Safety

Chapter 10

City of Fremont
General Plan

Adopted December 2011

CITY OF
Fremont

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Introduction

Protection of the health and safety of its citizens is one of the primary interests of local government. A city's General Plan must take into account risks associated with the physical characteristics of the community even though many risks cannot be eliminated. Residents in Fremont and all of the Bay Area must live with the constant threat of major earthquakes and the likelihood that fire, floods and other natural disasters may occur independently or as a result of an earthquake. The purpose of the Safety element of the General Plan is to guide decision making that helps reduce risks associated with environmental hazards.

The Safety Element is divided into seven parts related to each of the following topical issues:

- Seismic and Geologic Hazards
- Flood Hazards
- Fire Hazards
- Hazardous Materials and Waste
- Community Emergency Preparedness
- Noise and Vibration
- Crime Preventative Community Planning

Legal Framework

The City of Fremont has updated its Safety Element of the General Plan in conformance with State law and the recommended guidelines published by the Governor's Office of Planning and Research. As required by California Government Code Section 65302(g) every local government must maintain a comprehensive Safety Element that addresses a variety of natural and man-made hazards and that provides goals and policies aimed at reducing the risk associated with these hazards. The City of Fremont first included a Safety Element in its 1969 General Plan and again in the 1991 General Plan. The Safety Element was last amended in 2003.

Disclaimer

The Safety Element is provisional by nature. It provides a general evaluation of potential hazards on a city-wide basis. The identification and assessment of hazards described in this Element are based on previous published reports and sources that were available at the time that it was prepared.

SAFETY-RELATED STATE LAW

Per State law, the Safety Element must examine issues related to:

- Seismic Hazards
- Landslides
- Geologic Hazards
- Flood Hazards
- Fire Hazards

Site specific analysis was not conducted. This document and the accompanying illustrations are to be used for general land use planning purposes only. This element should not be used for site-specific studies, but rather it should be used to identify areas in the City that could be constrained and where detailed site-investigations should be required for new development or redevelopment.

Regulatory Framework

There are several State and Federal programs related to public safety that provide the legal framework for the State mandated Safety Element of the General Plan. These programs, laws and regulations provide minimum guidelines and criteria; however local jurisdictions can choose to adopt more specific and stringent policies that go beyond State and Federal requirements. Some of the specific laws and regulations that apply to the City of Fremont are referenced below. This is not intended to be an all-inclusive list. For more information regarding Federal, State and City regulations, refer to applicable Federal and State Codes and to the City of Fremont Municipal Code.

Seismic Hazards

- Alquist-Priolo Earthquake Fault Zoning Act (State)
- Seismic Hazards Mapping Act (State)
- Unreinforced Masonry Law (State)

Flood Hazards

- National Flood Insurance Program (Federal)

Fire Hazards

- Very High Fire Hazard Severity Zones (Local)

Hazardous Materials Regulations

Regulation and management of hazardous materials are administered by the City of Fremont Fire Department, other County, State, and Federal agencies and non-governmental organizations.

- Resource Conservation and Recovery Act (RCRA) (Federal)
- Transportation-related regulations (State)
- State Water Resource Control Board (State)
- Pre-Disaster Hazard Mitigation Program (Federal)
- Certified Unified Program Agency (Local)

ALQUIST-PRIOLO EARTHQUAKE FAULT ZONING ACT

This Act was passed in 1972 to mitigate the hazards of surface fault rupture. Alquist-Priolo Earthquake Fault Zones are regulatory zones, delineated by the State Geologist, where site specific geologic studies are required to identify and avoid fault rupture hazards prior to the subdivision of land or construction of habitable structures.

SEISMIC HAZARDS MAPPING ACT

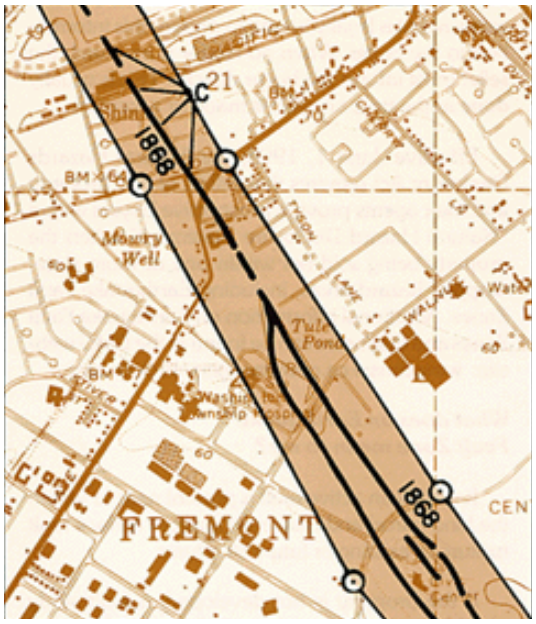
This Act was passed in 1990 and addresses non-surface fault rupture earthquake hazards, including liquefaction and seismically induced landslides.

Seismic and Geological Hazards

Seismic and geologic conditions must be taken into account in the planning and development of any parcel of land. When structures or roads are built on geologically unstable land or land subject to seismically induced hazards, there is an increased risk to the community. The State of California defines acceptable level as the minimum level of seismic activity at which ground failure is not expected to cause loss of life. The City has adopted the States definition as its own.

