954, and most people feel they are, the risk of injury and serious damage seems remote to local citizens. It has been found, however, that large and even moderate earthquakes loosen buildings and their capacity to withstand the next earthquake diminishes even though there is little external evidence of the damage. This is true of both frame and masonry structures.

Recommendation #1. The City building inspector should provide prospective builders of masonry buildings with a copy of the seismic information in the Public Safety Element so they can decide for themselves whether extra design considerations are warranted.

Environmental Assessment. This recommendation will have little impact. The public will have been advised of the existence of a potential hazard. Personal exercise of the stricter standards will be inversely proportional to the additional costs involved. Adoption of this recommendation will cause a minimum of social reaction unless a severe earthquake occurs in which case there will be angry recriminations proportionate to the damage and injury incurred.

Recommendation #2. The present practice of the Fire District staff warning property owners to inspect flues and chimneys for damage after moderate and large earthquakes should be formalized and coordinated with the city building inspector. Also, occupied structures which appear to have been seriously damaged by an earthquake should be inspected and evacuation required if they are found unsafe.

Environmental Assessment. This policy is entirely aimed at mitigating the adverse impacts of natural disasters.

Recommendation #3. The city should convey to the county its concern for the need for development control near the fault lines shown on Plate 3 and urge that considerations of appropriate controls be included in the Seismic Safety Element of the County General Plan.

Environmental Assessment. This recommendation is aimed at mitigating the impacts of natural disaster. It will secondarily limit the land use options of the owners of the property within the restricted zone.

An alternative plan would entail the public purchase of lands within the hazard zone for establishing an open space, green belt, or recreation area. This alternative would result in a public expenditure and a concommitant loss of property tax revenue. Open space and recreational areas are not in short supply in the Blue Lake area.

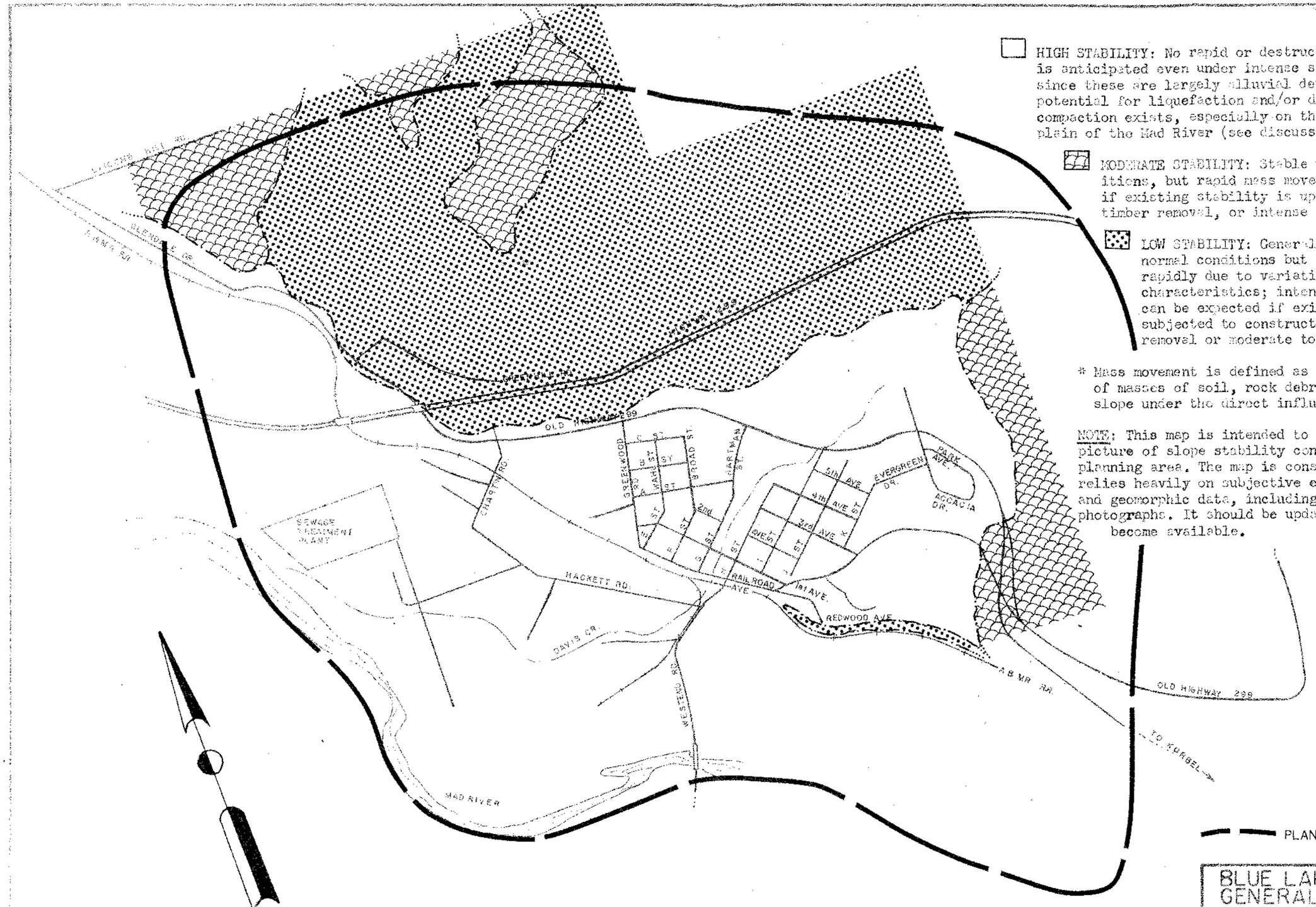
Slope Instability. Mass movement of material on hillsides is a major accompaniment of moderate and strong earthquakes. This may be in the form of landslides, rock avalanches, mud and debris flows, or other types of slope failure. Steep natural or artificial slopes and high water content favor such failure.

Plate 2 delineates the slope areas in the Blue Lake planning area which appear to have stability problems. The delineations are generalized and serve as a caution to those designing highways, subdivisions or critical structures that further slope stability investigation is warranted.

Construction, timber removal or strong seismic shaking in areas characterized as stable could reduce this stability and localized slope failure is anticipated under these circumstances. Most of the present townsite and adjacent lowland area are categorized as stable due to the gradual slope, but contain an undetermined potential for localized liquefaction, lurching, cracking, and differential subsidence. Location of critical structures in this area should be preceded by borings beneath the site to assess the potential for these less common but dangerous occurrences. These types of ground failure are discussed in more detail in Appendix A.

Recommendation #4. Before any major excavation, or the construction of dwellings, public facilities, and large commercial or industrial buildings is permitted by the city within low or moderate stability areas special studies by a registered soil engineer or licensed geologist should be undertaken by the developer and necessary provisions made for reducing landslide risk.

NOTE: Most of the low and moderate stability areas are presently outside the city limits. The County is utilizing Chapter 70 of the Uniform Building Code dealing with grading, and enforcement of County Ordinance #596 (which requires developers to provide appropriate soil studies for slopes in excess of 15%) to reduce the potential for landslides in the County's portion of the Blue Lake planning area.



HIGH STABILITY: No rapid or destructive mass movement is anticipated even under intense shaking. However, since these are largely alluvial deposits, an unknown potential for liquefaction and/or differential compaction exists, especially on the modern flood plain of the Mad River (see discussion). *

MODERATE STABILITY: Stable under normal conditions, but rapid mass movement is possible if existing stability is upset by construction, timber removal, or intense shaking.

LOW STABILITY: Generally unstable under normal conditions but varies widely and rapidly due to variations in bedrock characteristics; intensified mass movement can be expected if existing slopes are subjected to construction activity, timber removal or moderate to intense shaking.

* Mass movement is defined as the bulk transfer of masses of soil, rock debris, or rock, down slope under the direct influence of gravity.

NOTE: This map is intended to present a generalized picture of slope stability conditions within the planning area. The map is considered tentative and relies heavily on subjective evaluation of geologic and geomorphic data, including analysis of aerial photographs. It should be updated as better data become available.

PLANNING AREA BOUNDARY

BLUE LAKE GENERAL PLAN

SOIL STABILITY

OSCAR LARSON & ASSOC.
1809 ALBEE ST. EUREKA
443-8381

APPROX. SCALE 1"=1000' | PLATE NO 2

Environmental Assessment. This recommendation is the first step in the mitigation of a natural hazard. Adoption of this recommendation will result in an expenditure by affected property owners. Impacts may arise from the actions that flow from the study. These impacts may be in the form of restrictions on building or added construction requirements which will be unpopular with those affected. Long range saving may result in connection with the avoidance of damage to structures and of soil loss through erosion.

Recommendation #5. Any proposed construction of commercial or industrial structures in the area more than 300 feet southwesterly of the railroad right-of-way should be preceded by site investigations to determine the potential for liquefaction and similar types of earth movement resulting from ground shaking.

Environmental Assessment. This recommendation is the first step in the mitigation of a natural hazard. Adoption of this recommendation will result in an expenditure by affected property owners. Impacts may arise from the actions that flow from the study. These impacts may be in the form of restrictions on building or added construction requirements which will be unpopular with those affected. Long range saving may result in connection with the avoidance of damage to structures.

FLOODING AND DRAINAGE HAZARDS

Plate 3 illustrates the areas that are inundated in a 100-year flood. A levee on the north bank of the North Fork of the Mad River has successfully contained recent flooding and it is expected to withstand a 100-year event. Davis Creek, which runs through the center of the town, has created some flooding problems in the area north of the railroad but most of the bank overflow occurs between the railroad and the Mad River where the flood plain spreads out and floods an area east of West End Road. Near the Mad River it flows north and isolates the area around the sewage treatment plant. Some residences in the lower reach have been affected by flooding and various efforts to clean out the brush and debris in the creek have been undertaken in the past with only limited success.

Recommendation #6. The city should adopt a program that provides city inspection of Davis Creek each fall followed by notification of responsible property owners to remove brush or debris that could cause congestion during a flood. If the property owner does not wish to perform the work the city would do it and charge the property owner for the city's expense.

Environmental Assessment. Removal of debris and obstruction from the creek will mitigate localized flooding problems and possibly improve its appearance. Flooding reduction could have a mild influence on real property values though not enough to affect real estate tax revenues. It could also have a mildly stimulatory effect on community spirit. It will also likely generate some resentment on the part of property owners who feel that maintenance of the Creek channel is the responsibility of the city. An alternative would be the establishment of a special drainage district with taxing authority.

Revenues would be utilized for channel repair and maintenance and general flood prevention activities. Such a program would provide a more comprehensive approach to the problems presented by the creek but it is doubtful that the property owners within the drainage basin would support the creation of a district and increased property taxes.

Recommendation #7. The city should cooperate with the Department of Housing and Urban Development in its Flood Insurance Program to accurately define the 100-year flood limits and obtain eligibility for flood insurance for affected property owners. Any structure constructed within the defined 100-year flood zone should be protected to above the 100-year level, and any utility services should be designed to withstand a 100-year flood. If fill is used to raise building sites within the flood plain the area filled should be the minimum necessary.

There are many areas in Blue Lake where local drainage is inadequate and local ponding occurs during heavy rains. Much of this is due to a lack of street drainage, curbs and gutters or side ditches. Correction of this problem will involve time and careful budgeting of funds.

Recommendation #8. The city should identify all necessary ditching or curb and gutter needs and develop cost estimates and a priority list. An implementation program should be established and funding assistance sought from all available sources. These projects should be coordinated with any sidewalk construction.

Environmental Assessment. Completion of the recommended study will involve a commitment of staff time and resources. A long range program of drainage facility construction would require a separate environmental assessment. Both the source and destination of drainage waters must be considered. The improved drainage facilities can constitute a beneficial impact on erosion and standing water problems. On the other hand drainage from streets and parking lots contain heavy metals and petroleum by-products that can produce a shock load on natural bodies of water if they are carried off directly without benefit of treatment.

Recommendation #9. Where steep slopes are the only feasible location for access roads into hillside areas subject to considerable residential development such roads should include drainage facilities adequate to handle potential runoff.

Environmental Assessment. Poorly constructed and inadequately maintained roads are a major factor in hillside slippage, erosion, and surface water degradation. Grade, crown, drainage and surface type all effect the drainage patterns. Inadequate roads are a major flaw in many subdivisions.

County or municipal governments often find that they are saddled with an inordinate maintenance expense after accepting substandard roads in subdivision projects. Establishing high standards and enforcing them constitute the best mitigation against these hazards. An alternative is zoning against construction on steep slopes or in locations where access roads must be built on steep slopes. This alternative will meet resistance from the owners of steep land who plan to sell or to subdivide. Land owners tend to be an important power element in a small community. As a group they are likely to be more amenable to strict standards than to total restrictions on construction.

