VI.
SAFETY
ELEMENT

VI. SAFETY ELEMENT

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1.0 INTRODUCTION

The purpose of the Safety Element is to provide information on hazards and hazard preparedness in the City. Rather than a complete hazards management program, this Element should be viewed as a guide to local conditions which may be hazardous. This Element also contains policies that address the likelihood of loss of property or life in existing and proposed developments.

Before the City can plan how to deal with potential disasters, the hazards which can lead to these disasters must be identified and priorities for action must be assigned. Hazards analysis is a process for determining the emergency management needs of the community. One aspect involves knowledge of the kinds of hazards to which the City is subject. There are hazardous events which occur frequently but do little damage and therefore create little more than routine emergency needs. There are also events which occur infrequently (or may not have occurred but could occur), yet would have catastrophic effects and require extraordinary emergency management responses. This Element provides an estimate of emergency management needs by collecting available historical and quantitative data about local hazards.

Another aspect of the hazards analysis is knowledge of the community. This involves in inventory of areas in the community susceptible to damage from the occurrence of an event at a given intensity or location. This knowledge includes the number of people, age and location of buildings, and communication, transportation or other systems exposed to damage, interruption or collapse. When knowledge of hazards is combined with their potential impacts on the community, the result is a measure of the vulnerability of the community. Adequate information about the hazards will enable a community to assign priorities for its emergency management needs.

The Safety Element brings together information from several sources to describe the vulnerability of the community to known and suspected hazards. In many cases, this information is incomplete, and additional studies can and should be undertaken. Nevertheless, the present level of data should not be considered an obstacle to preparing a hazards management plan. Just the knowledge that the City is subject to a hazard will provide direction for its emergency management program. The Element is a balance between the need to develop a systematic multi-hazards management plan and the limitations in resources and methodologies available for preparing such a plan.

2.0 SEISMIC SETTINGS AND EARTHQUAKE HAZARDS (Figure VI-1)

The City is located within the Transverse Range of east-west trending valleys, mountain ranges and earthquake faults. The City is also located 33 miles southwest of the San Andreas Fault. Significant earthquakes in the City which may occur in the foreseeable future and which should be considered in the design of structures are of two types: (a) major events generated by movement on a very large but relatively distant fault, and (b) medium-sized events generated by movement on a closer fault.

The most likely event of the first category is the Richter magnitude 8.0 - 8.5 earthquake expected on the San Andreas Fault within the next 30 years. Locally, the effect would be strong shaking with maximum ground accelerations within a range of 0.30 to 0.40g, where "g" is the decimal fraction of the acceleration of gravity. The shaking could last for one minute. (By comparison, the duration of the 1971 San Fernando earthquake was 12-15 seconds.)

More intense, but shorter-duration shaking can be expected from one of the active faults closer to the City. The San Cayetano Fault traverses the northern edge of the Santa Clara Valley and passes through the City near Fourth Street and Pole Creek. The Oak Ridge Fault is located along the southern edge of the Santa Clara Valley and is one mile from the City at its nearest point. The maximum credible expected earthquake magnitude at either local fault is 7.5 - 8.0 on the Richter scale.

It is important to note that these are maximum values anticipated for the most extreme credible earthquake. Their probability of occurrence is not known. Nevertheless, future development should be directed away from the western portion of the San Cayetano Fault. Projects proposed within 100 feet of the San Cayetano Fault line should identify the potential for earthquake hazard as part of the soils engineering investigation or environmental impact report.

Seismic hazards affecting the City can be separated into two major categories: ground surface displacement due to fault movement, and ground shaking due to earthquakes on nearby or regional faults.