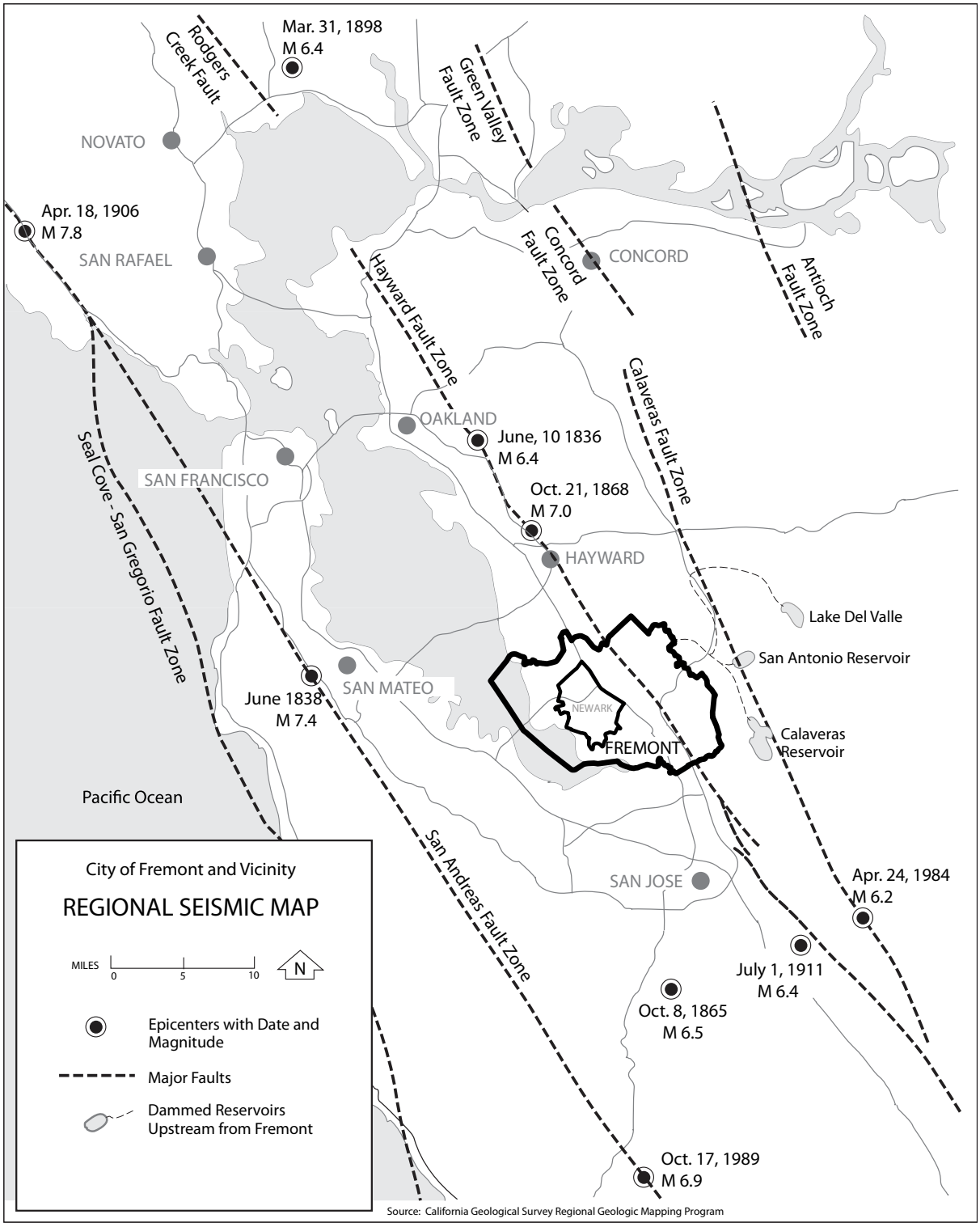
Regional Faulting & Seismicity

The San Andreas fault travels through much of the coastal area of California, traversing San Mateo County, west of Fremont on the San Francisco peninsula. The Hayward fault bisects Fremont and generally runs north and south through the City and could cause major damage and displacement due to its prominent location. It branches from the Calaveras fault in the eastern part of San Jose (Diagram 10-1). A seismic event on any of these major faults could cause serious damage in Fremont. In addition to large surface fault rupturing events, the Hayward fault is characterized by fault creep, the relatively slow, gradual fault displacement that has resulted in continuing damage to curbs, streets and structures in Fremont.



Hayward Fault through Central Fremont

Diagram 10-1
Regional Seismic Map



Seismically and Geologically Induced Hazards

Evidence of fault creep in Fremont

The damage caused by an earthquake depends on the magnitude of the quake, the area's geology, population density, land use, the quality of construction, emergency response system and the time of day the earthquake strikes. A major earthquake along the Hayward fault, together with related landslides, fires, and floods, could have a catastrophic effect in Fremont. Such a disaster would affect the entire region and could exceed the combined response capability of the city and the state. The specific seismic hazards associated with earthquakes are described below and include:

- Fault rupture or displacement
- Ground shaking
- Ground failure (including liquefaction, landslides and mudslides, and subsidence)
- Flooding resulting from dam or levee failure, tsunamis and seiches

Fault Rupture or Displacement

Fault rupture affects structures sited above or near an active fault. It results from the movement of the ground surface along the fault. Typically, this takes place during earthquakes, but it can also occur slowly in a process known as fault creep. Fault creep occurs along the Hayward fault. This gradual movement distorts and fractures structures built on the fault and has cracked and offset curbs, streets, and fences at several locations.

Ground Shaking

Strong ground shaking is a major hazard in Fremont and throughout the San Francisco Bay Area. The intensity of ground shaking and its effects on structures are determined by the duration and intensity of the earthquake, distance to the fault, property of the underlying geologic materials, and the building's design and construction characteristics. Unconsolidated soil or fill can amplify the strength and duration of ground shaking, increasing the risk of structural damage. See Diagram 10-2 for shaking potential in Fremont.

Seismically-Induced Ground Failure

Seismically-induced ground failure refers to a loss of ground strength or cohesion as a result of ground shaking. There are multiple types of ground failure, including liquefaction, seismically-induced landslides and mudslides, and subsidence.

Mission Peak landslide

Liquefaction

Liquefaction is the most common induced ground failure in Fremont as most of the City is within a liquefaction zone. Liquefaction occurs when increasing pore-water pressure during cyclic earthquake shaking causes loose, fine sandy and silty sediments layers below the water table to temporarily behave as a liquid, similar to quick sand. Liquefaction is restricted to certain geologic and hydrologic environments, primarily recently deposited sand and silt in areas with ground water levels less than fifty feet deep. The majority of the City is subject to liquefaction. Diagram 10-3 delineates the Earthquake Fault Zone and areas subject to liquefaction based on Seismic Hazard Zone maps produced by the California Geological Survey.

Landslides

Landslides are a significant hazard in parts of Fremont, particularly along the eastern boundary of the City in the Hill Area. Most sloping ground has some potential for landslides simply due to the effects of gravity. Unstable slopes are formed by many natural processes including hillside erosion, stream action that undercut slopes, weak or unconsolidated soil units, formations with a high clay content, water saturation, fires that destroy vegetation, and fault line displacements. Usually a combination of several factors will cause an unstable hillside to fail, with a single factor such as heavy rainfall or an earthquake being the catalyst. When landslides occur, creeks and streams below the slide area may become dammed with debris and cause flooding.

Diagram 10-4, Landslide Hazard Area indicates potential locations for landslide hazards in Fremont. It is based on the seismic hazard zone maps for landslides produced by the California Geologic Survey. The map is general in nature; the potential for landslides on individual parcels must be determined by site-specific geotechnical analysis.