FIRE HAZARDS

The Blue Lake Fire Protection District, a volunteer organization, provides fire protection within the planning area. Over the last several years, fires have averaged about 20 per year. About 30 percent of the fires involve single and multi-family residences, 15 percent involve automobiles and another 15 percent are grass fires outside of the city limits. No one cause is predominant but carelessness with appliances is high on the list.

Observations indicate that improper venting or chimney construction, and sub-standard wiring in dwellings constructed before building code requirements were established are potential fire hazards. A lack of firewalls in downtown commercial buildings could make containment of a fire difficult.

Recommendation #10. The City should encourage the Fire District to conduct an annual inspection of the downtown commercial buildings to identify risks that can be eliminated by the property owners.

Recommendation #11. The city of Blue Lake should ensure good fire protection by improving the water and hydrant system wherever necessary to eliminate dead end mains, provide adequate valving, provide a minimum of 1,500 gallons per minute from any single hydrant at the maximum daily residential consumption rate, provide hydrants within 300 feet of any point, and provide adequate storage for the types of fire encountered.

Environmental Assessment. Adoption of this policy will involve a minor commitment of staff time to determine if any of the needs outlined are not presently satisfied. If only minor improvements are required the impact will consist mostly of a commitment of energy and resources. If the project requires working on buried pipe line additional impacts will be equipment noise, and dust, which are temporary and can be minimized by careful construction practices. If a major revision of the water system is required to satisfy the policy, a separate study including an environmental assessment will be required.

Recommendation #12. Enforcement of the Building Code, the Housing Code and Title 19 of the California Administrative Code and the City Weed Abatement Ordinance should be given high priority to ensure adequate new construction and the correction of unsafe fire conditions.

The cost of full compliance with present building codes discourages many owners of substandard structures from making needed repairs. Some of the current requirements might be given lower local priority in order to accomplish primary rehabilitation objectives.

Recommendation #13. The city should consider adopting a special code governing rehabilitation of older structures requiring only the most essential improvements for the health and safety of residents and nearby property.

Environmental Assessment. The social value of historical buildings is presently held to be high. Preserving moderate cost older homes is also considered important. When building codes hinder the rehabilitation of such buildings historical and economical resources can be lost or damaged. This loss is frequently accompanied by political action and community dissension. The risks associated with meeting lesser standards are generally felt to be less significant than the potential hazards that result from building deterioration due to the owners inability to comply with stringent standards.

Recommendation #14. In order to achieve the lowest possible fire rating the city should support the fire district in its efforts to maintain the highest possible levels of fire protection, including man power recruitment and training, purchase and maintenance of fire fighting equipment, mutual aid agreements, adequate alarm systems and disaster communication equipment, and accomplishment of the fire hazard reduction and preparedness recommendations contained in the Public Safety Element.

TRAFFIC AND PEDESTRIAN HAZARDS

Traffic problems in the city of Blue Lake are endemic. They generally consist of street width constructions in heavily traveled areas of town such as Railroad Avenue and through the eastern section of downtown; a lack of walkways for pedestrians or bicyclists in certain portions of the city such as Railroad Avenue; a general lack of adequate traffic control markings and signings throughout the city (poor street surface conditions will not hold reflectorized markings or painting); congestion due to inadequate sight distances from obstructions; and lack of parking control. The most notable potential traffic accident causes are: the narrow bridge over Davis Creek on Blue Lake Boulevard, lack of sight distance at Acacia and Blue Lake Boulevard, and lack of traffic control striping and reflectorized markings on Blue Lake Boulevard, First Avenue, North Railroad Avenue and West End Road.

Other traffic problems are inadequate parking control near fire hydrants, existence of open ditches immediately adjacent to roadways, and a general lack of sidewalks throughout the town.

Recommendation #15. Where existing streets are narrow, on street parking should be controlled so that emergency vehicles will be able to pass at all times. Downtown Blue Lake needs to be studied to determine the types of control that will relieve existing congestion.

Environmental Assessment. The initial impacts will be commitment of the resources necessary to study and propose solutions to the problems cited. Until the specific nature of the solutions are known it is not possible to assess environmental impacts.

Recommendation #16. The narrow, unsafe bridge over Davis Creek on Blue Lake Boulevard should be replaced by the responsible agency.

Environmental Assessment. Replacement of the Davis Creek Bridge will cause short term impacts typically associated with construction. These impacts include; noise of construction, degradation of air quality from exhausts and dust, disruption of traffic flow and a permanent commitment of resources in the form of construction materials. None of these impacts are considered serious in comparison with the safety hazard posed by the inadequate bridge.

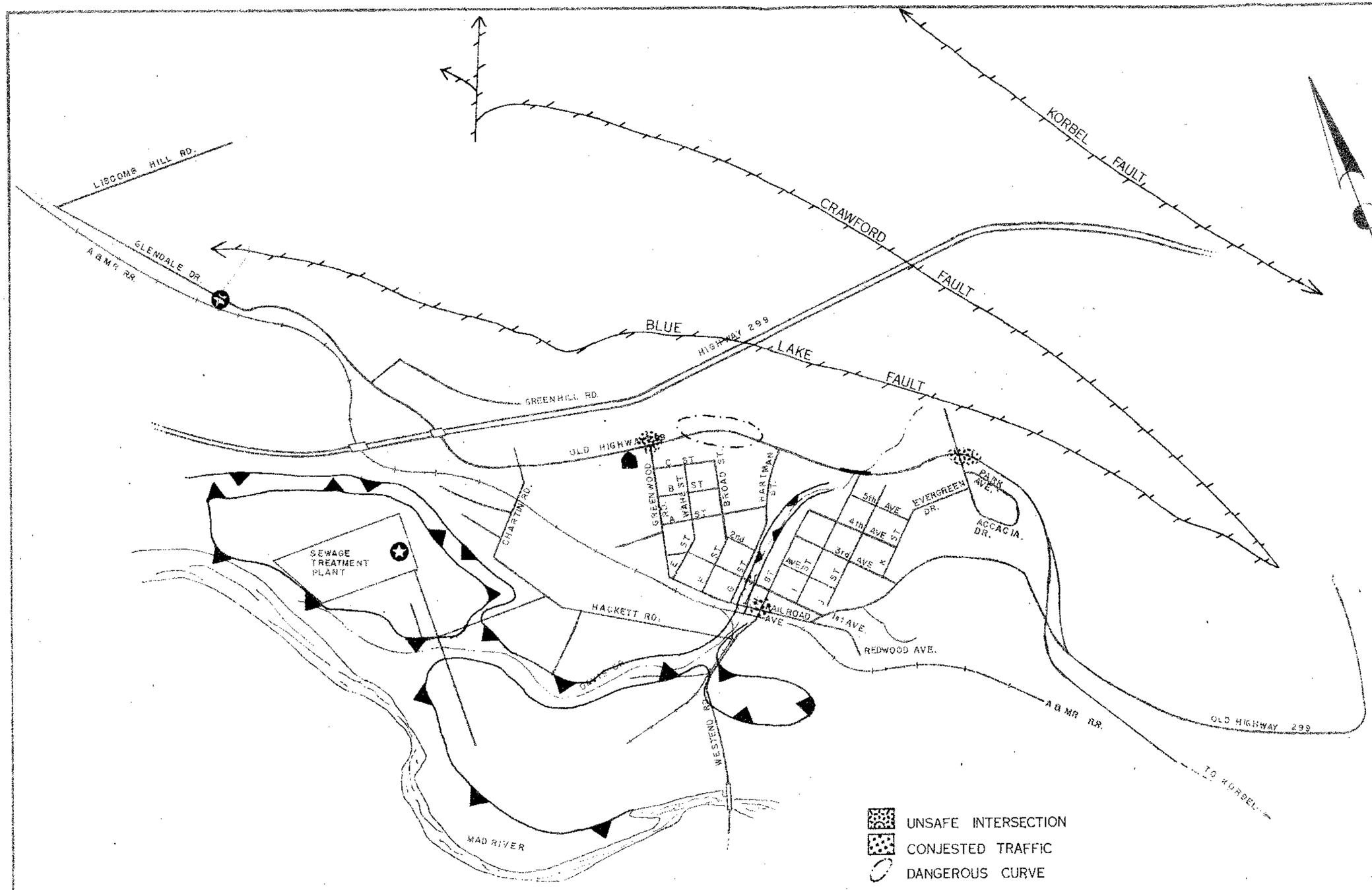
Recommendation #17. Where streets, parallel ditches, steep topography, or curves are difficult to see, reflective markers should be provided along the edge of the road. The west bound curve on Blue Lake Boulevard and the ditch along Blue Lake Boulevard near Greenwood are notable examples. County Road

Recommendation #18. Adequate sight distance should be provided at every intersection particularly in congested areas. Vegetation, fences, and on-street parking should not be allowed to block visibility. Acacia and Blue Lake Boulevard and the intersection of Greenwood and Blue Lake Boulevard are dangerous examples.

Recommendation #19. Centerline striping, warning signs and speed limit signs should be provided wherever necessary particularly on rural roads, in congested areas, and at railroad crossings. The intersection of Greenwood and Blue Lake Boulevard and the railroad crossings should be given particular attention.

Recommendation #20. Adequate sidewalks, walkways, and crosswalks, should be provided in congested areas and near schools. Curbs should be designed for use by handicapped persons. Broken or hazardous sidewalks should be repaired or replaced.

Environmental Assessment. Construction or repair of sidewalks would call for a minor commitment of materials and energy and involve the short term impacts typically associated with construction.



FLOOD DATA BASED UPON U.S.A. CORPS OF ENGINEERS
DEC 1964 FLOOD PLAIN MAP OF MAD RIVER

- UNSAFE INTERSECTION
- CONJESTED TRAFFIC
- DANGEROUS CURVE
- NARROW BRIDGE
- INADEQUATE CREEK FENCING
- HAZARDOUS BUILDING
- FLOOD PLAIN
- CL_2 STORAGE
- FAULT LINE

BLUE LAKE
GENERAL PLAN

Public Safety Hazards

OSCAR LARSON & ASSOC.
1809 ALSEE ST. EUREKA
443-0361

APPROX SCALE 1"=1000' PLATE NO 3

Recommendation #21. On-street parking should be controlled to allow passage of emergency vehicles, access to fire hydrants, and minimum interruption of traffic. Enforcement of double parking restrictions, prohibition of on-street truck loading during heavy traffic periods, design of off-street parking so vehicles don't back into travel lanes, prohibition of parking within 15 feet of fire hydrants and requirement of off-street parking where older buildings have been given new uses. The need for off-street parking near the entertainment centers is a specific need in downtown Blue Lake (see Appendix C for suggested policy on off-street parking for existing buildings).

Recommendation #22. Public bridges and private bridges providing access across drainage ditches should be inspected, be posted with load limits, and be repaired as needed. Private bridges should be properly engineered to support fuel and delivery trucks and should be subject to Building Code requirements.

Recommendation #23. The Blue Lake Planning Commission should study the need for provision of bicycle routes in the city and if the need exists, a bicycle plan including proposals for designated routes should be prepared and implemented.

Environmental Assessment. There is an increased emphasis on bicycle transportation as part of a lifestyle and as an energy saving measure. Implementation of a bicycle policy will have a beneficial impact in both areas.

STORAGE HAZARDS, ATTRACTIVE NUISANCES AND OTHER HAZARDS

When there is a local air inversion the air quality in Blue Lake deteriorates, but this is due mostly to pollution generated outside of the planning area. There is only one industry and little commercial use in the area, so hazardous land uses are negligible. Explosives or dangerous chemicals are seldom transported through the city but an accidental spill or explosion on Highway 299 is a possibility. The attractive nuisances noted were the drainage ditch adjacent to the school playground, a few old buildings, and numerous piles of debris. Observations of buildings and structures uncovered instances of exposed electrical wiring, inadequate chimneys and plumbing venting, deteriorating foundations, and leaning power poles. Roadside drainage is eroding the pavement in several places, a few deteriorated sidewalks were noted, tree limbs in power lines, and large dead trees were also found. Although many of the conditions described in the following recommendations were not found in the community, these policies are recommended for adoption for future reference.

Recommendation #24. Before issuance of permits for new construction or establishment of new land uses, particularly where explosives and hazardous chemicals are involved, the city or county should refer the application to the Fire District to ensure that all fire safety concerns are satisfied.