2.1 Surface Displacement

Ground surface displacement occurs along the trace of a fault during moderate to strong earthquakes and usually manifests itself in a relatively narrow, but intensely disturbed zone. The effects of surface displacement along a fault in a populated area can be disastrous, in that structures, roadways, pipelines, utilities,

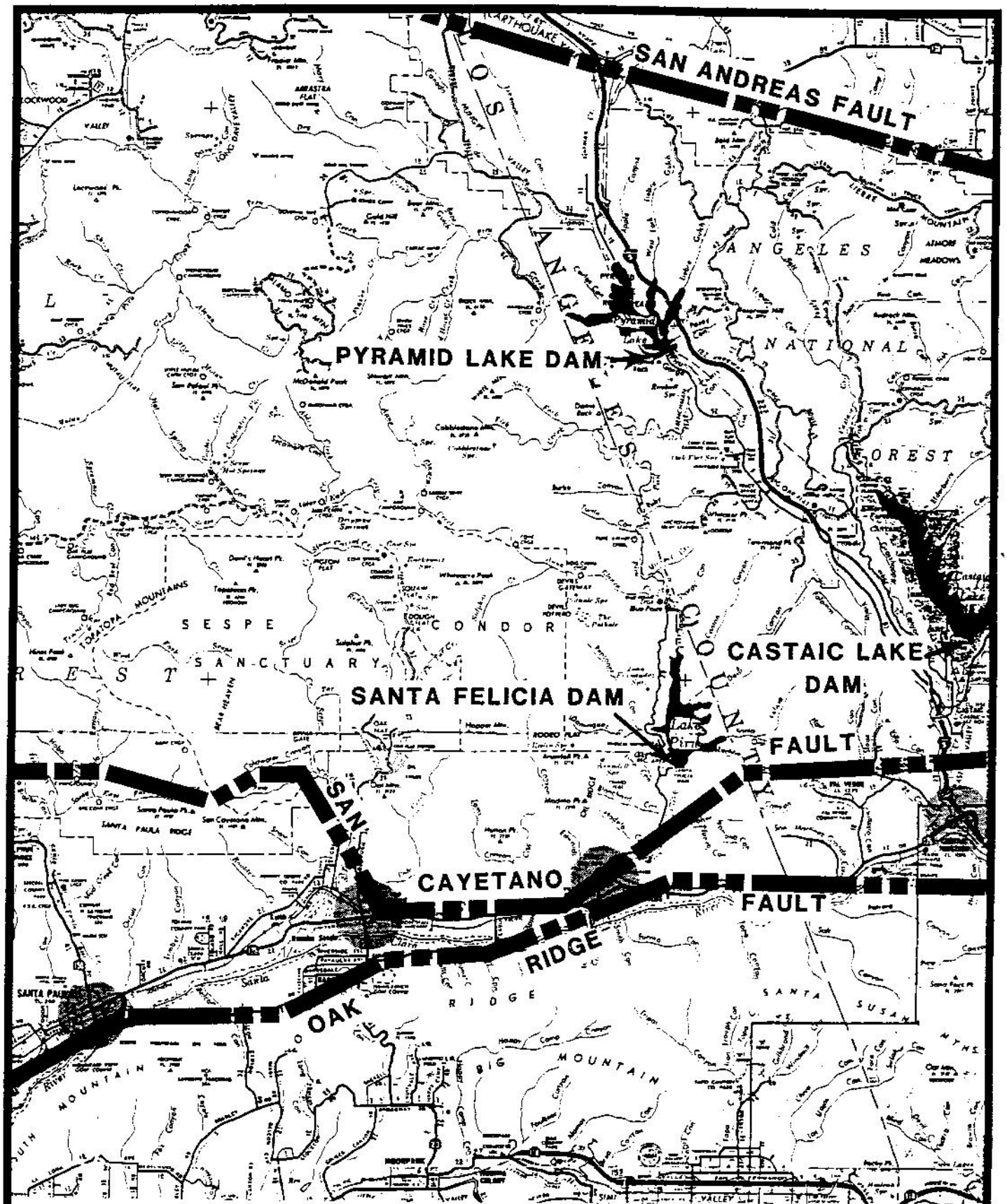


FIGURE VI-1

ACTIVE FAULTS IN FILLMORE REGION

General Plan

railroad tracks and storage tanks are either severed or so badly damaged that they are no longer functional. Designing improvements to resist surface displacement along a fault is not economically feasible.

The City of Fillmore may be subject to the risk of surface displacement. The San Cayateno Fault traverses the northwestern portion of the City (See Figure VI-1). It has been classified by the Division of Mines and Geology as an active fault. Because it does not meet all criteria for the Alquist-Priolo Act, the portion of the fault which passes through the City and proceeds easterly is not considered active enough to warrant special zoning under the act. The portion of the fault west of the City limits, however, was recently assigned a Special Studies Zone.