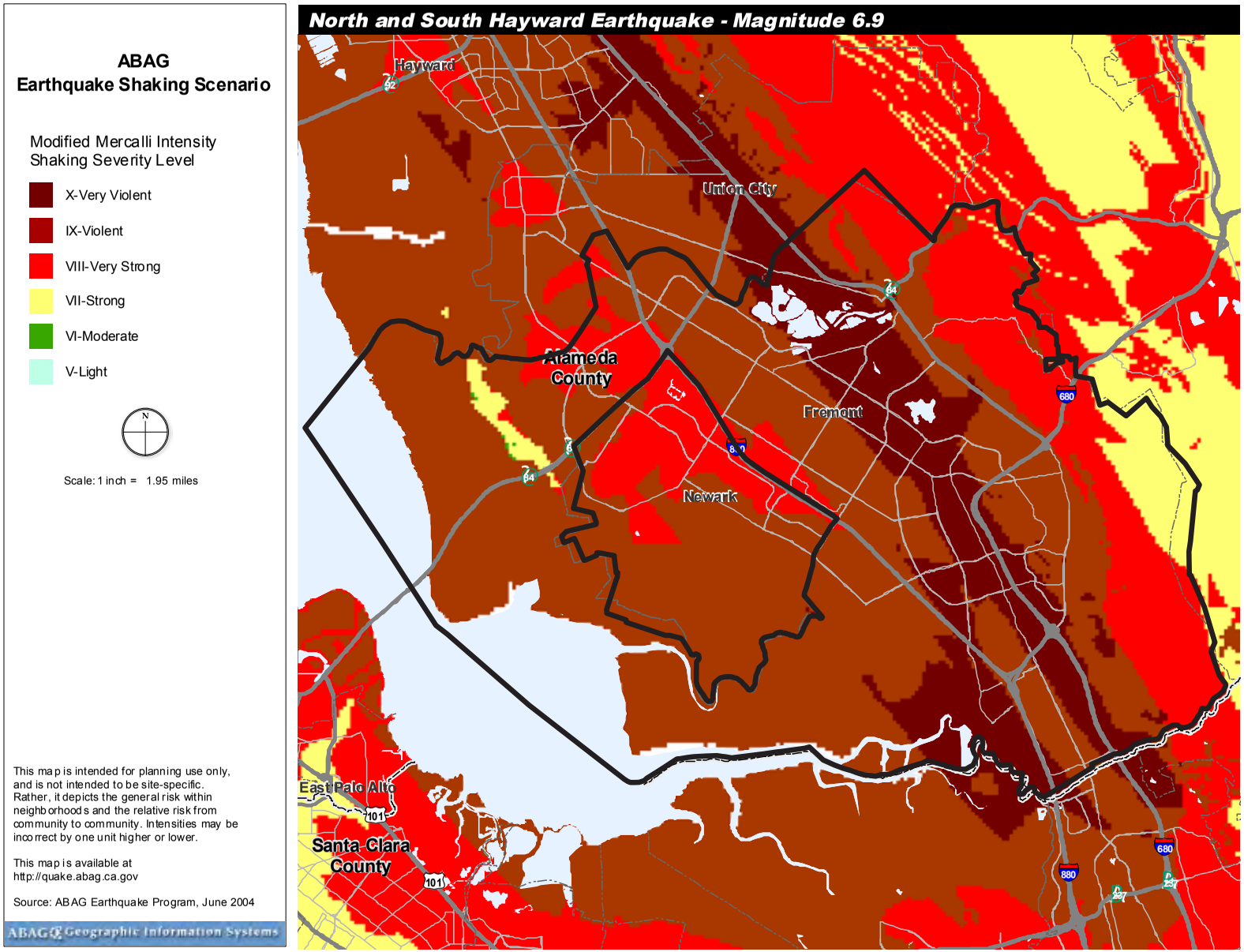


Diagram 10-2 Shaking Potential in Fremont

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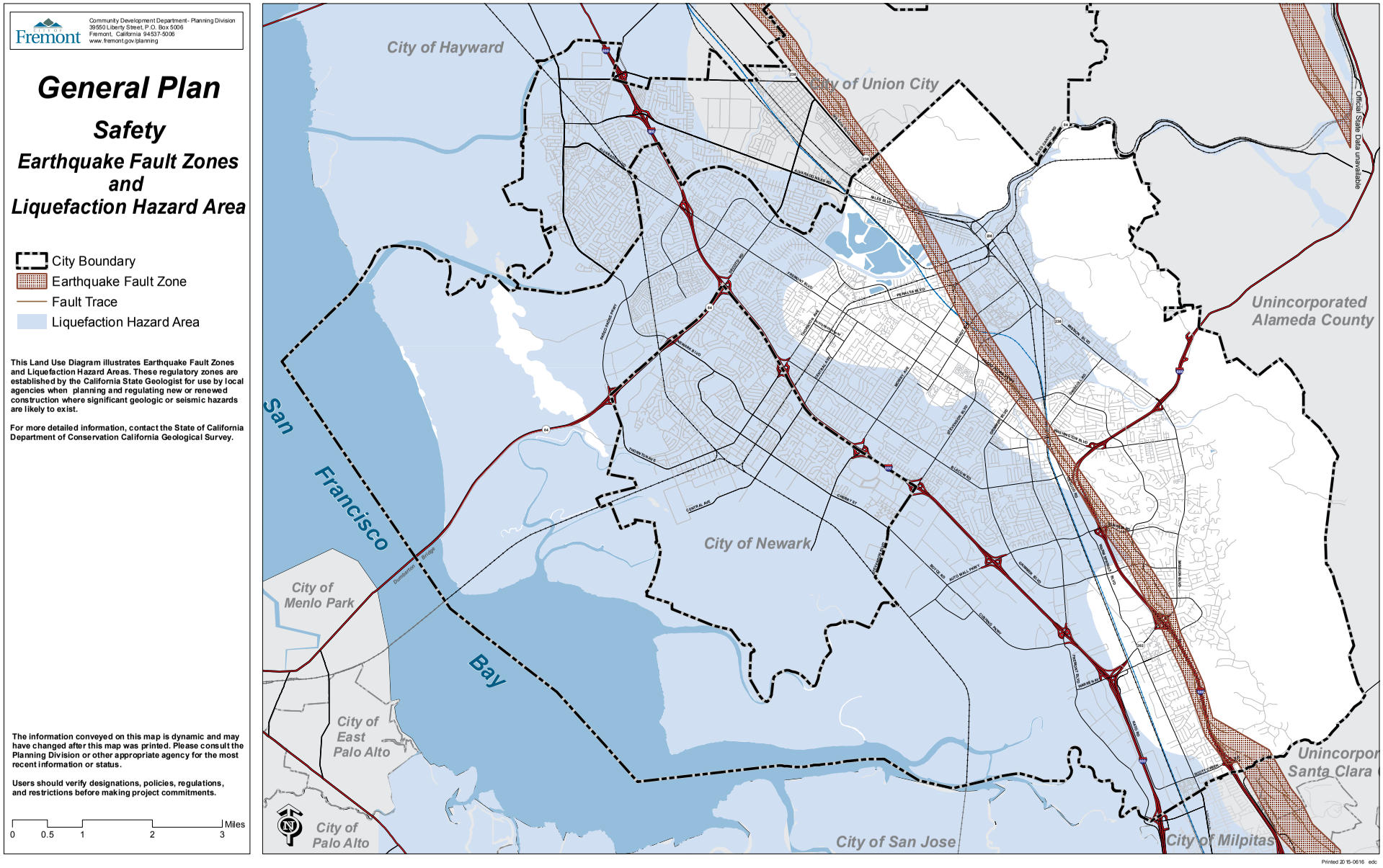

Diagram 10-3 Earthquake Fault Zones and Liquefaction Hazard Area

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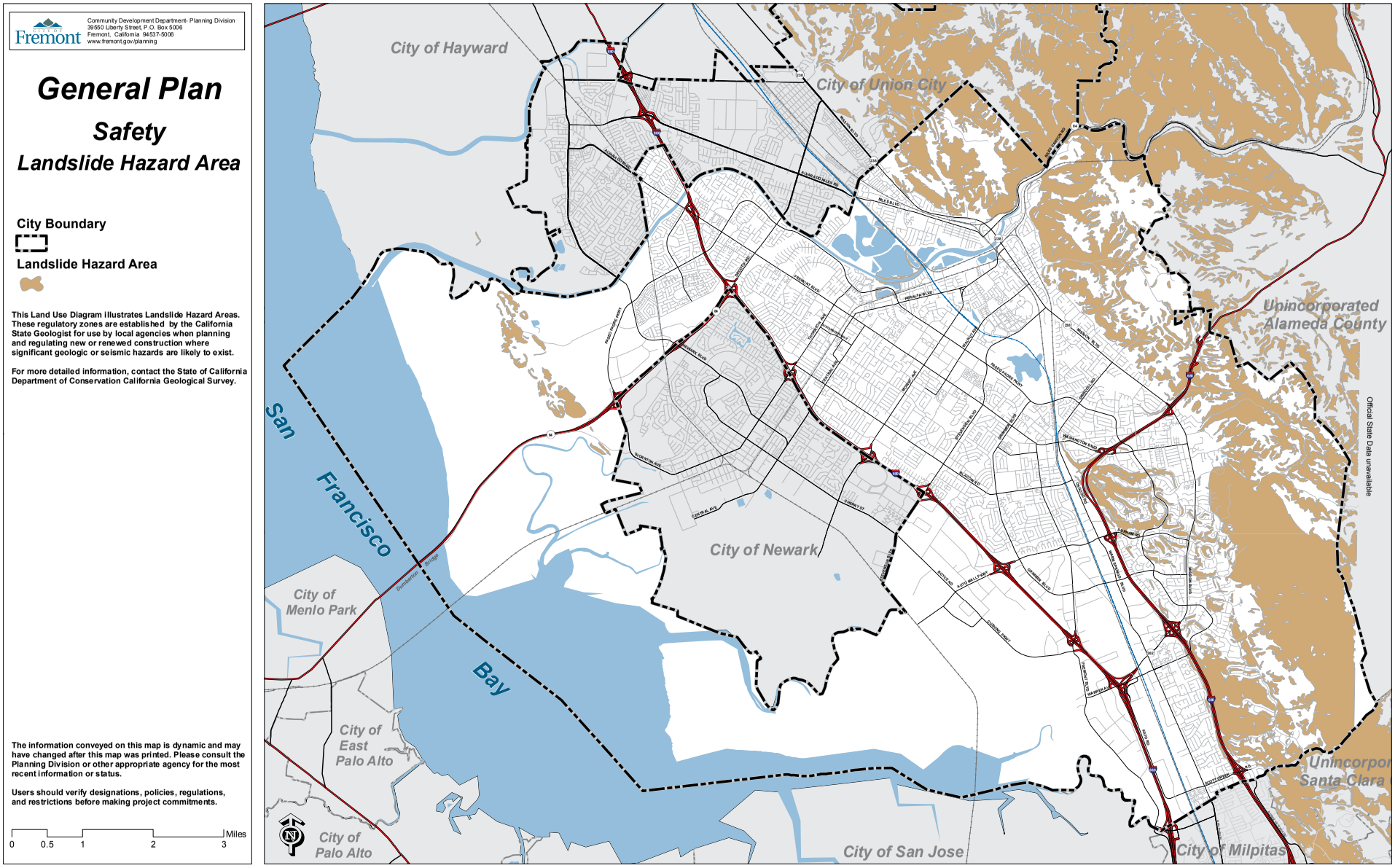