Recommendation #25. Land uses which include storage and transfer of hazardous materials should include special provision for accidental spills which ensure that the hazard will be contained on the premises and not be injected into the air or nearby drainage facilities or affect important traffic corridors or critical public facilities such as hospitals and schools or residential areas.

Recommendation #26. Any outdoor storage of fuels, debris, junk, equipment, appliances and wrecked vehicles should be completely fenced to prevent unwarranted access. Warning signs should be provided at outdoor fuel storage locations, and quantities of gasoline should be stored underground. Vehicles carrying hazardous materials should not be permitted to park in residential areas.

Recommendation #27. An annual cleanup program should be instituted to encourage residents to remove debris, old appliances and other hazardous items.

Recommendation #28. Critical public services such as the water system, sewer system, fire and police protection are essential to risk reduction and adequate emergency response and should be adequately staffed and equipped at all times. The water source and storage facility and the sewer treatment plant should be fenced to prohibit unwarranted access. The sewer system should be maintained to minimize the possibility of accidental discharges.

Environmental Assessment. Accidental discharge of sewage during floods or from damaged pipelines are major health and environmental hazards. Of primary concern is the contamination of water and food supplies by fecal bacteria and viruses. Perhaps the most insidious secondary threat comes from undetected leaks which pose not only the problem of contamination by pathogenic organisms but pollution of surface waters by an excess of organic materials.

Recommendation #29. The City should work with local insurance agents, and fire district staff to develop a program which provides a free home safety inspection at the request of the homeowner. Such inspections could include review of wiring, emergency exits, foundation conditions, etc. and provide the homeowner with ideas on how needed changes could be made at minimum expense.

Recommendation #30. The Building Code provisions which authorize condemnation by the city of structures that are public hazards should be utilized when necessary to encourage hesitant owners to repair or demolish the structure. Several buildings that may qualify were found in Blue Lake.

Environmental Assessment. Condemnation proceedings will lead to economic impacts for the owners especially if the buildings are being utilized commercially. There may also be a tax revenue loss. Beneficial aesthetic impacts can also be expected. Replacement of hazardous structures or the restoration of open space will represent a benefit to long term productivity at the expense of short term use.

Recommendation #31. Inspection of power poles should be included in the regular city street inspection program. The appropriate utility should be notified when hazardous conditions are found.

Recommendation #32. All signs projecting over public right of ways represent a potential public liability and should be inspected regularly to ensure public safety and proper spacing from utility lines. Any dangerous materials used in the sign, such as glass, should be replaced.

Recommendation #33. The city should establish a periodic program to remove tree limbs and other growth projecting over public rights-of-way that represent a hazard.

Environmental Assessment. Tree pruning will involve public expense, energy utilization and disposal of the pruned material.

Recommendation #34. Erosion caused by roadside drainage should be corrected before costly repairs to street pavement or sidewalks are necessary.

Recommendation #35. City parks should be inspected and safety hazards be corrected. Monkey bars and asphalt playground surfaces are notorious accident hazards. The city should encourage the school district to take similar action for school playgrounds.

Recommendation #36. The city should request that its public liability insurance carrier conduct an annual inspection of all public buildings and facilities to uncover ways the city can reduce its liability and improve working conditions for city employees.

DISASTER PREPAREDNESS

Most of the preceeding recommendations are directed at correcting, or being prepared for small scale hazardous situations. This section presents consideration of the steps that can be taken to cope with major emergencies such as a major earthquake, extensive flooding, or large scale threats to the public health and safety.

Recommendation #37. State Highway 299 (in both directions), Glendale Boulevard and Blue Lake Boulevard, Maple Creek Road and West End Road should be designated as evacuation routes from the planning area. Greenwood Avenue, Railroad Avenue and I Street are the evacuation routes within the city. These routes should be kept passable in major emergencies recognizing that the type and location of the disaster will determine which will be most needed.

Recommendation #38. The following contingency plans (and those referenced in Recommendations 39 and 40) should be available in City Hall for reference and communication during disasters: (1) Accidental Sewage Discharge Plan, (2) Humboldt County Flood Plan, (3) Water Quality Emergency Notification Plan.

Recommendation #39. Either as part of an existing contingency plan or separately, plans should be developed to include earthquake emergency considerations such as alternate water source, rerouting of Highway 299 traffic should it be severed by the fault, and housing of residents of homes rendered unsafe by an earthquake.

Recommendation #40. The City of Blue Lake does not have the resources to provide thorough support to the community in the event of a disaster. However, it should prepare a contingency plan which itemizes what its capabilities are in the event of a major catastrophe to the Arcata and Eureka areas upon which it is dependent. The responsibilities that should be assigned or addressed in the plan would be in the areas of leadership, fire protection, law enforcement, health and medical care, shelter, utility repair, traffic control, engineering and supply of food, petroleum, vehicles, housing, clothing, and medicines.

Recommendation #41. Carelessness with electrical appliances and other fire hazards, safety hazards in the home, and ignorance of what should be done during an earthquake or other disasters can all be reduced by providing information to the general public. Hazard reduction information is particularly effective when presented in the schools. Public Safety officials should continue to work with school administrators to insure that this important information is reaching the students and that frequent drills are conducted to illustrate appropriate disaster response at school.

Environmental Assessment. This policy is aimed at the mitigation of future disasters. Failure to make provisions for the safety, education and disaster preparedness of school children and the general public would be an adverse impact of a "No Policy" alternative. The risks addressed cannot be so low that contingency plans can be neglected.

Implementation

The Public Safety Element includes 41 recommendations which call for some type of implementary action by one or more city departments or other agencies. Each recommendation identifies the responsible department of agency whenever possible. However, time and resources are limited and it is expected that each city department will need to establish a phased implementation program with the City Council providing guidance on priorities. To assist in evaluating the implications of each recommendation a list of pertinent recommendations with some comments on implementation strategy are provided below for each affected agency.

Building Inspector. Recommendations 1,2,3,4,5,7,12,13,21,22,24,25,26,29 and 30 will be of most direct concern to the City Building Inspector. Several of these recommendations call for a cooperative implementation effort between the inspector and Fire District personnel. Most are related to the need to inspect certain hazardous situations, and may require more field work than is currently necessary. Because these activities will involve inspecting private property, the inspector will need to understand the reason for his activity so he can explain the program to concerned property owners. Support from the City Council will be important. The policies contained in these recommendations can also be incorporated in the building permit review procedure to ensure that new construction conforms to the adopted safety standards.

Public Works Department. Recommendations 4,6,7,8,9,11,15,16,17,18,19,20, 21,22,23,27,28,29,31,32,33,34,37,38,39 and 40 touch on some phase of the Public Works Department's responsibilities. In several instances the staff will be assisting the Planning Commission and the City Council in eliminating hazards during the design phase of private development. Other actions, particularly in the area of street maintenance and maintenance of the water and sewer system, may already be incorporated in standard operating procedure and a periodic review of the recommendations to ensure their continued application may be all that is required. Several other recommendations will require specific study of problems by the staff, and possibly the city engineer, with specific implementation recommendations being submitted to the City Council for authorization. Some of the proposals will no doubt involve minor to major construction projects with commitments of city funds and possible financial involvement by affected property owners. These projects can only be accomplished if the staff and the City Council carefully establish priorities and budget the necessary funds. Funding assistance from state and federal agencies may well be available and should be pursued, to supplement the city's limited financial resources.

Planning Commission. The policies expressed, or problems identified in recommendations 3,9,15,18,21,23,25 relate to land use issues which are considered by the Planning Commission. Periodic review of these problem areas and the suggested means of correcting them should enable the Commission to detect potential hazards during the permit review process. If they can be eliminated at this point the risks incurred by the city and affected property owners in the future will be lessened.

The Public Safety Element, as a whole, is of particular interest because the Commission is responsible for the General Plan and should be prepared to review it periodically to see if it still addresses pertinent problems and serves the community's interests. In the course of its review the Commission can determine from city staff and other agencies what recommendations in this element have been implemented, and which have not and why. If new problems are uncovered they can be added, and unimplementable recommendations can be revised.

Fire District. Many of the recommendations in the Public Safety Element are of direct concern to the Fire District (See Recommendations 10,12,14,21,24, 29,30,37 and 41). The first group of recommendations relate to hazard identification and the provision of adequate fire fighting capacity. The last few recommendations are concerned about preparedness for major emergencies. Because of their training and public safety responsibility the Fire District staff is directly involved in disaster preparedness efforts. The Fire District budget is limited and the staff is all volunteer so it is important that the District develop a phased implementation program based on a prioritization of the various recommendations. Although not as exciting as fire fighting, fire prevention activity and disaster preparedness can reduce the frequency of major fires and make fire protection less expensive in the long run. Maintaining good community relations and dynamic volunteer interest in the district is essential to the accomplishment of these objectives.

Police Department. The traffic safety and emergency preparedness recommendations will be of direct concern to the Police Department (see Recommendations 14, 15,19,21,26,37,38,40 and 41). The Department can be of particular assistance to the street maintenance staff by identifying locations where improvements such as centerline striping, edge markers, repair of dangerous surface conditions, etc. could reduce driving hazards. The police staff will also need to be informed about the activities of the fire district and other public safety agencies to ensure coordinated response in time of emergency.

School District. The School District will be involved in the implementation of Recommendations 35 and 41 in particular, although other recommendations in the report may be helpful to the District in suggesting ways that hazards can be reduced on the school premises. Both the Public Safety and Noise Elements place great emphasis on the role of education in the effort to reduce hazards. The school system is well suited, with the assistance of public safety personnel, to present this information in a convincing and interesting manner.

City Council. By its adoption of the Public Safety Element, the Council is indicating to its staff and affected agencies what City policy is, and what it hopes to do in the way of hazard reduction and emergency preparedness. General Plan elements are intended to provide general direction, so implementation will necessarily involve further study, consideration of staff input, decisions on priorities, implementation strategy, funding, and efforts at coordination with other involved entities. Without the continuing support

and interest of the City Council, implementation efforts will lag and the full benefits to the City and the public will not be achieved. An early decision on priorities and specific instructions to affected staff will demonstrate the Council's interest in implementing the Plan. Many of the recommendations suggest incorporation of new policies and procedures into existing staff activities and should not require additional staff. A few recommendations will necessarily involve shifting staff away from less important matters for a time, and may also require diversion of some funds. The temptation to give preventive actions a lower priority and to concentrate on other more immediate problems should be resisted.

Humboldt County. As noted in the introduction, Humboldt County will consider these recommendations during the development of the County Public Safety Element. It is expected that they will cooperate with the City of Blue Lake in the implementation of policies and programs in the county's portion of the planning area. Maintenance of good communication between city and county staff is essential to the implementation of a coordinated program.

Public Utilities. Recommendations 7,31,40 affect local public utility companies. The Pacific Telephone Company and Pacific Gas and Electric Company are most directly affected. The problems cited in these recommendations are often detected in the course of regular utility inspection programs. However, when special problems occur, the City Public Works staff can assist by notifying the appropriate utility of the hazard.

APPENDIX A

BLUE LAKE SEISMIC SAFETY ELEMENT

General Structural Geology and Geologic History

Blue Lake is located in the lower Mad River Valley, a downfaulted portion of the Northern Coast Ranges geologic province of California. The oldest and most widespread rocks in the area belong to the Franciscan Complex of Late Jurassic-Cretaceous age (100,000,000-145,000,000 years old)--a badly disrupted and sheared mass consisting predominantly of graywacke (a type of sandstone) and shale, with subordinate volcanic rocks (largely greenstone, altered basalt), conglomerate, chert, and minor metamorphic rocks ("blueschist"). The sedimentary and volcanic rocks were deposited in a marine trough along the west coast of North America which was subsequently severely deformed and uplifted. The widespread disarray of the rocks within the Franciscan Complex, and prevalence of shear zones, testify to the immense forces involved in its disruption. Most of the deformation took place during and soon after its deposition, so that the shear zones are no longer active. The ubiquitous presence of this sheared rock, however, together with rapid and unpredictable changes in rock type from place to place, give the associated slopes a general, but highly variable, instability.

During Tertiary time (approximately 3,000,000-70,000,000 years ago) the Franciscan rocks were uplifted and deeply eroded. Late in this period, perhaps only several million years ago, downwarping, and possibly downfaulting permitted the sea to invade the area again, probably as a southeast trending trough whose shoreline was not far east of Blue Lake. Sands, silty sands, and gravels from the nearby land area were deposited, trapping shallow water faunas within the sediments. The trough rapidly filled and the uppermost sediments may represent non-marine deposits (Manning and Ogle, 1950. p. 28). These marine and non-marine sediments are known as the Falor Formation.