The San Cayetano Fault is a northerly dipping thrust fault which comprises a segment of a complex system of reverse and thrust faults including the Red Mountain, Sulphur Mountain, San Cayetano and Holser Faults. This system of faults runs 65-70 miles from off-shore of Carpinteria westward to Castaic and represents an important structural element in the regional geological framework.

In classifying the San Cayetano Fault as active, the State Geologist has determined that enough evidence exists to indicate that the latest movement along this fault occurred less than 11,000 years ago (Holocene epoch). Under State law, an active fault is one which has demonstrated movement within the past 11,000 years, and an inactive fault is one which can be shown by direct evidence (radiometric dating or geologic relationships) to have <u>not</u> moved in the past 11,000 years. A potentially active fault is a fault which has demonstrated movement during the Quaternary Period (the past 3,000,000 years), but for which evidence is lacking to determine whether it is active or inactive.

Under the Alquist-Priolo Special Studies Zones Act, a Special Studies Zone is assigned, by the State Geologist, to all active faults on a priority basis. The zone extends a minimum of 1/8 mile (660 feet) on either side of the fault. Any structure for human habitation, which is proposed within the Special Studies Zone, must be shown to be at least 50 feet from any trace of this fault. The level of expertise necessary to determine that the structure is appropriately sited usually involves engaging a registered geologist to perform a sub-surface study with trenches or borings. At a minimum, all new development proposed within the hazard management zone established under the Alquist-Priolo Act should comply with State Requirements.

While the eastern portion of the San Cayetano Fault is not subject to the Alquist-Priolo Act, Ventura County has identified a fault hazard zone for Fillmore in its Seismic Safety Element and recommends special development standards. These standards comply with State requirements pursuant to the Alquist-Priolo Act.

2.2 Ground Shaking

The City of Fillmore will be subject to strong to severe ground shaking from significant earthquakes generated on nearby or regional faults. Table VI-1 summarizes the known faults in the region and tabulates their earthquake-generating capabilities. It illustrates several important facts. First, the moderate-size earthquakes postulated on the San Cayetano and Oak Ridge Faults will produce very high levels of ground shaking within Fillmore because the faults are very close. The earthquake expected on the San Andreas Fault will be one of the "great earthquakes" to occur in Southern California and is significant because of its high probability of occurrence. However, the ground accelerations in Fillmore from the event will be relatively low due to its distance from the fault (33 miles). Strong shaking from the San Andreas Fault will last approximately 60 seconds, while the strong shaking from the San Cayetano or Oak Ridge earthquakes may only last up to 20-25 seconds.

Significant earthquakes can and will occur on other faults. However, available evidence indicates that their effect in Fillmore will be significantly less than the effects from the faults listed on Table VI-1.

In evaluating seismic hazards, the primary concern should be the identification of buildings and systems likely to suffer significant damage during a strong earthquake. In Fillmore these include older commercial and residential structures, critical-use structures to be used for emergency response activities, and the City's utility networks. The Central Avenue Business District is composed of unreinforced brick buildings, most of which were constructed prior to the enactment of stringent building codes. The City's eastern and north-western areas contain many old wood-frame houses which are not anchored to their foundations. Water, wastewater, natural gas, power and telephone systems are all subject to potential damage from ground shaking. The earthquake which struck Coalinga, California in 1982 provides an example of the damage the City would likely suffer in the event of a major local earthquake: loss of the downtown commercial

Table VI-1. Known Faults in Fillmore Region

Active Faults	Distance from Fillmore (Miles)	Expected Magnitudes (Richter)	Maximum Reportable Ground Acceleration Gravity	Approximate Probability of Occurrences (100-Year Period
San Cayetano	0	6 1/2 - 7	0.50 - 0.70	High
Oak Ridge	1.5	6 - 7	0.40 - 0.60	High
San Gabriel	16	6 1/2 - 7	0.15 - 0.20	Intermediate
San Andreas	27	8 - 8 1/2	0.15 - 0.20	Imminent
Potentially Active Faults:				
San Ynez	12	6 - 7	0.10 - 0.20	Low
Pine Mountain	13	6 - 7	0.10 - 0.20	Very Low
Malibu Coast	24	6 - 7	0.10 - 0.15	Low

1/ Source: Westland Geological Services, Inc., 1986.

district; disruption in older residential neighborhoods, including collapsed porches, toppled fireplaces and upset building foundations; and temporary loss of public utility services.