Diagram 10-4 Landslide Hazard Area

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Debris Flows

Debris flows, or "mudslides," are shallow landslides saturated by water that travel rapidly down slope as muddy slurries. Debris flows commonly travel at speeds greater than 20 mph, although speeds in excess of 100 mph have been observed. These flows typically follow watercourses, but can jump the banks and spread over wide areas. Most debris flows are localized and threaten only buildings in their direct path. Debris flows are most likely to occur on steep slopes composed of saturated, granular soils typically following intense rainfall.

Subsidence

Subsidence, or ground settlement, is most likely to occur during an earthquake in areas of moderate to high liquefaction potential. Subsidence can also occur through prolonged pumping of groundwater which would lower the water table over a large area and contribute to sinking of the ground elevation. Although Fremont's groundwater levels have been lowered due to pumping, no related subsidence has resulted. A groundwater recharge program has been underway for several years under the direction of the Alameda County Water District, and groundwater levels are now stable.

Earthquake-related Flooding

Seismically-induced ground shaking can also cause dams or water tanks to fail, create waves that can overtop a dam, or create landslides that temporarily block stream channels. Shoreline levees are particularly vulnerable to seismic failure due to the potential for liquefaction of the underlying soils. Infrastructure associated with flood control such as lift stations and tidal gates could be damaged, thereby eliminating the capacity controls of the flood control system.

Dam Failure

The Association of Bay Area Governments (ABAG) has created dam failure inundation maps for the Bay Area, including the City of Fremont. The two major upstream dams are James Turner (San Antonio Reservoir) and Del Valle, which are inspected regularly by the California Division of Safety of Dams. Flood waters resulting from dam failure would take 90 minutes (Turner) and 160 minutes (Del Valle) to reach populated areas of the city. The Calaveras Reservoir is also located upstream from Fremont but a further distance away. Additional information on dam failure, including inundation maps, appears later in the Flooding Hazards Section.

Earthquake damage to transportation infrastructure

Tsunamis & Seiches

Other seismically-related flood hazards include tsunamis and seiches. Tsunamis are ocean waves caused by large earthquakes or landslides that occur near or under the ocean. Due to the location of Fremont on the San Francisco Bay and shallowness of the Bay along the Fremont waterfront, tsunamis are not considered a significant hazard.

Seiches are standing waves created on rivers, reservoirs, ponds, and lakes when seismic waves from an earthquake pass through an area. Seiches can have similar effects to a tsunami, and could affect the City of Fremont by causing either of the reservoirs (Del Valle and Turner) in the hills to overtop their dams, leading to inundation or flooding in Niles Canyon and other portions of the city.

Structural Hazards

In general, the older a building, the less likely it is to meet the seismic provisions of the current California Building Code and the more likely it is to suffer damage in an earthquake. The majority of homes in Fremont are single-story, post-1950 wood frame structures. While such structures generally perform well, poorly designed or constructed wooden buildings can sustain substantial damage. These homes are considered to be the most susceptible to damage. Other seismic retrofit programs include the following:

- Unreinforced masonry (URM), stone, brick or block buildings are the most failure-prone structures in urban areas. In 1986, the State required cities to inventory potentially hazardous masonry buildings and develop and implement a mitigation program to reduce potential hazards.
- Multi-story buildings with lower floors less rigid than upper floors are commonly known as "soft-story" buildings. The City Council passed an ordinance requiring the owners of "soft-story" buildings to retrofit and upgrade buildings.
- Concrete tilt-up buildings and reinforced masonry buildings built before the 1993 Uniform Building Code also may be vulnerable. These structures may lack proper ties between roofs or floors and walls and can sustain damage from ground shaking.

Transportation & Utility Hazards

A number of local and regional transportation routes cross the Hayward fault in Fremont. Many of these crossings are located at grade and are on level ground. While the pavement and road bed might be damaged by

ground rupture and displacement, streets could remain passable. Elevated or grade separated crossings such as freeway overpasses would be more seriously impacted by fault rupture. The BART system was designed to withstand the effect of seismic hazards. However, the system crosses structurally poor soils and the Hayward Fault trace creating the risk of track distortion in even a moderate earthquake.

Most utility systems in the City have been built with possible fault displacement in mind. With the exception of storm drain and sewer mains, the city's utility and pipeline systems have shut-off valves to control flows near the points of intersection with the Hayward fault.

Projected Impacts of Seismic Events

Although the potential for damage from earthquakes generally decrease as the distance from the epicenter increases, a major earthquake on any of the faults in the region has the potential to cause damage throughout Fremont. Studies completed in 2008 by the United States Geological Service estimate a 93 percent combined probability of one or more large earthquakes greater than 6.7 magnitude (Richter Scale) occurring in the San Francisco Bay Region in the next 30 years.

Earthquakes also have secondary impacts. One of the more serious secondary impacts would be fires resulting from ruptured electric and gas connections, collapsed chimneys and other damage. Addressing fires is complicated by the possibility of breaks in the water distribution system reducing or eliminating water supply and pressure. Impassable roads would also complicate emergency response. Any road closures would limit evacuation routes and timely response to emergencies. However, most surface roads are expected to remain passable. Of the major highways, I-680 is the most susceptible to significant damage leading to closure. Eastern portions of the City's hills and Niles Canyon might be isolated by road closures due to slides and other damage. As noted, most utility systems in the City have been built to withstand fault displacement. However, in the event of a severe quake, most or all utility systems could be inoperable for several days.

SIGNIFICANT EARTHQUAKES IN THE BAY AREA

October 21, 1868
7.0 Magnitude
Hayward Fault

April 18, 1906
7.8 Magnitude
San Francisco
San Andreas Fault

October 17, 1989
6.9 Magnitude
Loma Prieta
San Andreas Fault

FLOODING

A rise in the level of a water body, or the rapid accumulation of runoff, including mudslides and land subsidence, that results in the temporary inundation of land that is usually dry.

Flood Hazards

Flooding in Fremont can be caused by heavy rainfall, extremely high tides, and the failure of flood control or water supply structures such as levees and reservoirs. Through the use of hydrologic data, regulatory controls, and flood prevention measures, land use planning can effectively reduce flood hazards.