Downfaulting along a narrow northwesterly trend commenced during or following this phase of deposition. The present townsite, and the adjacent Mad River Valley, are related to this downfaulting. The course of the Mad River, probably originally positioned along the downfaulted trend, has modified the terrain through periods of valley widening interspersed with downcutting. In the Essex area west of Blue Lake, the river cuts across this trend of faulting, and heads westward to the sea.

Philosophy of the Analysis

The western portions of Humboldt County, and adjoining offshore areas, are regions of moderate to high seismicity. Plate I shows the location of any major known Plio-Pleistocene Faults (those with movement within the last two to three million years). Except for the Cape Mendocino area, no obvious patterns emerge tying earthquakes to particular faults or shear zones. The only known historical surface rupture associated with a fault

in the area was in 1906 along the San Andreas Fault in southern Humboldt County, at Shelter Cove and Upper Mattole. That fault is therefore obviously active.* The frequent earthquakes south and southwest of Ferndale are taken to indicate modern activity along the Cape Mendocino-False Cape shear zone, and its seaward extensions.

Elsewhere in the area no faults are known to be unequivocally active, but several should be viewed with considerable suspicion. Even the source fault of the strong 1954 "Humboldt Bay" earthquake (M=6.5) has not been clearly identified. Therefore it behooves us to establish a philosophy by which to deal with the inadequacy of the data. Since structural engineers require quantitative information in their design work, we have attempted to arrive at reasonable "best estimates" based on this sparse data. In order to provide figures for the maximum probable earthquake, we have used the approach described in the following section.

Maximum Probable Earthquake

Paramount to the assessment of seismic risk and development of seismic safety criteria is the determination of the Maximum Probable Earthquake (MPE): the strongest earthquake which is possible within the confines of the existing geologic setting and has a reasonable probability of occurring during an interval of time consistent with the useful life of structures and developments in the planning area. In this study the MPE has been calculated for a 100-year interval, and thus should be interpreted as the strongest earthquake likely to occur on a given major fault during any 100-year period. It does not represent the strongest earthquake possible on that fault or in the region, but earthquakes with higher magnitudes are more widely spaced in time.

Determination of the Maximum Probable Earthquakes on faults affecting the planning area is based on a statistical analysis of the seismic history of the region surrounding the planning area and an evaluation of geologic features, including faults, related to earth movements caused by earthquakes. The western portion of Humboldt County, and adjoining offshore area, have been characterized during the past 100 years by frequent small to moderate and occasional large earthquakes. Two areas of different seismic character are present. The northern seismic area,

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* The California Council on Intergovernmental Relations in the General Plan Guidelines (Anderson, 1973) defines an active fault as: "A fault that has moved in recent geologic time and which is likely to move again in the relatively near future. For geologic purposes there are no precise limits to recency of movement or probable future movement that define "active fault". Definitions for planning purposes extend on the order of 10,000 years or more back and 100 years or more forward. The exact time limits for planning purposes are usually defined in relation to contemplated uses and structures."

characterized by moderate seismic activity, extends northward through western Humboldt County from the lower Eel River Valley. The southern seismic area, a region of substantially higher seismic activity, includes the southwestern portion of Humboldt County south of the Eel River and the offshore areas adjacent to Cape Mendocino. (Plate I) Differences in the seismic characteristics, particularly the frequency of small to moderate earthquakes in the two areas, has resulted in separate analyses for each area. Results of these analyses are shown on Figures 1 and 2.

Both the northern and southern seismic areas contain many active or potentially active* faults, although many of these are short fault segments. At least four major faults or fault zones are present in the northern seismic area and at least three distinct systems of large active or potentially active faults are present in the southern area. Since large magnitude earthquakes (Richter magnitude = 6.0+) involve faulting along many miles of fault length, future large magnitude earthquakes in the region surrounding the planning area can be expected to occur on these large faults or fault zones. Although geologic evidence of fault movement suggests that certain of these zones may be characterized by higher levels of activity, insufficient information is presently available to allow quantitative assessment of the level of activity of any individual fault or zone. In this analysis the MPE is therefore assumed to be a credible seismic event capable of originating on any of these active or potentially active zones. Calculations of bedrock accelerations in the planning area for Maximum Probable Earthquakes have been based on minimum surface distances to the fault zones (Table I). Surface distances are justifiably used because it is likely that MPE's will be accompanied by surface rupture along the fault zone.

Limitations of this Analysis

This assessment of the seismicity and seismic characteristics of the western Humboldt County region is based on a review of published and unpublished information from a variety of sources. Although limited data are available from previous studies, much information is the result of reconnaissance investigations and is somewhat general. No attempt has been made to check or refine published information, and little new data have been generated for this study. Relatively sparse detailed information concerning seismic geology of the region is available from previous studies. Additional detailed work would allow refinement of the results presented in this report. However, it is our belief that additional detailed work would not significantly change the results.

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* The Association of Engineering Geologists has defined a potentially active fault as "one along which, based on available data, no known historical ground surface rupture or earthquakes have occurred. These faults, however, show strong indications of geologically recent activity".

Active or Potentially Active Faults in the Region Surrounding the Planning Area

Table I summarizes the seismic potential for known faults of particular significance to the Blue Lake planning area. The four faults in the southern seismic area are far enough away so that no serious damage stemming from movement on them is anticipated in the planning area.

Following the procedure outlined under "Philosophy of the Analysis" (above), the seismicity of the northern seismic area (north of Eel River Valley and south of Klamath River) was dealt with by considering that there are four active or potentially active faults or fault zones in the area, any one of which could be expected to have a magnitude 6.4 earthquake approximately once every 100 years. Table I shows the predicted maximum and repeatable strong bedrock accelerations that would be felt in Blue Lake. Higher intensities would be expected on areas underlain by river alluvium, unstable landslide terrain, or fill. Since Blue Lake lies within the Falor-Korbel zone of faulting, this zone will be discussed in the following section.

Active or Potentially Active Faults within the Planning Area

Manning and Ogle (1950, plate 1) show that Blue Lake lies within a complex graben (elongate, downdropped segment) in which the Falor Formation of Plio-Pleistocene age (approximately one to several million years old) was downdropped against the much older rocks of the Franciscan Complex. In the immediate vicinity of Blue Lake this complex graben is shown by Manning and Ogle to consist of four northwest trending faults--two of them, Korbel and Falor, bounding the northeast and southwest sides of the graben, respectively, and two smaller faults immediately northeast of Blue Lake creating a small horst (upfaulted wedge) within the larger graben. Although no recent surficial faulting can be demonstrated along these zones, several lines of evidence lead us to believe that there is a high likelihood that one or more of these faults is active. This evidence consists of the following. Three out of four published epicentral locations for the 1954 "Humboldt Bay" earthquake place it within or closely adjacent to this zone of faulting (See Cameron, 1961). Studies offshore, along the seaward projection of this fault zone, show the possibility of geologically recent activity along this fault zone (Silver, 1971; Jennings, 1973). The modern topography and drainage patterns on land are suggestive of active faulting and tilting. Preliminary results from the Pacific Gas and Electric Company seismographic network in operation currently (Spring 1975), suggest shallow quakes along the zone. And finally, plotting of epicenters shows several possible foreshocks and aftershocks clustering along this zone both before and after the strong 1954 event.

Freshwater Fault

The Freshwater Fault is a major structural break in Humboldt County, traceable on land from southeast of Bridgeville northwestward to Arcata Bay, where its extension into the offshore area approximately four miles southwest of Trinidad is based upon geophysical evidence (Curtis and Hamilton, 1972, p. 21).

Although Byerly (1969) and Curtis and Hamilton consider that the fault is most likely active, our investigations along the fault suggest that recent activity is open to question. Nevertheless, even though we assign to this fault a "potentially active" category, whereas the Falor-Korbel zone is considered to be active (see above), our level of confidence is not high enough to say, without equivocation, that the Freshwater fault is less dangerous than the Falor-Korbel zone. This is why they are weighted equally in our analysis (Table I).

Evaluation Of Stability Problems Within Planning Unit Associated With Nearby Earthquakes

Mass Movement on Hillslopes

Mass movement of material on hillsides is a major accompaniment of moderate and strong earthquakes. This may be in the form of landslides, rock avalanches, mud and debris flows, or other types of slope failure. Steep natural or artificial slopes and high water content favor such failure. As an example, areas of artificial cut or fill, subjected to a moderate or strong earthquake during the wet season, often undergo failure. Continued modification of the topography by further cut and fill would increase the landslide potential in hillside areas.

A stability map has been prepared to delineate stable areas from those with stability problems. This is generalized and meant to indicate those areas where further slope stability investigation should be made if highways, subdivisions or "critical"* structures are proposed for those areas. Boundaries between adjacent sectors are inexact and only meant to delineate the zones in a general way.

Most hillsides in the northern part of the Blue Lake planning area are underlain by rocks of the Franciscan Complex, thus are of extremely variable but generally unstable character. Small areas of increased stability are present within the larger unstable area, however, because of resistant bedrock masses scattered within the Franciscan mass, or low slope angles.

The hills east of the townsite are largely of the Falor Formation and appear to be moderately stable in their present state. Construction, timber removal, or strong seismic shaking could reduce this tenuous stability, with localized slope failure anticipated.

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* "critical structures" would be hospitals, schools, other high occupancy structures, high cost facilities, and facilities vital in emergencies.

Most of the present townsite and adjacent lowland areas are categorized as stable, in terms of mass movement, because of the very low to negligible slope angles. However, an undetermined potential for localized liquefaction, lurching, cracking, and differential subsidence exists in these lowland areas (see below).

Liquefaction

Liquefaction is defined as "the sudden large decrease of shearing resistance of a cohesionless soil, caused by collapse of the soil structure by shock or strain, and associated with a sudden but temporary increase of the pore fluid mass" (American Geologic Institute, Glossary of Geology). Fine unconsolidated sand or silt saturated with water is particularly subject to liquefaction. Horizontal to slightly tilted layers of this material may underlie river flood plains and terraces. Earthquake shock waves may cause an overlying sloping soil mass to slide laterally along the temporarily liquefied layer at the base.

The lowlands and present river flood plain in the Blue Lake planning area are underlain by river alluvium of undetermined thickness. Such alluvium (silt, sand, pebbles, cobbles) may contain lenses of material susceptible to liquefaction, especially when under the shallow water table (top of saturated zone) characteristic of the area. Although, if these zones are present they are likely of minor extent, the possibility of localized liquefaction should not be discounted entirely. The siting of critical structures should assess this potential by means of borings beneath the sites.

Lurching, Cracking, Fissuring

Under moderate to intense shaking, unconsolidated alluvium and soils may undergo various amounts of horizontal displacement toward adjacent unconfined areas (such as the bluff along a river or stream), associated in some cases, with liquefaction. Cracks and fissures generally accompany this "lurching", ranging from inches to many feet in length, and of varying widths. Intervening ground segments are often tilted. Structures located on such ground can be severely disrupted and tilted.

Those areas in the lowlands of the Blue Lake planning area that are marginal to the Mad River or other sudden natural or artificial declines in elevation possess the likelihood for the development of these types of features accompanying a strong earthquake.

Differential Subsidence or Settlement

Differential subsidence or settlement may occur in underconsolidated materials during shaking, associated with the induced tendency toward a more compact arrangement of the grains. As the porosity

is decreased, pore water may be forced to the surface to form sand boils or mud spouts. Ground settlement often leads to tilting of buildings or differential settlement of other engineered structures. Again, the lowland areas and present Mad River flood plain are most susceptible to this type of earthquake effect, associated with the unconsolidated alluvium underlying these areas.

TABLE I

Planning Area:

BLUE LAKE

	Southern Seismic Area			Northern Seismic Area				
	SAN ANDREAS FAULT (SOUTH)	SAN ANDREAS FAULT (NORTH)	MATTOLE SHEAR ZONE	CAPE MENDOCINO-FALSE CAPE SHEAR ZONE	LITTLE SALMON-YAGER FAULT ZONE	FRESHWATER FAULT ZONE	FALOR-KORBEL FAULT ZONE	GROGAN FAULT ZONE
State of seismicity of fault: Active (A) or Potentially Active (PA)	A	A	PA	A	PA	PA	A	PA
Estimated maximum probable earthquake (Richter Magnitude) in 100 year interval	8.0	7.3	7.3	7.3	6.4	6.4	6.4	6.4
Minimum distance from center of planning area to surface trace of fault or fault zone (in miles)	58	45	39	30	13	5	1	9
Estimated maximum bedrock acceleration (%g)* at planning site for maximum probable earthquake in 100 years	.10	.09	.12	.18	.24	.45	.75	.30
Repeatable strong bedrock acceleration (%g)* in planning site for maximum probable earthquake in 100 years.	.07	.05	.08	.12	.16	.29	.49	.19
Duration of strong phase of shaking (in seconds)	34	27	27	27	17	17	17	17

* %g is the instantaneous acceleration in any direction imparted to bedrock by the seismic shock wave. It is related numerically to the acceleration imparted to a freely falling object at the earth's surface by the pull of gravity (1.0 g, or 980 cm/sec^2).