Critical-use structures are specific buildings necessary for the successful implementation of emergency-response activities. The City's Fire Station and City Hall, the San Cayetano Elementary School, the Ventura County Fire Station and local medical offices must be available to provide effective emergency response. All of these buildings have been built according to modern building codes and are designed to withstand substantial ground shaking.

3.0 OTHER GROUND FAILURE HAZARDS (Figure VI-2)

See Figure VI-2 for areas of potential ground instability.

3.1 Shrink-Swell Potential

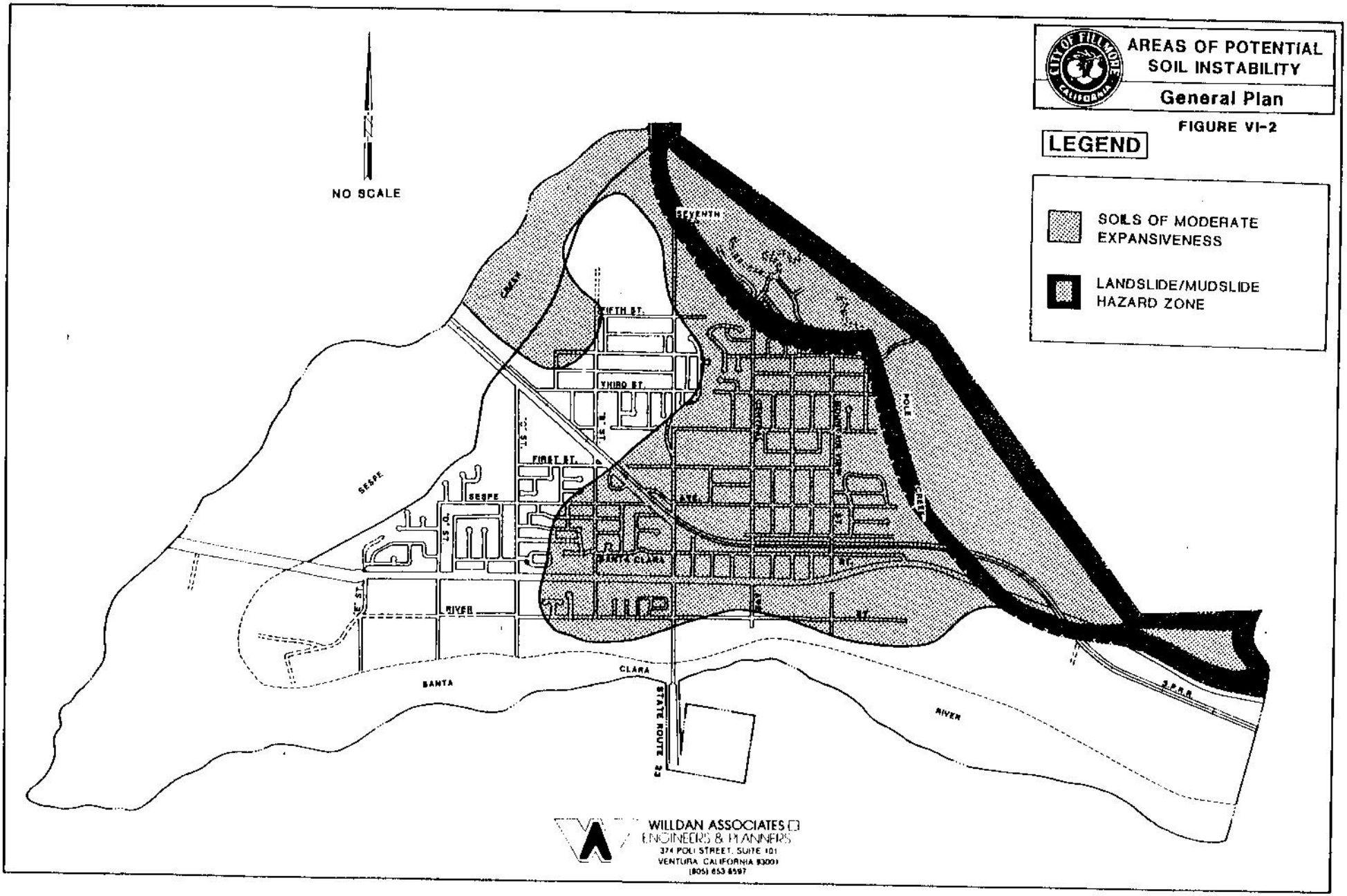
The presence of expansive clays in soil causes it to shrink when dry and swell when wet. A moderate shrink-swell potential exists within most of the City, in surrounding hillsides and in the areas along the Santa Clara River. Proper design and construction of floor slabs and footings will mitigate this problem. Site-specific soil investigations which identify a high shrink-swell potential will require additional building foundations improvements.