Flood protection efforts in Fremont are primarily handled by the Alameda County Flood Control and Water Conservation District (ACFC/WCD). Although ACFC/WCD has a separate funding source, it functions as an arm of the Alameda County Public Works Department. The ACFC/WCD is divided into ten zones which correspond to the major watersheds of Alameda County. Fremont is located in Zone 5 and Zone 6. Zone 5 stretches from the Fremont and Hayward hills to the shoreline of San Francisco Bay and includes Newark and the northern portions of Fremont. Zone 6 includes the Irvington, Mission San Jose, and Warm Springs areas of Fremont.

Flood Prone Areas

Flooding from a 100 - year or greater flood could affect portions of the North Fremont surrounding Coyote Hills and portions of the City's industrial west of I-880 and south of Stevenson Boulevard. Most of the areas prone to historical flooding are located in the western portions of the City and have been designated primarily for permanent open space uses such as habitat preservation, salt ponds, and federal and regional parks and preserves.

Other areas of the City where inundation from flooding is possible include Alameda Creek through Niles Canyon; the area surrounding Lake Elizabeth, extending into the Mission Valley neighborhood; Laguna Creek; the Crandall Creek area west of Deep Creek Road; and the KGO radio transmitter site along the approach to the Dumbarton Bridge. There is also localized flooding potential along the urban fringe near the base of the hills and in scattered flat land areas. See Diagram 10-5 for flood-prone areas in Fremont.

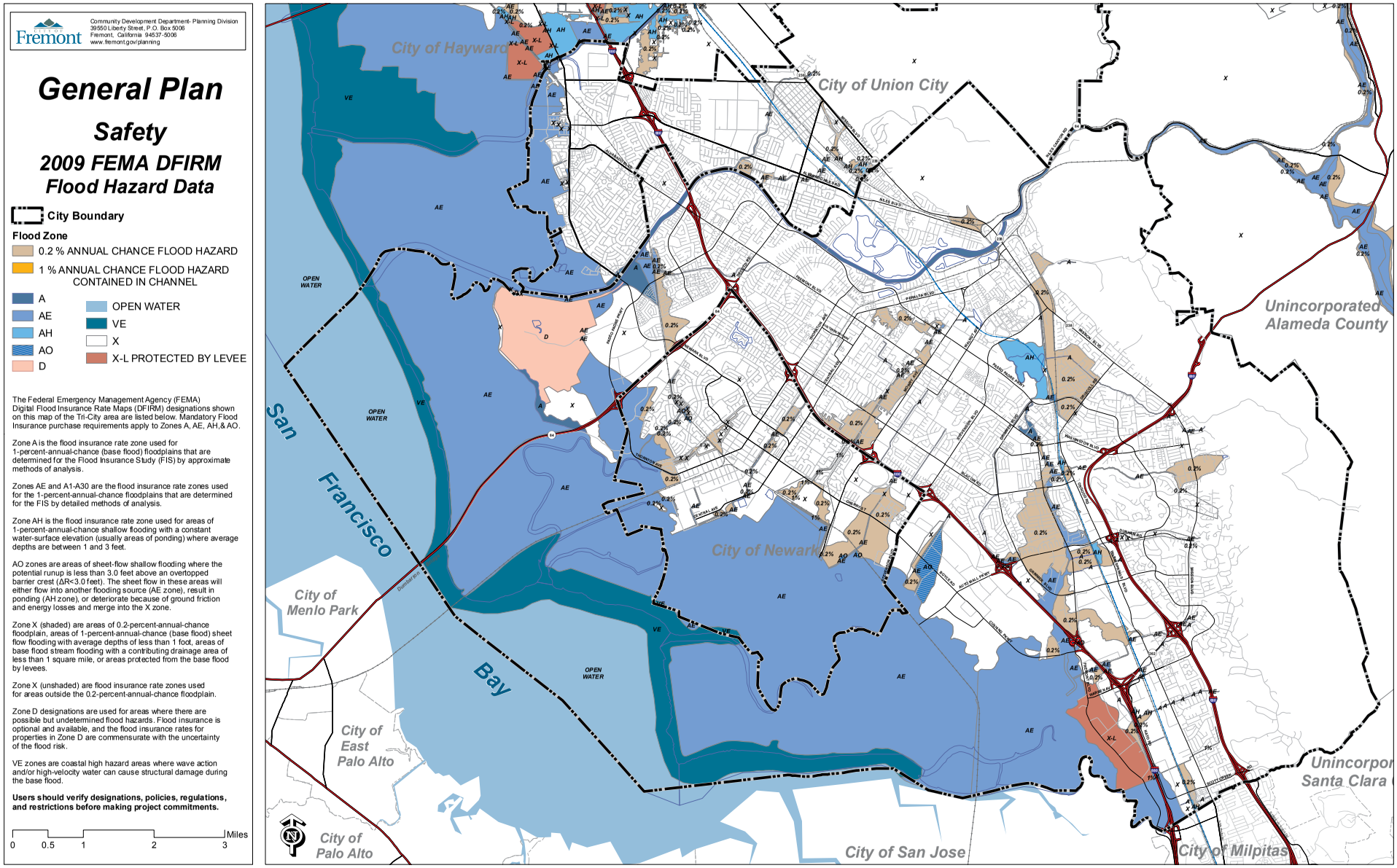

Diagram 10-5 2009 FEMA DFIRM Flood Hazard Data

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Levee Failure

Levee failure also poses a great risk to life and property in areas where levees protect surrounding property from sea level rise, surge and flooding. The City has two primary levees. One is located along Alameda Creek protecting North Fremont and the other along Coyote Creek protecting the south Baylands area. If the levees were to fail then property adjacent to these areas would be susceptible to flooding and flood damage. The Alameda County Flood Control District has jurisdictional authority over the maintenance of the levees. Recent natural disasters and current concerns over rising sea levels have brought attention to the risk of levee failure.

Levee Accreditation

FEMA, as part of the nationwide Flood Map Modernization project, has asked communities and levee owners to show that levees, which are currently designated as protecting land from flooding, continue to meet minimum design, operation, and maintenance standards consistent with the National Flood Insurance Program regulations. FEMA identified two levee systems in Fremont that provide flood protection and must be accredited by FEMA. The two levee systems are along Alameda Creek and along Coyote Creek.

In 2007, the City and ACFC/WCD agreed to pursue accreditation of these levee systems by providing necessary documentation to demonstrate the levees meet the requirements of the National Flood Insurance Program. In response, FEMA designated both levee systems as provisionally accredited levees (PALs). The PAL designation requires that the City and ACFC/WCD provide FEMA with the necessary accreditation documents to certify the levees. Should either or both levee systems not be accredited, the land areas behind the levees will be designated by FEMA as special flood hazard areas, or areas within the 100-year flood plain.

Flooding Related to Earthquake Induced Dam Failure (Inundation Areas) or Water Tank Failure

Flooding could accompany an earthquake if a dam or storage tank fails; the earthquake creates severe ground shaking resulting in a wave or seiche in a reservoir and causing a dam to fail or overflow the surrounding area; a stream is dammed by a landslide and water volume exceeds channel capacity; or an earthquake-triggered landslide into a reservoir creates an

overflow. Channels and water courses with earthen banks and levees are particularly vulnerable and could collapse in a major earthquake resulting in partial or complete blockage of channels causing flooding upstream of the impoundment. Lift stations and tide gates could be damaged and shoreline levees could collapse, eliminating or impairing the control capabilities of the system. Levees are especially susceptible to rapid settlement due to liquefaction or horizontal spreading of underlying soils.