FIGURE I

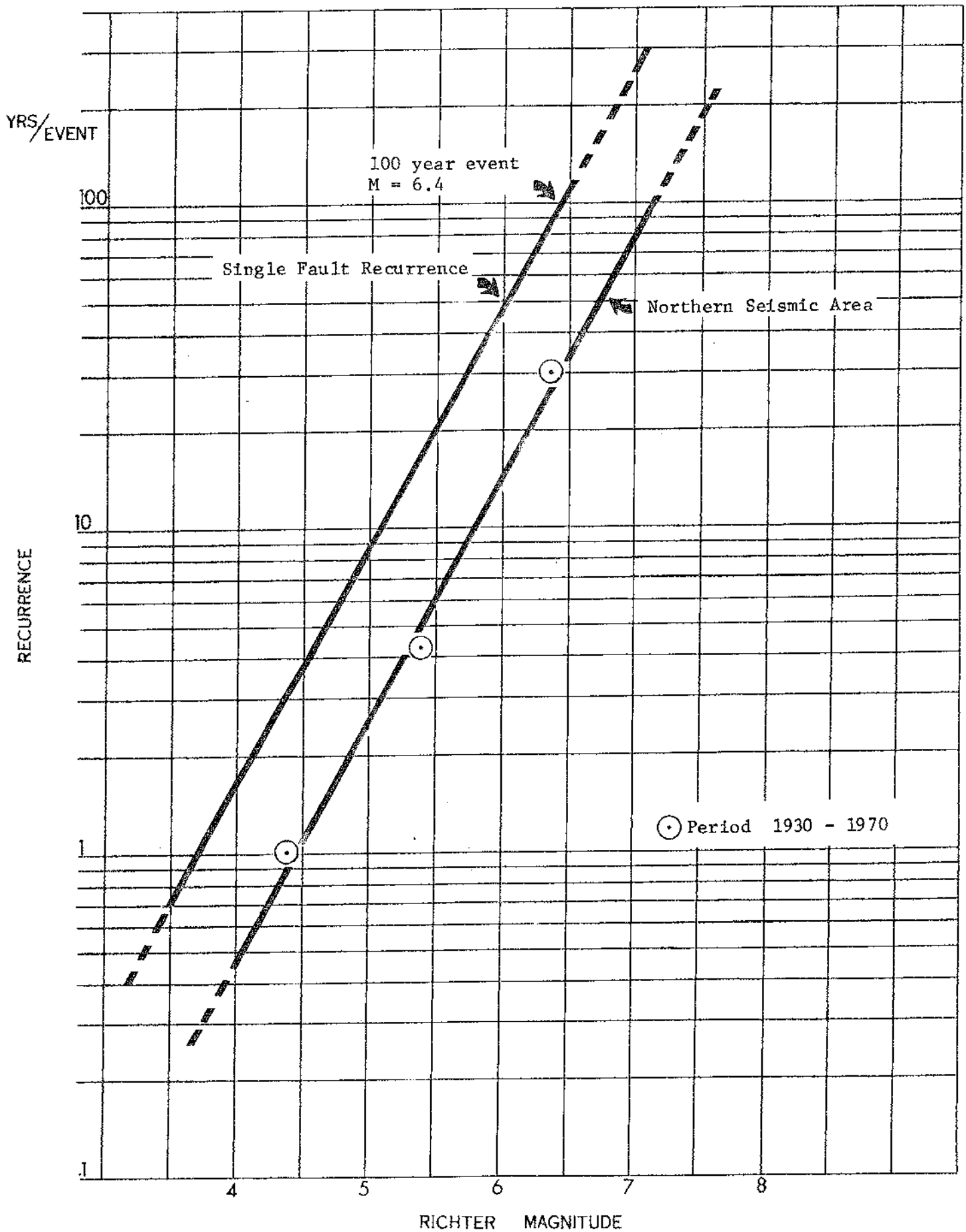
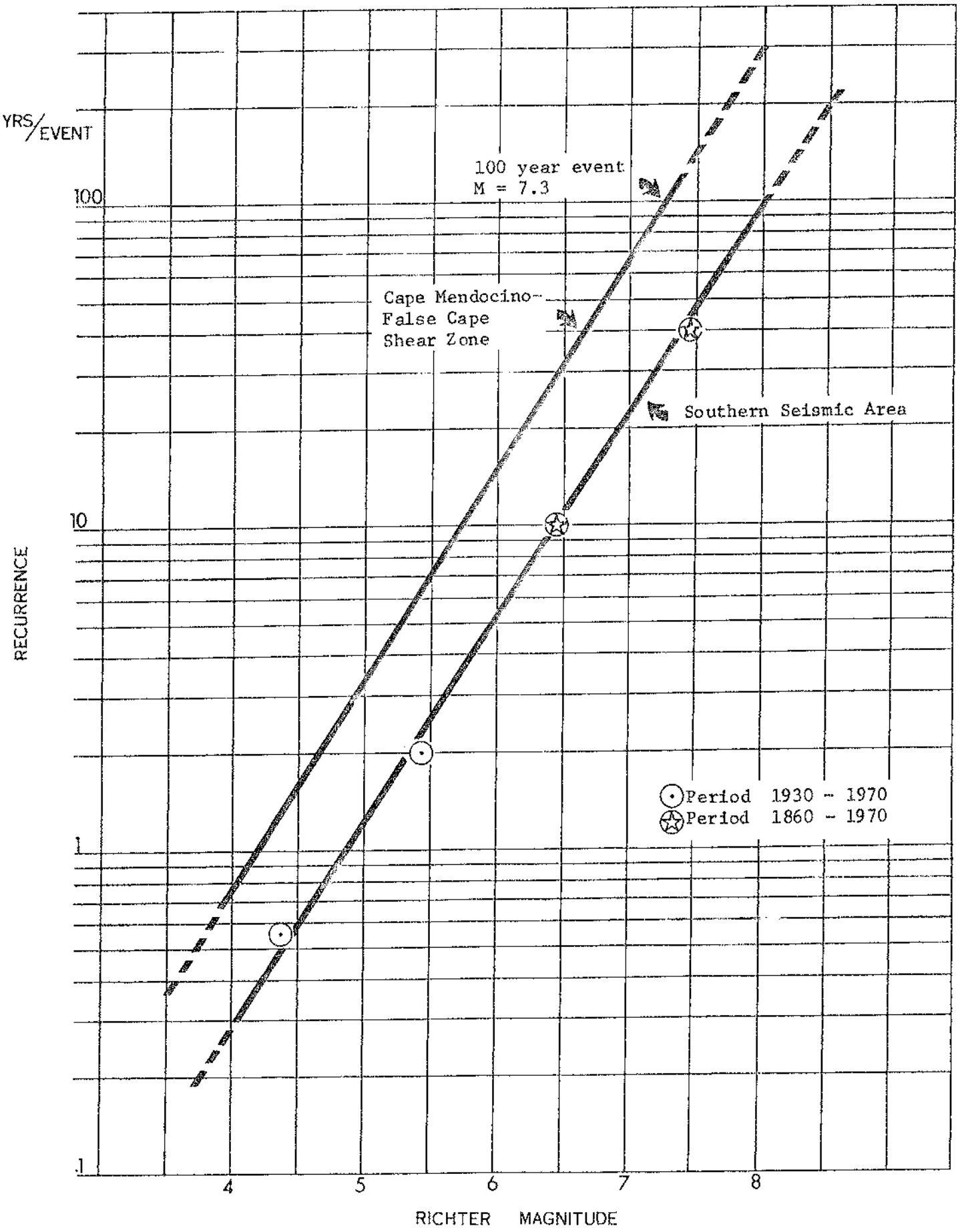

YRS/EVENT
100
10
1
.1
RECURRENCE
100 year event
M = 6.4
Single Fault Recurrence
Northern Seismic Area
Period 1930 - 1970
4
5
6
7
8
RICHTER MAGNITUDE

FIGURE II


YRS/EVENT
100
10
1
.1
RECURRENCE
100 year event
M = 7.3
Cape Mendocino-
False Cape
Shear Zone
Southern Seismic Area
Period 1930 - 1970
Period 1860 - 1970
4
5
6
7
8
RICHTER MAGNITUDE

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APPENDIX C

OFF-STREET PARKING POLICY

The following is suggested for consideration as a policy regarding existing buildings and land uses with or without off street parking. Such a policy should be incorporated in the zoning ordinance.

Off street parking facilities existing on the date this policy is adopted, incidental to a building or land use, shall be considered the required off street parking for that specific use or building, even though it might not conform to the off street parking requirements of the zoning ordinance. Any change in the use, the building or the parking facilities is subject to the following:

1. Existing off street parking as described above, shall not be abandoned, reduced in area or redesigned so that the facility is less in conformance with the provisions of the zoning ordinance in any respect, unless an equivalent number of off street parking spaces, or the number of parking spaces prescribed for that use or building in the zoning ordinances is provided as required in the zoning ordinance.

2. If a building or use is expanded, off street parking as required by the zoning ordinance shall be provided for the expanded portion of the building or use. Any existing parking shall conform to the requirements of item 1.

3. If the use of land or a building is changed to a use with a greater parking requirement, as specified for the previous and the new use in the current zoning ordinance, off street parking equal to the difference between the two requirements shall be provided as required by the zoning ordinance and any existing off street parking shall conform to the requirements of item 1.

4. Where no suitable locations are available due to building congestion or unwillingness to sell, the city should offer to utilize its property condemnation authority with the affected building owner paying for the amount of property and improvements necessary to meet his off street parking requirement. The owner then donates his share of the project to the city to be maintained as a public parking lot. The city could grant temporary waivers of the off street parking requirement for short periods while the participation of other owners of existing buildings is sought to help finance the project.

   Another alternative would be the formation of a downtown improvement district which could collect funds to acquire and develop off street parking. If this was accomplished the above policies could be modified to exempt those buildings whose owners participated in the project.

   Another alternative is to scale back the new uses to conform with the amount of off-street parking presently available.