3.2 Liquefication

Liquefaction is a soil condition brought about by a shock, typically from a major earthquake. When a high water table is found among certain soil properties, the shock produces a "quicksand" condition and causes a loss of support for building foundations. Fillmore's ground water levels have historically exceeded fifty feet or more below ground surface levels and indicates a low to non-existent liquefaction potential.

3.3 Erosion

Wind, running water and other geological agents all act to wear away the surface of land. The erodibility of an area is dependent on several factors including climate, soil characteristics, slope and type of development. Erosion is not presently a significant problem for the City as urban development is generally confined to areas of slight erosion hazard. However, the hillsides surrounding the City have a moderate to severe hazard primarily due to steep slope conditions.


AREAS OF POTENTIAL SOIL INSTABILITY
General Plan
FIGURE VI-2
LEGEND
SOILS OF MODERATE EXPANSIVENESS
LANDSLIDE/MUDSLIDE HAZARD ZONE
NO SCALE
SEVENTH
SIXTH ST.
THIRD ST.
FIRST ST.
SESPE
SESPE
RIVER
SANTA CLARA
RIVER
S.P.R.R.
STATE HIGHWAY 23
WILLDAN ASSOCIATES
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To avoid the possibility of erosion and to reduce the impacts of erosion on surrounding lands, development proposals in hillsides and other areas of moderate to severe erosion hazard must include adequate erosion control measures.

4.0 FLOOD HAZARDS

4.1 100-Year Flood Plain (Figure VI-3)

Construction of the Sespe Creek levee in 1983 dramatically altered the City's flood hazard potential by removing approximately one half of the existing City from the 100-year flood plain. Sespe Creek has inundated the City in 1920, 1938, 1969 and 1978, causing extensive property damage and some loss of life. The Creek drains a large area of wilderness to the north of the City, and approaches the City through a narrow gorge. The levee has reduced the probability of flooding from this waterway to less than one percent, such that the hazard involved is not a significant consideration in planning of potentially affected areas.

The Santa Clara River 100-year flood plain extends into portions of the City proposed for urban development (see Figure VI-3). However, the construction of three up-river dams makes flooding into the City highly improbable. Projects proposed in the existing flood plain must, nevertheless, employ measures to mitigate the potential for flood by excluding intensive development from the flood plain.

4.2 Levee Failure (Figure VI-4)

As mentioned above, the Sespe Creek Levee has reduced the probability of flooding from Sespe Creek to less than one percent. While flooding from this waterway is not a significant consideration in the planning of potentially affected areas, levee failure warrants consideration in this Element. Figure VI-4 illustrates those areas subject to inundation as a result of levee failure.