Dam Failure

Dam failures are one of the greatest threats to life and property of all natural disasters because of the large population typically exposed to danger. The majority of Fremont's urbanized areas are at risk of inundation as a result of dam failures. Three dams have the potential to flood the city. These dams are located in the upper reaches of the Alameda Creek watershed and include:

- Calaveras - 100,000 acre-feet capacity - owned by City/County of San Francisco
- Del Valle - 77,100 acre-feet capacity - owned by California Department of Water Resources
- James H Turner - 50,500 acre-feet capacity - owned by City/County of San Francisco

It would take an estimated 90 minutes (James H Turner) to 160 minutes (Del Valle) for flood waters to reach the mouth of Niles Canyon where they could spread into populated areas. Flood hazards would be most severe in winter, when streams and reservoirs are full. Diagram 10-6 indicates areas of Fremont subject to flooding from dam inundation.

Tank and Reservoir Failure

The failure of water storage tanks releasing a large volume of water over down-slope areas is a local land use planning concern. The Alameda County Water District has several water storage tanks and five reservoirs located on the lower slopes of the eastern hill face. Additionally, there are scattered ponds in the hill area. Should one tank fail or pond overflow, there is the possibility that a large volume of water could suddenly be released over down slope areas.

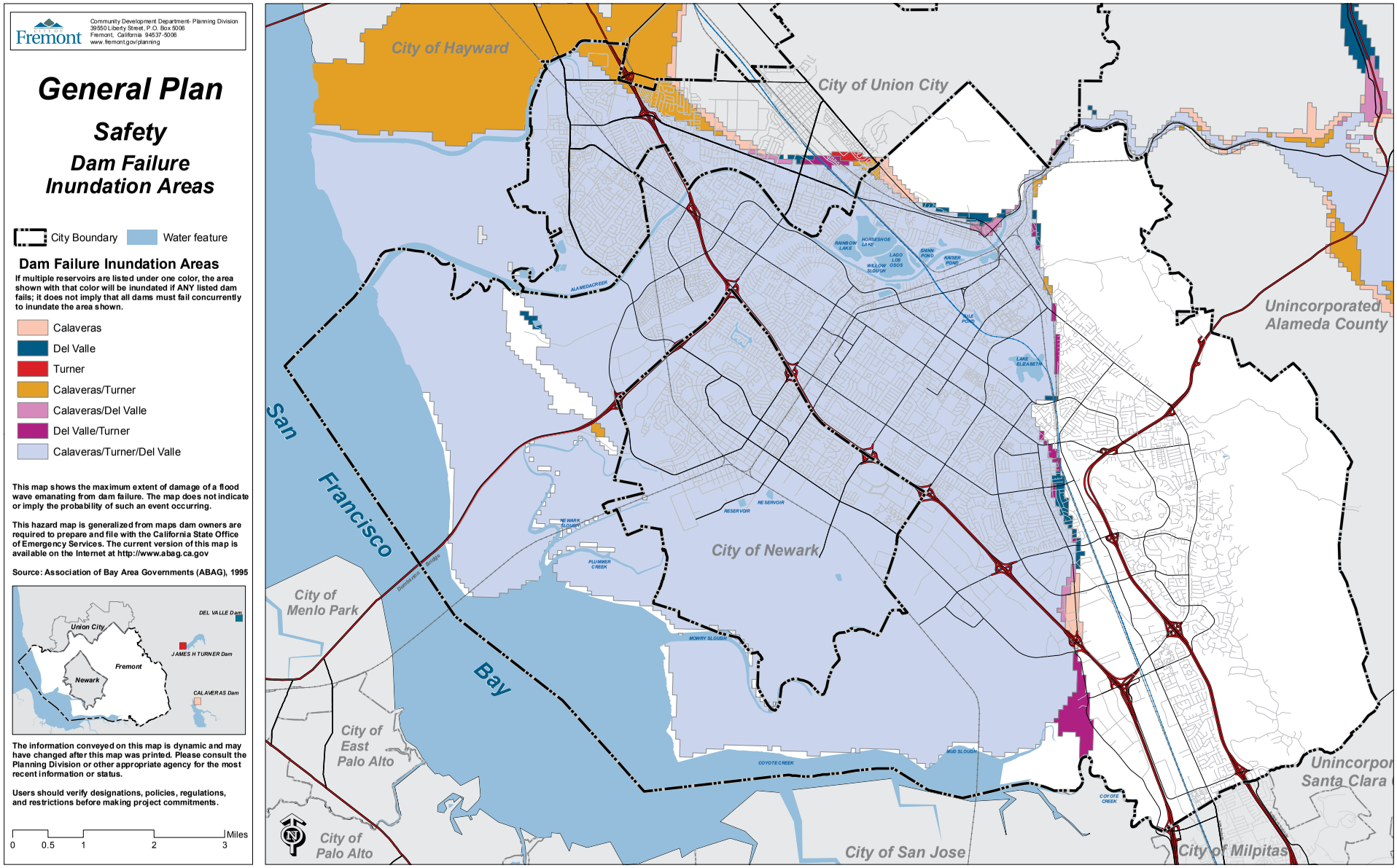

Diagram 10-6 Dam Failure Inundation Areas

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Flooding Related to Sea-Level Rise

According to the Bay Conservation and Development Commission (BCDC), global warming is expected to result in sea level rises in San Francisco Bay of 16 inches by 2050. A rise of this magnitude would put about 180,000 acres of Bay shoreline at risk of flooding. Although much of Fremont's shoreline has been preserved as wetlands and has remained undeveloped, thus mitigating the impacts of sea level rise, some lower-lying developed areas are likely to be affected. Diagram 10-7 shows areas that would be affected by the anticipated 16-inch rise in sea levels.

While national, state and local governments are taking measures to reduce greenhouse gas emissions to reduce human effects on the climate as much as possible, it is also important that governments begin planning for sea-level rise in a coordinated and concentrated way.

In September 2009, the City joined the Bay Area Climate Change Compact, a regional approach to reducing emissions and to adapting to the effects of climate change. The Compact includes commitments to coordinate planning with other Bay Area cities and BCDC, and to prepare a separate adaptation plan in the future. Typical adaptation strategies might include enhanced flood protection or more stringent building requirements in areas that could be affected by future sea-level rise.

SEA LEVEL RISE

The City of Fremont has approximately 23 miles of Bay coastline that could be subject to inundation by rising sea levels.