NOISE ELEMENT OF THE BLUE LAKE GENERAL PLAN

NOISE ELEMENT

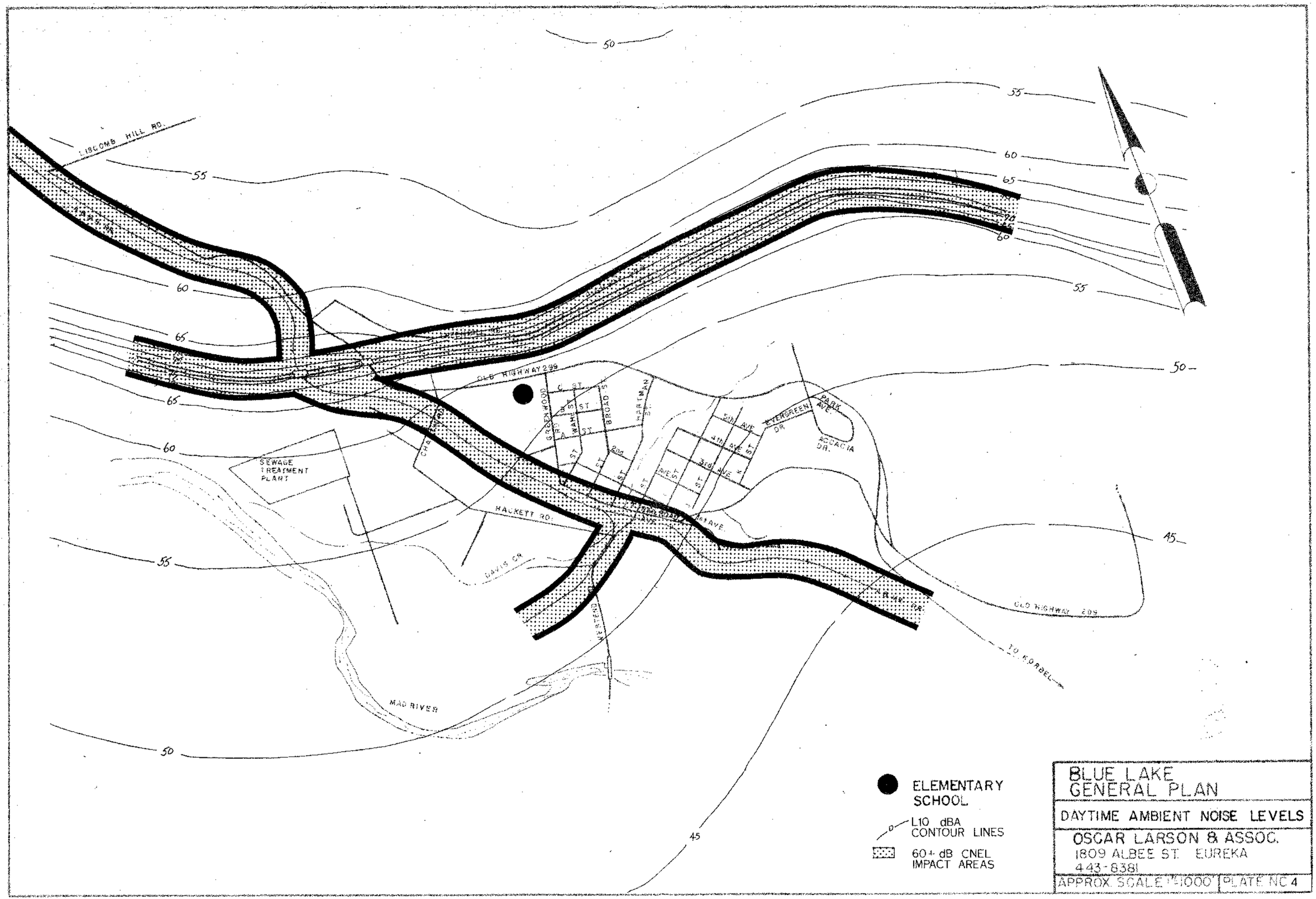
As described in the Government Code the Noise Element of a General Plan should include noise contours of present and projected noise levels associated with all existing and proposed major transportation elements which include but are not limited to highways and freeways, ground rapid transit systems, and ground facilities associated with airports. Appendix D includes a discussion of what noise is, how it can damage the ear and cause other ailments, describes ambient noise and single event noises, discusses how noise is being controlled by various agencies and what the local government role can be, and explains why projection of noise levels for the future is impractical.

Ambient Noise Levels. Highways, freeways, and railroads are the only transportation elements found in the Blue Lake planning area. Using the methodology described in the appendix, and the noise contour data supplied by the State Department of Transportation for Highway 299, a daytime ambience contour map has been prepared for the planning area (see Plate 4). Nighttime ambience levels are estimated to be about 10 dB(A) lower than indicated on the map. For persons inside a residence these noise levels would be perceived at about 20 decibels less with the windows closed and 10 decibels less with the windows open.

Ambient noise levels in commercial and residential areas are well within the ranges suggested by the standards in Appendix D. Highway 299 above Blue Lake does not cause high ambient noise levels because it is above the town and the sound is either prevented from projecting by roadside banks or it projects out over the town and diminishes rapidly along the ground. The effective sound level due to passing trucks is below 60 dB(A). The traffic volume is low enough on other city streets that traffic represents single noise events rather than an increased ambience.

Noise Problems. Logging and diesel delivery trucks and trains generate the most common noises in the planning area. At 50 feet a truck generates a peak noise level of 88 decibels and at 100 feet the level is 82 decibels. Several residents commented on the noise of logging trucks travelling through the area, but did not find the noise disturbing.

The Arcata and Mad River Railroad track passes through Blue Lake within a short distance of Railroad Avenue. Along the north side of Railroad Avenue there are several residences and it is estimated that the noise level on the front porches is around 82 dba and probably higher when the train horn is sounded. The law requires that the horn be sounded at each intersection and there does not appear to be any way to reduce the number of intersections. Fortunately the train passes through only a few times each day. While local citizens were aware of the train noise and found the general noise distracting only the horn is considered disturbing. When logging operations increase in the summertime the trains run earlier in the morning and this will disturb some sleepers.



BLUE LAKE GENERAL PLAN

DAYTIME AMBIENT NOISE LEVELS

OSCAR LARSON & ASSOC.
1809 ALBEE ST. EUREKA
443-8381

APPROX. SCALE 1"=1000' | PLATE NC 4

Another noise which some of the citizens consider objectionable is the amplified music emanating from local entertainment centers. There are residents in the vicinity that can hear the music until well after midnight. More than 150 feet away from one such establishment the sound level is 52 dB(A) and at the open front door, partially blocked by spectators, the level is 88 dB(A).

Obviously the level inside the building is even higher, and undoubtedly those who listen to the music for any time suffer permanent hearing impairment. Closing the front door would reduce the noise level in the general neighborhood some.

The warming up of logging truck engines in the early morning hours is another noted problem. These vehicles are parked in residential areas and often awaken nearby residents. The problem of dogs barking excessively during the night was also noted.

Sounds in the 75 to 85 decibel range are distracting to most people and peak sounds over 85 decibels are often disturbing and can cause hearing loss if exposure is frequent. Single event impacts from other sources which generate noises of above 75 decibels, such as chain saws and lawn mowers, occur unpredictably and at scattered locations. Undoubtedly these noises are sometimes considered a problem by local residents.

The impact of transportation systems on nearby land uses is recognized in Title 25, Article 4 of the California Administrative Code. Essentially it provides that when hotels, motels, apartments and duplexes are constructed near highways, railroads, airports and industrial areas, that special studies must be performed to ensure that noise levels inside the buildings will be at acceptable levels. Meeting these levels may well entail use of sound insulation in the exterior walls of the structure or use of other sound reduction techniques. The area affected by this provision lies within the 60 dB(A) Community Noise Equivalent Level contour which is identified on Plate 4 (see Appendix D for more details).[1]

Although this Code does not apply to single family residences, the effects of noise on the residents will be the same. The noise impact can be reduced through careful orientation of the structure, the use of baffle fences or local requirements that sound insulation be provided if other means of sound reduction are not sufficient. Another alternative is adjustment of the land use plan and zoning ordinance to provide for other types of land uses within the affected area.

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[1] Sites near the railroad in Blue Lake would be exempt from the requirements if there were four or less trains and they all ran after 7 a.m. Because one train runs before 7 a.m. for at least part of the year it appears that the regulations must be considered.

Environmental Assessment. The impacts of implementing the following recommendations are generally indirect and restricted to the social and economic categories of the environmental impact assessment process. In general, the impacts are considered long term and beneficial. There is a possibility that improving the quality of life through noise abatement and related planning effects will increase the attractiveness of the community as a residential area for commuters, for retired persons, or for some other segment of society and thus have a growth inducing aspect. Implementation of the recommendations will have no unavoidable, direct, adverse impacts nor call for any irretrievable commitment of resources or expenditure of energy. Appendix D includes a discussion of the social, economic, and environmental impacts of noise in general.

Recommendation #1. The State Vehicle Code establishes maximum decibel levels for trucks, automobiles and motorcycles. If vehicle noise becomes a problem the city should consult with Highway Patrol staff to develop a vehicle noise monitoring program that will effectively cite violators and reduce noise from vehicles travelling within the planning area. Acquisition of a decibel meter should be considered. Enforcement of speed limits also has a beneficial noise reduction impact.

Recommendation #2. If non-vehicular noises become a problem, the city should consider adopting a noise ordinance. The model noise ordinance developed by the League of California Cities can be used as a starting point (See Appendix D for a discussion of what it covers and the advantages and disadvantages of a noise ordinance).

Environmental Assessment. The above recommendations will not have any direct impact upon community resources but will give the authorities a mechanism to consider for quickly and effectively mitigating the impacts of an unwanted noise. If these programs are established, a commitment of man-power, energy and equipment will be necessary. Offenders will react unfavorably to a supposed infringement of their personal license to do as they please. Some social friction can be expected.

Recommendation #3. The city should discuss the implications of the State Noise Code with the railroad to determine if the train schedules can be adjusted so that no trains run through the area before 7 a.m.

Environmental Assessment. Implementation of this recommendation may have an impact upon some segments of the business and industrial community. Rescheduling of rail deliveries may cause short term economic impacts until accomodation to the new schedules is accomplished.

Recommendation #4. The Blue Lake Planning Commission should review the implications of the State Noise Code on the existing Land Use Plan and current zoning classifications within the 60 CNEL contour line. Uses that can economically incorporate sound proofing and other noise reduction techniques should be given preference. Where single family dwellings or recreational vehicle parks are permitted within this noise impact area the Planning Commission should encourage the developer to use all practical means to ensure that the noise level in sleeping areas will be within acceptable limits.

Recommendation #5. Although landscaping must be quite dense to diminish sound to any extent it does have the psychological effect of making noise less noticeable, therefore, the city should consider landscaping both sides of the railroad track from West End Road to beyond the City Hall in an attempt to soften the impact of the train horn somewhat.

Recommendation #6. The Blue Lake School District should be encouraged to develop an educational unit on noise and include it in the teaching program at the appropriate age level. Educating the next generation to the hazards of excessive noise is one of the most important weapons in the fight against deafness and increased noise pollution.

APPENDIX D

TECHNICAL CONSIDERATIONS IN THE NOISE ELEMENT

When energy is expended it causes vibrations in the air, water, land or man-made objects. These vibrations are transmitted through the air and are perceived by the ear as sound. The frequency of the vibrations can vary considerably - short frequencies produce high pitched sounds and long frequencies generate low pitched sounds. The undamaged human ear is capable of detecting many but not all tones. Certain animals are noted for being able to hear higher pitched sounds than humans.

The human ear does not respond equally to sounds of different pitches. Moderately high sounds, such as those produced in the uppermost register of a piano are heard better than either very high or very low pitches. If the ear were as sensitive to the lower end of the register as it is at the higher end, sounds like the roaring of the wind, or the beating of the heart would be unbearably loud. High pitched sounds such as the scratching of a fingernail on a blackboard are the most disturbing.

The intensity or loudness of sound is related to the amount of energy utilized in generating the vibrations. The more energy expended the louder the sound seems, and bombarding the ear with very loud sounds for extended periods can cause physical deterioration of the delicate parts of the ear mechnaism. The combination of high pitch and extreme loudness is the most damaging.

The effects of noise are insidious because they are undetectable by the victim until after irreversible damage has occurred. It is possible to sustain noise levels sufficient to produce permanent hearing impairment without any accompanying sensation of pain. The only symptom of the damage is a need on the part of the victim for a progressively higher noise level to produce the original stimulus to the brain. Thus noise confers a "tolerance", like a narcotic, but in the form of progressive deafness.

The ear is able to adjust somewhat to loud noises, but not sufficiently to cope with the constancy and loudness experienced in industrialized societies. Two limitations of the ear are its delayed adjustment to sharp sounds and its inability to withstand continued loud noise for extended periods of time. When the ear first perceives a loud sound it takes about .2 seconds for it to adjust and turn down the volume. During this moment when the sound is not dampened serious damage can occur. Someone who had a firecracker explode 15 inches from his ear showed permanent hearing loss. During extended periods of loud noise the ear, like an automobile in an endurance race, begins to disintegrate due to the constant vibration.

The results of two studies substantiate the impact of noise in our society. Recently a study of more than 4,000 Tennessee college students showed that 33% failed the screening test on higher frequency tones. The following year the number failing rose to 61%. This loss was attributed to high-intensity recreational noise, such as live amplified music, sport shooting, motorcycling, etc. A study in 1962 of the Mabaan tribe in the Sudan showed that older

members of the tribe have hearing acuity comparable with that of young children in America.

Besides physical damage to the ear, noise produces stress on other parts of the body. To quote the Environmental Protection Agency Publication EPA-335: "Even a sound of moderate volume and short duration such as a heavy truck passing on the other side of the street (rated about 80 decibels), produces a remarkable number of physical changes. Blood vessels in the brain dilate while blood vessels in other parts of the body constrict. Blood pressure rises, and the heart rhythm changes. The pupils of the eyes dilate. The blood cholesterol level rises. Various endocrine glands pour additional hormones into the blood. Even the stomach changes its rate of acid secretion. While most of these reactions are only temporary, the modern environment presents such ever-changing noise levels that some of the 'temporary' effects become chronic".

In addition to the physiological impacts on the ear and the body there are the psychological reactions: frustration when noise interrupts conversation, or hampers concentration on work, or makes it difficult to relax and obtain needed rest. Although suffering from noise cannot be weighed only in economic terms, the cost of accidents occurring because the victim failed to hear the approaching danger, or arising from work inefficiency due to noise, or from treatment of related physical maladies must be staggering. If, as some experts claim, urban noise levels have been increasing by an average of 1 decibel per year for the past 30 years it becomes obvious that noise must be controlled and reduced wherever possible.