4.3 Dam Failure (Figure VI-4)

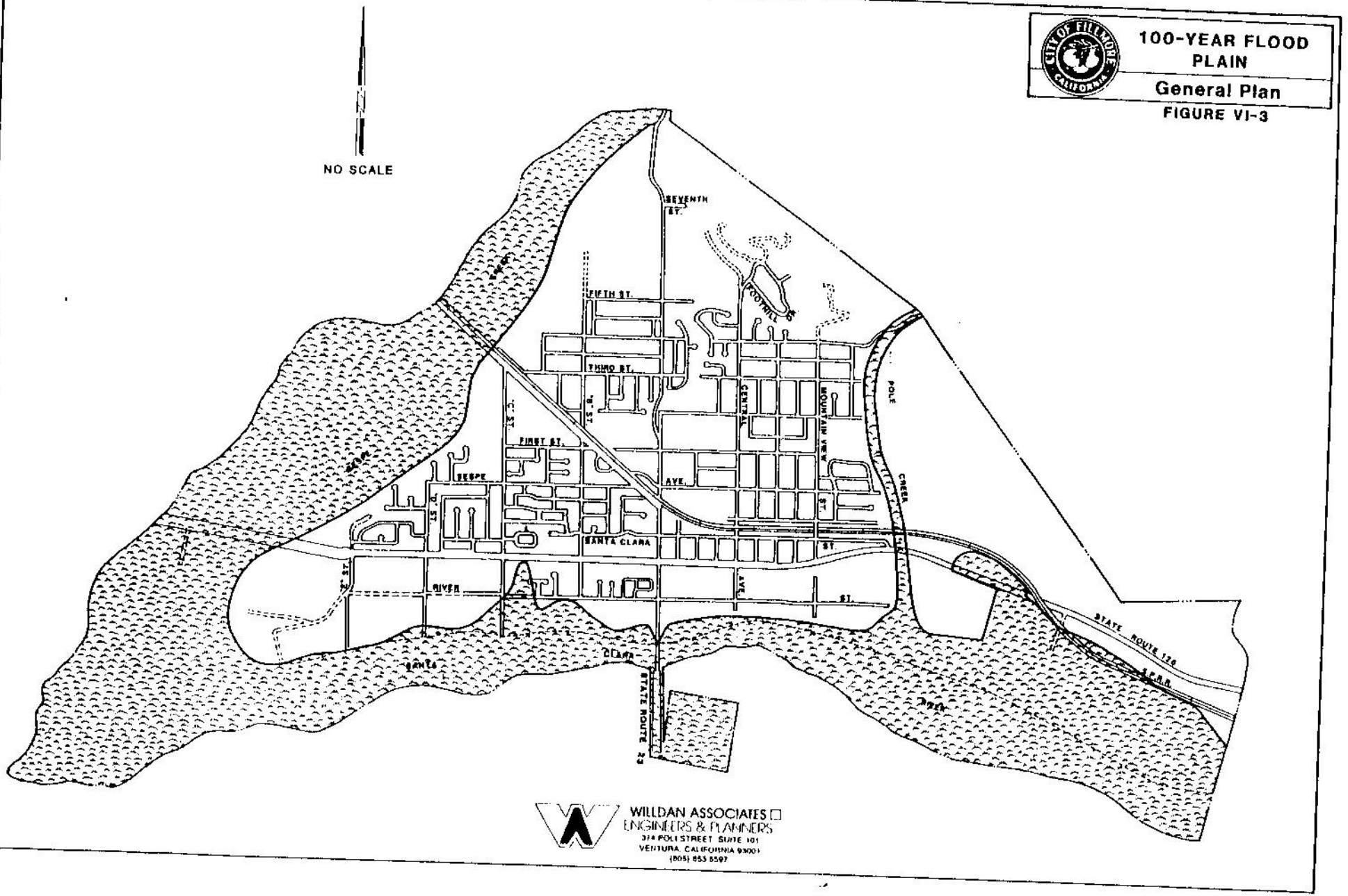
Three dams are located on the Santa Clara River above the City: Pyramid Lake Dam, Castaic Dam and the Santa Felicia Dam (Piru). Created to provide irrigation water to local farms, these dams also regulate stormwater runoff into the Santa Clara River.

Dam failure along the Santa Clara River would inundate approximately 80 percent to 85 percent of the City.