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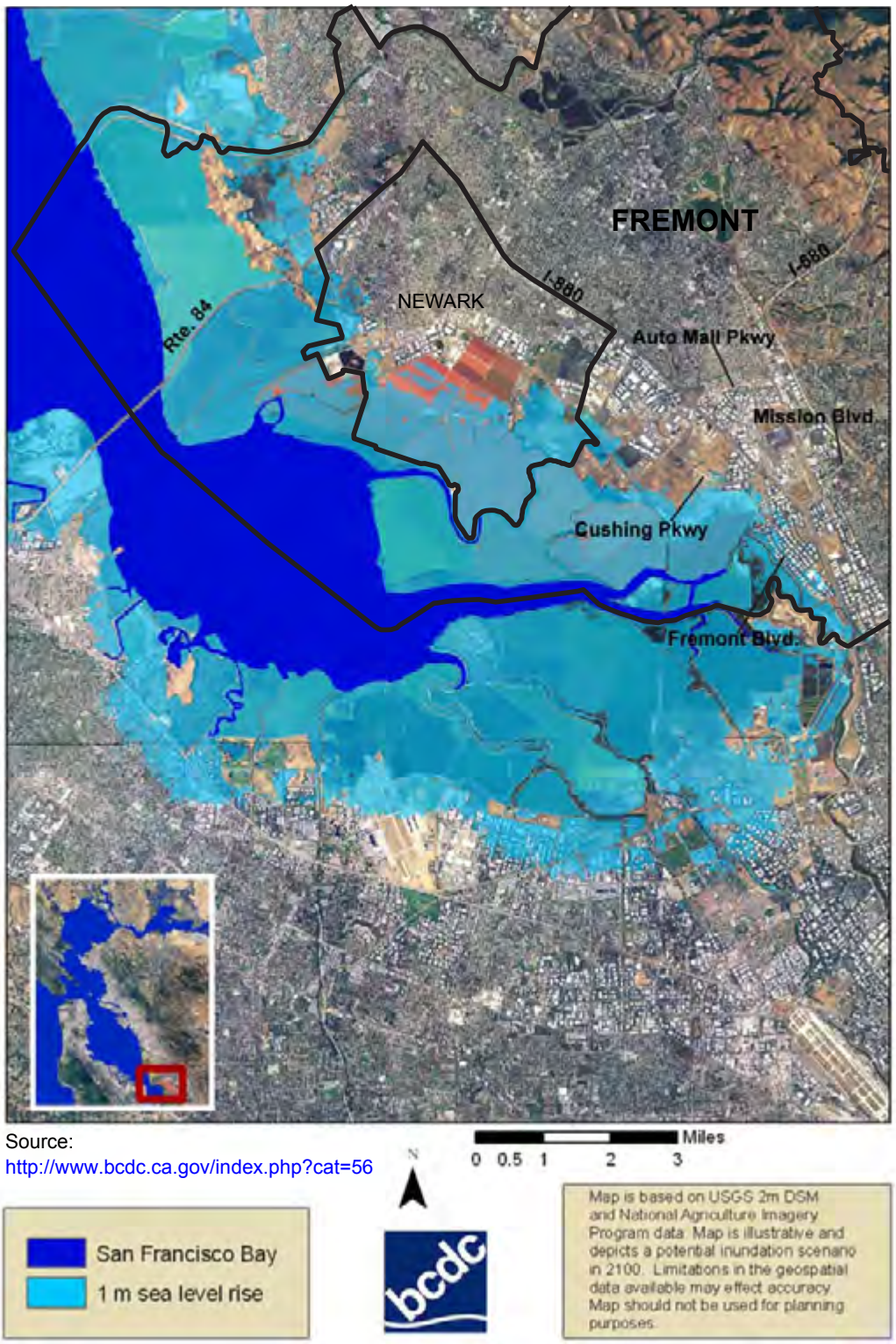
San Francisco Bay Scenarios for Sea Level Rise
South Bay



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http://www.bcdc.ca.gov/index.php?cat=56

Diagram 10-7 SF Bay Scenarios for Sea Level Rise

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Fire Hazards

The City's Fire Department is not only called upon to fight fires, but is usually the first agency called in the event of a medical or other emergency. From 2005-2010, fire related emergencies accounted for approximately 3% of the calls to the Fire Department. This includes buildings, vehicles, grass, and all other types of fires. About 68% of the calls were for medical emergencies and the remaining 29% were for citizen assistance or other calls. The City of Fremont strives to maintain a 6 minute 40 second response time goal 90% of the time for all emergencies located below the Toe of Hill.

Fire Prevention

All proposed development in Fremont is reviewed by the Fire Department to ensure that appropriate measures are taken to minimize fire risks. Projects are reviewed for adequacy of access, design features (setbacks, clearances, etc.) and compliance with technical code requirements. Access is particularly important to ensure that fire and other emergency apparatus can reach fires or other emergency situations, and that people can escape in the event of an emergency. If necessary, the provision of alternative access routes may be required as part of the planning and design process.

The Fire Department also participates in the Alameda County Mutual Aid plan with all other fire agencies within Alameda County. The Alameda County Fire Mutual Aid Plan is implemented when resources have been depleted to the point that additional resources are necessary to provide reasonable protection for the jurisdiction. Fremont also participates in the California Master Mutual Aid Plan that allows a resource request to be filled from an agency outside Alameda County.

Wild Land Urban Interface

There is a risk of wildfire in the Fremont hills due to the interface of residential and open space land uses. The combination of rugged terrain, flammable vegetation, high winds, and limited access creates hazards that prompted the City to designate much of the hills as a Hazardous Fire Area requiring special development controls. These controls include the use of non-combustible roofing, one-hour rated exterior walls, wetbands, firebreaks, sufficient clearance between structures, drought tolerant landscaping, and maintaining "defensible space", an area clear of flammable vegetation around structures. The provision of adequate water supply is also critical.

WILDLAND FIRES

A fire occurring in a suburban or rural area which contains uncultivated lands, timber, range, watershed, brush or grasslands. This includes areas where there is mixed developed and undeveloped lands.

Wildland Interface

The City has adopted an ordinance that designates areas within the City as Very High Fire Hazard Severity Zones that were not so identified by the State Maps. This amended designation will carry forward the building standards for heightened fire protection and vegetation management and conform Fremont's local requirements to State law. See Diagram 10-8 for Fremont's Very High Fire Hazard Severity zones.

Residential Hill Area Development

Several residential areas are outside where the Fire Department can meet its 6 minute 40 second response goal. However, planned improvements to fire service will correct this situation for most residential areas with the exception of the Hill Area. Some additional residential development along the base of Fremont's hills is expected over the next few years. Most of these areas are within the expected 6 minute 40 second response time for the Fire Department, but face special hazards due to their relative isolation and proximity to open brush and grassland, where fires can easily spread. For these areas, the City has special development requirements similar to those in Very High Fire Hazard Severity zones.

High Rise Buildings

High rise buildings (greater than 75 feet in height, according to the California Building Code) present special problems of access and emergency exit. Moving fire fighters and equipment up stairways typically increases response time. Thus, advanced built-in protection measures such as early warning and detection systems, automatic sprinklers, fire resistive materials, and appropriate design are required components of new development.

The Fire Department reviews all development plans for adequacy of access and water supply, noncombustible roofing, one-hour rated exterior walls, adequacy of exits and entrances, fire lanes (if required), and sufficient clearance between structures. Higher density residential and commercial development also poses special risks due to the concentration of people and the greater chance of fire spreading from one dwelling unit (or business) to the next.

As Fremont becomes more densely developed, there is likely to be additional construction of taller buildings, especially in the City Center area. Project review to assess compliance with regulations and standards will continue to be especially important with high rise and high density commercial or residential development.