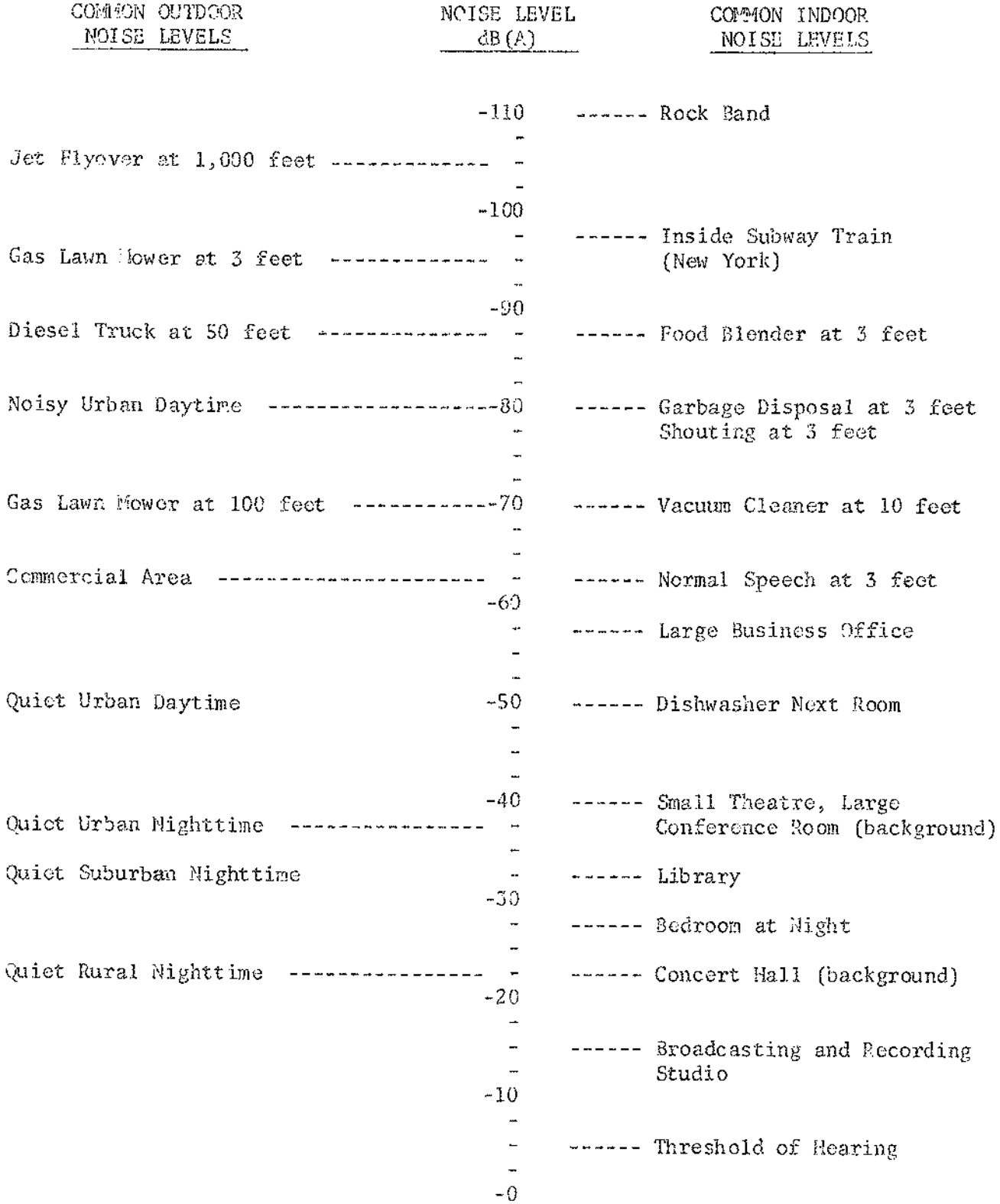
Defining Noise. Noise has been defined as unwanted sound. However, this definition does not give proper consideration to the tolerance of noise resulting from ear damage or the many imperceptible but undesirable effects of noise. Therefore it may be better to define noise as excessive sound.

In order to determine which sounds are excessive some means of measuring it are necessary. The unit of measurement most commonly used is called the decibel (dB) and is very near the "just perceptible difference" in loudness in the human ear. Since it takes a tremendous increase in energy to increase the loudness of sound the decibel scale is logarithmic - a sound measured at 40 decibels requires ten times as much energy as a sound at 30 decibels. The scale most commonly used is the A-weighted decibel scale which suppresses the bass response to better correspond to the response curve of the human ear. Figure 1 gives some typical examples of various decibel levels generated by familiar noise sources.

Ambience and Single Events. When measuring sound, it is possible to differentiate between what is termed the ambient sound level and louder peak noise levels generated by single events such as a passing truck. Essentially ambience is the undifferentiated background noise which is the resultant of thousands of events, either small or distant, which in combination constitute a steady accompaniment to the sound being measured. Ambiences of above 60 dB(A) are almost exclusively generated by heavily traveled streets and highways with an average daily traffic count of more than 2,000 vehicles.

FIGURE I

COMMON INDOOR AND OUTDOOR NOISE LEVELS



Source: "Guide on Evaluation and Attenuation of Traffic Noise", American Association of State Highway and Transportation Officials.

NOTE: A ten (10) decibel increase in sound level on dB(A) scale doubles the apparent loudness or annoyance of the sound.

An airplane landing at an airport, a truck traveling along a low traffic volume street, a motorcycle climbing a nearby hill are examples of single event noises. Such loud events stand out above the general ambience level and can be disturbing, startling, distracting, and even damaging to the ear if experienced repeatedly at close range. At 50 feet a diesel truck generates single event maximum of approximately 85 decibels, a diesel train - 88 decibels, a power lawn mower between 59 and 85 decibels depending on make, and a chain saw - 64 to 86 decibels. The operators of lawn mowers and chain saws are exposed to noise levels of 80-95 decibels and 103-115 decibels respectively ("Effects of Noise on People", Environmental Protection Agency).

Inventory Methodology. The estimates of ambience in the vicinity of major highways were developed by the California Department of Transportation utilizing a concept called L10, which can be defined as that noise level which will not be exceeded more than 10 percent of the time during the peak hour of traffic. Where traffic counts on county roads exceed 2,000 vehicles L10 data have been developed to supplement the State Highway information. The contours from 60 to 45 dB(A) were extrapolated from the highway data and checked by random field measurements.

These data do not consider variations due to buildings, barriers, or vegetation. Some adjustment has been made where major topographical features affect sound dispersion over significant stretches of highway; otherwise, terrain variations have not been considered. Contours are subject to an error range of plus or minus 3 dB(A). All field measurements were taken on a General Radio Sound Level Meter, type 1551B.

In addition to the L10 contours the 60 decibel Community Noise Equivalent Level (CNEL) contour has been supplied on the ambience map (Plate 4). This is a noise measurement which gives added weight to the noises occurring during the evening (3x) and nighttime (10x). This weighting reflects the relative increase in levels of annoyance. Although this methodology (developed by Wiley Laboratories) has been widely used near airports, it has only recently been employed to report noise levels near highways and railroads. In order to determine the 60 CNEL contours, nomographs developed only recently were used. Required data were not available in a few instances and best estimates had to be employed. When better data and more experience with this methodology has been obtained, it should be possible to develop a complete set of CNEL ambience contours for the planning area. For the purpose of implementing the State Administrative Code requirements, the CNEL 60 line shown on Plate 4 is adequate (see discussion below).

Noise Control. There are several ways in which noise can be controlled. Redesign of equipment and use of sound absorbing materials has been effective. Where dampening the sound at the source is impractical or technologically infeasible

protective devices for the car have proven effective if the number of people exposed to the noise is limited. New techniques are being used to reduce sound transmission through the walls of residences. And, in some cases sound barriers or just increased distance between the source and observer have been used. Any of these can be encouraged or required by federal, state, or local governments through the adoption of standards, guidelines, and ordinances.

The Department of Transportation has adopted federal standards which are generally applicable to highway design in the state of California. These standards relate the L10 noise levels to four general land use categories and represent the highest desirable noise level conditions.

FEDERAL HIGHWAY DESIGN STANDARDS

Land Use Category	Design Noise Level (L10)
A. Unique and unusual tracts of land in which serenity and quiet are of extraordinary significance and preservation of those qualities is essential if the area is to continue to serve its intended purpose.	60 dB(A) (Exterior)
B. Residential areas, schools, churches, libraries, hospitals, and so forth.	70 dB(A) (Exterior)
C. Other developed land not included in (A) and (B) and generally constituted by urbanized business or industrialized areas.	75 dB(A) (Exterior)
D. Special condition site, areas, or activities. The design noise level should be established, based on the merit of the specific case and an analysis of the acceptable level.	(Exterior or Interior)

These same standards also identify the impact of noise on various types of buildings and window openings. The factors indicated in the table below are used in highway design to ensure that the noise level inside adjacent buildings does not exceed 55 dB(A).

Building Type	Window Condition	Noise Reduction Due to Exterior of the Structure
All	Open	10 dB(A)
Light frame	Ordinary Sash	20 dB(A)
	(closed with storm windows)	25 dB(A)
Masonry	Single Glazed	25 dB(A)
Masonry	Double Glazed	35 dB(A)

The Department of Housing and Urban Development has also established noise level standards which are utilized by HUD and FHA in approving financing of residential housing. They are:

General External Exposures dB(A)

1. Unacceptable:
   a. Exceeds 80 dB(A), 60 minutes per 24 hours
   b. Exceeds 75 dB(A), 8 hours per 24 hours

2. Discretionary, Normally Unacceptable:
   a. Exceeds 65 dB(A), 8 hours per 24 hours
   b. Loud repetitive sounds on site

3. Discretionary, Normally Acceptable: Does not exceed 65 dB(A) more than 8 hours per 24 hours

4. Acceptable: Does not exceed 45 dB(A) more than 30 minutes per 24 hours.

The U. S. Government also has jurisdiction over all noises occurring under conditions of employment, even if interstate commerce is not involved. The maximum level for an eight hour day is presently 90 dB(A) but consideration is being given to reducing this level. While most people agree that this level is too high the cost to employers of reducing the level to 85 decibels is considerable. These regulations are administered by the Occupational Safety and Health Administration. Another program is the efforts of the Environmental Protection Agency. It works with manufacturers of equipment and appliances to develop designs that generate less noise. Noise level standards have been adopted in several categories to encourage progress in noise reduction.

The State of California Vehicle Code establishes maximum decibel levels for all vehicles based on the year of their manufacture. These requirements are projected into the future and gradually reduce the permissible noise level as illustrated below:

Year of Manufacture	Maximum Noise Level in Decibels (dBA)	
	Automobiles	Vehicles Over 6,000 Pounds
1968 - 72	86	88
1973 - 74	84	86
1975 - 77	80	83
1978 - 87	75	80
after 1987	70	70

The Vehicle Code (Section 27151) makes it unlawful to operate a vehicle which is emitting noise levels above those applicable when it was first sold. Off-road vehicles are subject to established dB(A) levels also, but they are exempt if used only on the owner's property. Enforcement of off-road noise violations is hampered because Highway Patrol vehicles are not equipped to engage in off-road pursuit.

The state has also adopted "Noise Insulation Standards" (see Chapter 1, Article 4 of Title 25 of the California Administrative Code). Their purpose is to "establish uniform minimum noise insulation performance standards to protect persons within new hotels, motels, apartment houses, and dwellings other than detached single family dwellings from the effects of excessive noise...".

Requirements for interior airborne sound insulation and impact sound insulation are established for wall and floor-ceiling assemblies utilizing the sound insulation ratings incorporated in the Uniform Building Code.

For exterior noises the requirement specifies that with windows closed, the community noise equivalent level (CNEL) attributable to exterior sources shall not exceed an annual CNEL of 45 dB in any habitable room. An acoustical analysis of the proposed design is required when the proposed structure will be located within the 60 dB CNEL contour line around any airport, the select system of county roads and city streets, freeways, state highways, railroads, rapid-transit lines and industrial areas. Suggested means of noise reduction include orientation of the structure, set-backs, shielding, and sound insulation of the building.

Noise also can be subject to the nuisance laws of the state (state penal code) or a city. These codes require that the plaintiff demonstrate that the offending noise constitutes a nuisance. Because the burden of proof lies on the plaintiff and involves the time and expense of a jury trial, this method of control is seldom used. To facilitate legal recourse for private parties many cities have adopted noise ordinances which establish criteria for determining when a noise constitutes a violation. When a violation is recorded, usually in response to a complaint to the local police department, the violator can be cited and the police department handles the prosecution.