100-YEAR FLOOD PLAIN

General Plan

FIGURE VI-3



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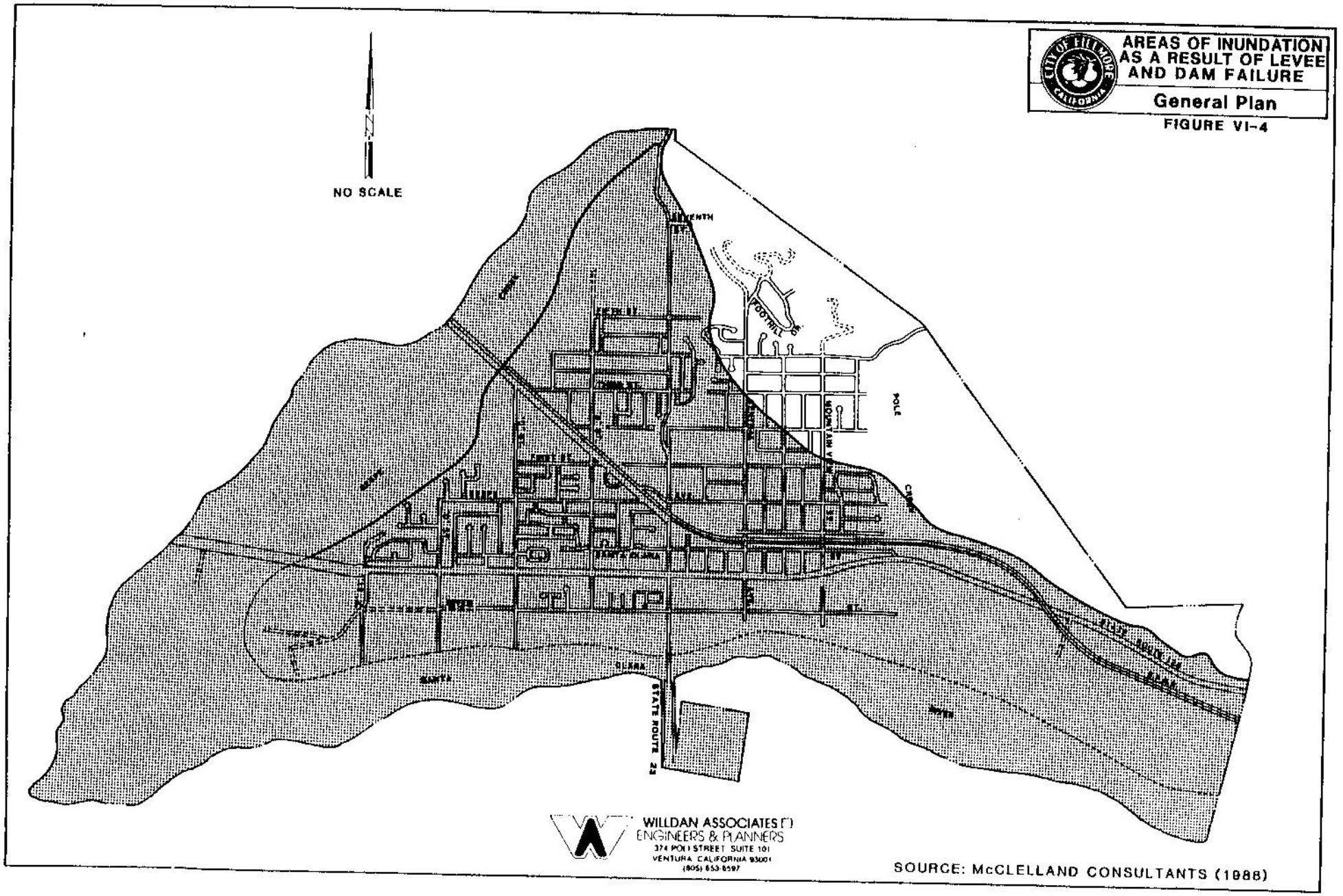
AREAS OF INUNDATION AS A RESULT OF LEVEE AND DAM FAILURE
General Plan
FIGURE VI-4
NO SCALE
SEVENTH ST.
FOOTHILL
MOUNTAIN VIEW
POLE
CREEK
SANTA CLARA
STATE ROUTE 23
WILLDAN ASSOCIATES
ENGINEERS & PLANNERS
374 POLI STREET, SUITE 101
VENTURA, CALIFORNIA 93001
(805) 653-8597
SOURCE: McCLELLAND CONSULTANTS (1988)

About ninety minutes of warning time would be available before the flood waters arrive from either Castaic or Pyramid Dams and about fifteen minutes before the flood waters from Santa Felicia (Piru) Dam inundates the City.