The League of California Cities model noise ordinance is a typical example. It regulates: (1) noises generated by radios, television, amplifiers and similar audio transmitters between the hours of 10 p.m. and 7 a.m., (2) equipment such as air conditioners and fans, (3) restricts construction activity within 500 feet of a residential zone; and, (4) makes it unlawful to generate disturbing noise near posted institutions such as schools, hospitals and churches.

Two basic problems have evolved in the administration of noise ordinances. First, although attempts have been made it has proved difficult to develop ordinance provisions for some types of noise, such as noise created by animals, special events, etc. In many cases only a small percentage of the potential noise sources are actually covered and this limits the effectiveness of the ordinance in controlling overall noise levels. Further, it means that some types of noise are treated more strictly than others because of administrative problems.

Secondly, measurement of noise levels is a technical task requiring fairly sophisticated equipment and technique. If the enforcement officers are not well trained the courts may dismiss the evidence as inadequate to support the charges. Another related difficulty is insuring that the noise level recording is an accurate representation of the offending noise. In fact,

the presence of other noise in the area can distort the recorder reading and in effect suggest a noise level higher than actually attributable to the specific noise source. Blowing of the wind, falling rain, or a barking dog - almost any noticeable noise will affect the readings and the operator must be aware of this and be able to compensate - or the evidence will be inaccurate. In spite of these limitations noise ordinances are still the best local means of attempting to control noise on a community-wide basis.

Land Use Classification Standards. Noise ordinances are based on ambient standards for general land use categories. The model noise ordinance includes standards recommended by the League of California Cities and another set (about 5 decibels higher) recommended by the Pacific Gas and Electric Company. The standards listed below were developed from the HUD standards reported above. Essentially they are slightly higher than the PG&E recommendations. These standards were used in evaluating ambient noise problems in the community and are recommended for adoption as the official standard. They can be incorporated in any noise ordinance that might be considered and used in reviewing zoning issues and environmental impact reports.

Land Use Classification	Desired Ambient Level, dB(A)	
Residential, rural-suburban	night	less than 40 - 45
	day	less than 45 - 50
Residential, suburban	night	less than 45 - 50
	day	less than 50 - 55
Residential, low-density urban	night	less than 50 - 55
	day	less than 55 - 60
Residential, medium/high density	night	less than 55 - 60
	day	less than 60 - 65
Commercial zones, districts	night	less than - 65
	day	less than - 70
Industrial zones, districts		less than - 75

It is evident that most of the noise control effort is being exerted at the state and federal levels where it undoubtedly has the widest impact. Control of noise related to motor vehicles, aircraft and railroad equipment is pre-empted by federal and state agencies. However, efforts to improve enforcement at the local level may be necessary. Otherwise there is little that can be done about such noise problems by local government.

At the local level noise reduction can be achieved in the design and location of local roads, the routing of local bus systems, the designation of truck routes, the separation of noisy commercial and industrial activities, outdoor assembly areas, and airports from residential areas, the provision of increased setbacks for dwellings along busy streets and through careful orientation and construction of dwellings.

Many of these situations are controllable through the zoning and subdivision ordinances. Others are public projects where consideration of noise impacts would be included as part of the environmental impact report. Noise impacts

must also be covered in environmental impact reports for large private developments and this enables the city and other affected agencies to consider ways to reduce noise impacts at the design stage. The standards included in the Noise Element of the General Plan provide a valuable yardstick in reviewing development proposals. A noise ordinance such as the model discussed above is another local option aimed at reducing noise levels.

Future Noise. Our society has become very tolerant of excessive sound and only in the last 10 years have serious efforts been undertaken to reduce noise pollution. The efforts by agencies at the federal, state, and local levels summarized above are having an effect. Public concern over preserving the "quality of life" is growing and this should sustain the momentum achieved unless the cost to the social and economic sectors of our society becomes unacceptable. The trend is toward quieter equipment and appliances. Limitations on fuel supplies will dampen the projected increase in usage of the automobile. And, young people may become aware of the ear damage potential in loud music and turn the volume down. On the other hand noise reduction efforts may be counteracted by an increase in the number of noise generating devices.

The impact of educational programs, noise reduction programs, and the social and economic condition of our society will all have a bearing on how much noise reduction will be accomplished. Because it is difficult to predict the outcome in any of these areas it is almost impossible to adequately support any projection of future noise levels. Therefore, no specific projection of ambient noise levels has been attempted. It is likely that the rate of increase in noise levels will be reduced, but noise levels will probably continue to increase in the future.

The State Department of Transportation has prepared L10 noise contours for state highways in the planning area for 1995. These contours are available at the local public works department. These projections were based on traffic flow estimates derived in 1973 - before shortages in fuel supplies and higher costs began having an impact on driving habits. Once these projections have been adjusted based on more recent experience more realistic long range noise projections will be possible, although their accuracy and consequent value as a planning tool will still be in question for the reasons cited above.

SCENIC HIGHWAY ELEMENT OF THE BLUE LAKE GENERAL PLAN

SCENIC HIGHWAY ELEMENT

The purpose of the Scenic Highway Element is fourfold: (1) to inform the city of the State Scenic Highway Program including identification of state and county roads that are, or could be, designated as scenic routes under the state program (2) to develop standards and criteria by which a local scenic route system can be developed and maintained (3) to make recommendations on (a) whether a local scenic route system supplementing the state program is feasible and desirable (b) whether other scenic amenities in the community deserve protection or enhancement, and (4) to facilitate coordination between the city and the county regarding scenic routes traversing both jurisdictions.

The State Scenic Highway Program

A State Scenic Highway Program was established in 1963. This program includes standards, guidelines and a Master Plan map showing which state highways are eligible for official designation. The state role in implementing the program includes the preparation of a corridor study at the request of the local governments having jurisdiction over land use in the scenic corridor, and they review and approve the local scenic corridor protection plan and install the "poppy" signs along the officially designated route. The corridor study suggests scenic highway corridor boundaries, identifies scenic values and defines the relationship of the right-of-way to its surrounding environment. It also notes the scenic and aesthetic elements that should be preserved and potential locations for roadside rests, vista points and areas for information sites. This report is for the use of the local jurisdiction in the development of the local scenic corridor protection and enhancement program.

The local protection plan and program must include as a minimum: (1) Regulations of land use density or intensity of development (2) Provisions for review of site planning on proposed developments (3) Control of outdoor advertising (4) Control of earth moving and provisions for landscaping cuts and fills and (5) Control of the design and appearance of structures and equipment. Citizen involvement during the corridor study and development of the local program is stressed.

Once the local protection program is in effect the local jurisdiction can request official designation. If the Director of Transportation approves the program the state then proceeds with placement of the signs and other efforts to identify the route.

In addition to state highways, county roads may be officially designated as scenic routes if the county has designated the route in the scenic highways element of its general plan and adopted a protection program that meets the criteria for state highway protection programs. The state does not perform the corridor study, but they are available to provide technical assistance.

Although the program would appear to have much appeal very few portions of the eligible state routes have been designated. Those that have been are mostly segments within state and federal parks where public ownership of the land makes implementation of a protection plan almost a formality. Resistance to adding more land use controls within the scenic corridor, and concern about increased tourist impacts on the roadway corridor and adjacent communities are two reasons that more segments of eligible state routes have not been designated.

State Highway 299 which passes through the Blue Lake planning area, is eligible for official scenic highway designation between Arcata and Willow Creek. If all of this segment is to be designated, the city of Arcata, the City of Blue Lake and Humboldt County will need to submit a formal request for a corridor study and be prepared to develop and adopt the necessary corridor protection program.

Scenic Route Criteria and Standards

In order to be considered scenic, local roads should exhibit many of the following characteristics:

1. A definable scenic corridor
2. Quality in scenic view of natural, improved or historic areas
3. A variety of terrain and landscape
4. Conformance with open space and conservation objectives
5. Accessibility between areas of recreation, parks or historical interest.
6. Routes of adequate design and safety
7. Control of development within the scenic corridor to prevent obstruction of important views or development of unsightly land uses
8. Screening or relocation of existing unsightly land uses
9. Complements the land use and circulation elements of the General Plan
10. Opportunity for development of vista points, roadside rests, and other amenities.

In addition to criteria which suggest the desirable character of the scenic corridor, there are standards which can be utilized to insure that road improvements themselves do not detract from the scenic quality.

1. Where any portion of road is reconstructed, the natural grade should be followed as much as possible - minimizing cuts and fills.

2. Scenic roads should be designed for moderate travel speed.

3. Improvements related to the scenic route system, such as route location and directional signs, roadside rests and vista points, should be provided where possible, and be attractively designed to blend with the scenery.

4. Natural landscaping, particularly on cuts and fills, should be provided for scenic improvements and erosion control.

Local Scenic Roads

Local residents identify with interesting locations such as the fish hatchery, the demonstration forest managed by Simpson Timber Company, and the local Perigot Park facilities. But no scenic routes were identifiable within the planning area. Residents recognize the scenic routes in other areas of the county and would generally support efforts to designate them as scenic routes. The idea of providing a vista point on Highway 299 above the city, providing a panoramic view of the townsite and environs was favorably received.

Scenic Highway Element Recommendations

Recommendation #1. The City of Blue Lake should indicate to the county whether it is interested in the official designation of Highway 299 as a State Scenic Highway and whether it will consider adopting the necessary corridor protection program for the portion of the corridor under its jurisdiction.

Recommendation #2. If Highway 299 is designated as a scenic route, the main entrance into town will be within the highway's scenic corridor. The Planning Commission should review Land Use Plans and zoning requirements to ensure that they preserve and enhance the attractiveness of this area. Any future development proposals should be carefully reviewed to ensure that they contribute to, rather than detract from, the accomplishment of an attractive city entrance.

Recommendation #3. The city should request that the State Department of Transportation provide a suitable vista point on Highway 299 with a view of the townsite, the Mad River Valley and the general vicinity. The likelihood that such a request would be given favorable attention could be improved if Highway 299 is designated a State Scenic Highway.

Recommendation #4. The city should convey to the county, the support of its citizens for protection and enhancement of the scenic routes in the region, and urge the consideration of such a program in the Scenic Highway Element of the County General Plan.

Recommendation #5. The city should encourage a local civic group to provide an appropriate plaque explaining the history of Blue Lake - the namesake of the city. The plaque should be placed in a location with convenient tourist access such as Perigot Park, in front of City Hall, near the entrance into the community, or at a vista point on Route 299.

Recommendation #6. The commercial area of Blue Lake and the area adjacent to the railroad between downtown and City Hall could be made more attractive by the provisions of landscaping, street trees, and other aesthetic improvements. In turn, these improvements should encourage property owners to beautify their premises and would increase community identity and pride.

Environmental Assessment. In general, the designation of scenic routes within the region implies a desire to attract visitors and enable them to appreciate local scenic amenities. If the effect is significant the visitors will have a mild stimulatory effect on local trade and will increase the traffic load of certain thoroughfares. The effects will be proportionate to the number of visitors attracted. Increase in traffic will call for an increase in maintenance and patrol activity at the public's expense. Increase in traffic will also increase the level of noise pollution and air pollution for residents adjacent to the involved thoroughfares.

The construction of parking facilities and vistas has certain predictable impacts. There is a long term or permanent commitment of a small plot of land with the necessary destruction of vegetation and wildlife habitat. There is an increase in runoff carrying heavy metals and petroleum by-products into surface waters at each rain. These impacts are very localized. There is a commitment of resources in the form of construction materials and the commitment of energy resources for construction. Finally, there are the short term impacts of noise and air quality degradation during construction. Proper engineering and construction practices should eliminate or mitigate construction impacts and the possible effects of geological and landscape hazards such as slippage. Maintenance, including trash pick-up will call for a commitment of public funds. Areas adjacent to vistas will receive increased use in some cases. Trails and trash are common features of the brushy areas around many north coast vistas. The presence of a vista near residences will have an impact on the residents. The nature and degree of the impact will depend as much upon the nature of the residents as upon the volume of sightseers.

Review of land use plans and zoning ordinances can have a variety of impacts if changes result from the review. The most likely recommendations of a review oriented to a scenic highway program would involve review of building design, provision of landscaping and control over the installation of signs in the viewshed. Such recommendations will meet citizen resistance from the owner whose use rights are restricted and from the commercial community that benefits from billboard advertising. Social friction over the issue of property rights versus community rights may arise.