Failure of these dams during a catastrophic event, such as a severe earthquake, is considered a very unlikely event. Due to the method of construction of these dams, they have performed well in earthquakes, and failure is not expected to occur. However, for purposes of emergency preparedness, areas expected to be inundated, should failure occur, is shown in Figure VI-4. Although the failure of these dams is considered to have an extremely low probability, future development along the Santa Clara River must include measures to ensure safe and efficient evacuation of the residents.

5.0 FIRE HAZARDS

The City is adjacent to a mountainous watershed area which experiences periods of severe fire hazard during extreme climatic conditions of high temperatures, low humidity and high wind velocities. Future development is projected to increase the City's exposure to fire hazards. Hillside development will be located among highly flammable brush which ignites readily, burns with intense heat and spreads fire rapidly. Large, destructive fires have burned through local mountains and near the City on a regular basis. Development within the City which has used combustible roofing materials presents a hazard and firefighting problem during severe fire weather due to flying brands from wildland or structure fires.

Reduction of the fire hazard risk is possible based on sound construction practices, sufficient fire flows and water storage capacity, brush and weed clearance and the provision of adequate access. Presently, the City requires all new construction to meet the standards specified in the current edition of the Uniform Building Code and other related codes.

Water mains and fire hydrants are important resources for fighting structure fires and suppressing brush fires. Water availability, or "fire flow" is the combination of water quantity and pressure, measured in gallons per minute (GPM). Fire flow requirements are based on the types of land use and conditions of land intended to be served. For example, single family development may require a fire flow of 1,250 GPM, while industrial development may have a required fire

flow of 5,000 GPM. Development of hillsides surrounding the City will place special demands on the City's water supply. Adequate fire flow for these areas will require additional pumping, storage and distribution improvements to the City's existing water supply system.

Brush and dense undergrowth are a primary fire hazard in the vicinity of Fillmore. Vegetative clearance within and around the City is necessary to reduce structural exposure to flames and radiant heat, and to give residents and firefighters a reasonable chance to protect structures. Property owners are presently required to maintain a firebreak around structures by removing all flammable vegetation or other combustible growth from the structures to the property line or out to a minimum distance of 50 feet, whichever is closer. Exceptions to this requirement may include single specimens of trees, ornamental shrubbery, or cultivated ground cover such as green grass, ivy, succulents or similar plants used as ground cover, provided that they do not form a means of readily transmitting fire from the native growth to any structure. Additional modifications may be required when it is found that, because of extraordinary hazardous conditions, a firebreak of only 50 feet is not sufficient to provide reasonable fire safety.

To provide adequate access, public or private road networks must provide safe and ready access for emergency equipment and evacuation of citizens during disasters.

6.0 TOXIC MATERIALS RELEASE

Among the hazards to which we are subject, the release of toxic materials is the newest and potentially the most dangerous. The City is located on State Highway 126 which has been designated by Caltrans for the transportation of toxic wastes and hazardous materials. The City has limited authority to regulate the thru-hauling of toxic substances as the State has pre-empted local jurisdictions.

The City should consider implementing programs to regulate commercial and industrial toxic materials users, beginning with its existing Ordinance on the discharge of toxic substances into the wastewater treatment plant. Of equal significance to the health and well being of residents are the toxic substances used in the home. An education program should be implemented which advises residents of the dangers associated with mishandling pesticides, flammable liquids, caustic materials and other potentially harmful substances.

7.0 REFERENCES

Envista, Inc. Amended General Plan, City of Fillmore, California. October 1979.

Hart, Earl, Geologic Investigating Officer. Division of Mines and Geology, Department of Conservation. Personal communication, March 26, 1987.

McClelland Consultants, November 1988. Final Environmental Impact Report - City of Fillmore General Plan Update, 1988-2010. (Ventura, California).

Ventura County, Resource Management Agency. Ventura County Comprehensive Plan, Seismic Safety Element. 1974.

Westland Geological Services, Inc. Draft Initial Study: City of Fillmore General Plan. 1986.