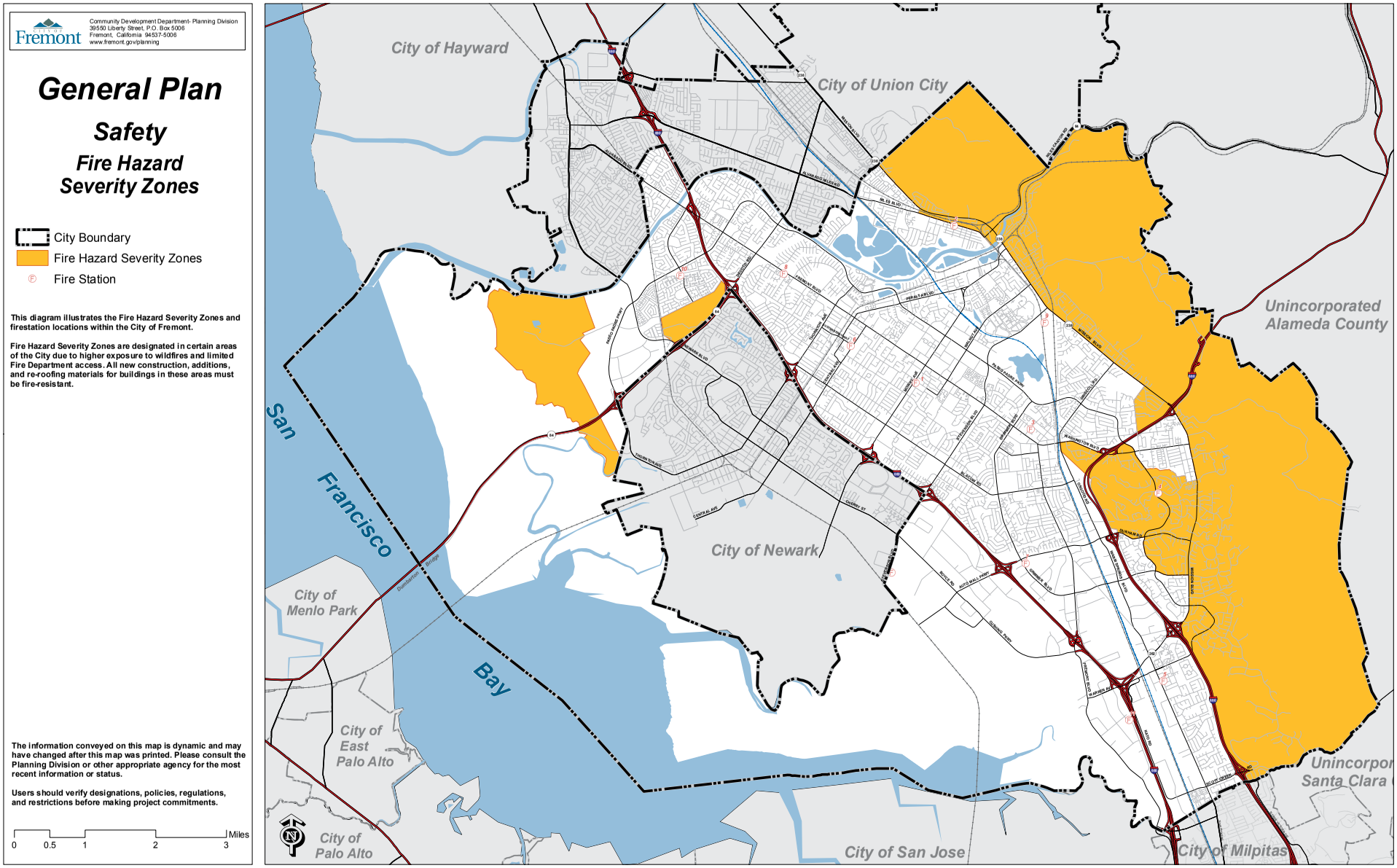

Diagram 10-8 Fire Hazard Severity Zones

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Minimum Pavement Widths

Emergency equipment must be able to reach the site of an emergency and people must be able to escape from danger. Roads must have sufficient width to allow fire and other emergency equipment to pass. On larger developments, Fremont typically requires two ingress-egress roads to ensure sufficient access in the event of an emergency. The City has established minimum pavement widths and overhead clearance for all emergency access roads. Overhead clearance, turning radii and turnaround areas are also regulated to insure emergency vehicle access. Fire lanes, emergency access roads, dead end streets and alleys must also end in a cul-de-sac or other approved turning area Ensuring adequate width and clearance for emergency vehicles while also trying to create a human scale pedestrian environment is an ongoing design challenge for developers and City staff.

Peak Load Water Requirements

The peak load water requirement for a given land use varies with the type of development, the degree of fire hazard, and the building occupancy. Requirements range from 1,500 gallons per minute (gpm) for low density residential areas to 12,000 gpm for some commercial and industrial areas. A minimum residual pressure of 20 pounds per square inch (psi) should remain in the system while the required gallons per minute are flowing. The Alameda County Water District periodically runs fire flow tests to verify that water pressure is maintained. If tests show that pressure is substandard, system improvements are required when development is proposed.

The Insurance Service Organization rates all cities for their emergency response capabilities and the availability of peak load water to fight fires. The rating affects insurance costs for private property owners and range from 1 (highest and most desirable) to 9 (lowest). Fremont has received a rating of 2, which was reaffirmed in 2007. This high rating for the City is a benefit to private property owners by resulting in lower insurance premiums.

HAZARDOUS MATERIAL

Any harmful substance, including pesticides, herbicides, toxic metals and chemicals, liquefied natural gas, explosives, volatile chemicals and nuclear fuels.

Hazardous Materials and Waste

Release of hazardous materials into the atmosphere or onto the ground can threaten the health and safety of workers and of nearby residents. Many levels of government, including the City, are involved in regulating the storage, use and transport of these materials.

Fremont has experienced rapid industrial growth in recent years. Much of this growth has been in high technology, biotechnology, life science or alternative energy industries, many of which use hazardous materials. With the increase in usage of hazardous materials, the potential risks to the community have also increased. The transport of materials throughout the City also poses a widespread threat. Accidents could occur on any of the City's transportation corridors or truck routes, posing a risk to adjacent neighborhoods and businesses.

In addition to managing routine use of hazardous substances, the City must also seek to ensure the clean-up of contaminated areas where those substances have been used, stored or disposed of in the past.

Hazardous Material Management

Every city and county is required by State law to adopt a Hazardous Waste Management Plan. If the county plan is applicable and contains sufficient detail for the city's use, a city may adopt the county plan. The Fremont City Council adopted the Alameda County plan by resolution on July 25, 1989. The City, as a Certified Unified Program Agency (CUPA) regulates the management, handling and storage of hazardous materials and waste.

Sources of Hazardous Materials

Over 1,100 identified businesses require regulation under the City's Hazardous Materials ordinances. Most hazardous materials use occurs in the industrial areas of the City. Residential areas or sensitive receptors closest to major industrial development areas are at the greatest risk of being affected by an accidental release of hazardous substances. Some neighborhoods in the Warm Springs and the North Fremont Community Plan Areas, as well as some neighborhoods in the City of Newark are close to industrial areas. Hazardous materials are also found near residential areas in smaller industrial areas in Niles and Centerville.

A significant increase in industrial uses is expected in Fremont, especially by technology oriented industries, leading to a proportional increase in the use of hazardous materials. Continued enforcement of existing regulations will be required to reduce the associated risks. In addition, as vacant land designated for residential uses becomes scarcer, pressure has grown to permit residential development in areas planned for industrial uses. If residential development is to occur near industrial areas a complete environmental and hazardous material assessment will be necessary.

Hazardous Material Transport

Transportation of Hazardous Materials and Waste

An accidental spill of a hazardous material can occur almost anywhere in the City, endangering life and property, and causing the temporary closure of major transportation arterials. The City has jurisdiction over what is transported on City streets within the City limits, while the State controls freeways, some pipelines. The Federal government regulates the railroads and interstate pipelines. The main highway routes for hazardous materials through Fremont are Interstates 880 and 680. Interstate 880 is considered the primary transport route for much of the hazardous waste produced in Alameda County.

Federal, State and local laws and regulations on transport of hazardous materials assign specific duties and responsibilities to the producers, transporters and receivers of hazardous substances. These regulations also define the responsibilities of the various governmental agencies for regulating and monitoring the transport of the material or waste, and for emergency response to spills in transit. Should a spill occur on one of the State highways or railroads through the City, the City's Fire Department would initially respond.

A major concern to the City when a hazardous chemical spill occurs is the possibility of surface and groundwater contamination. Floodplains and creeks lie in close proximity to some primary transportation routes. Because of the importance of Alameda Creek for the City's water supply, most vehicles carrying hazardous materials are banned through Niles Canyon on Route 84. However, the railroad which also runs through this area is still permitted to transport such materials.

An increase in industrial development also implies an increase in the amount of hazardous substances transported within the City. The City periodically reviews its truck routes and other controls over the transport of

hazardous materials to minimize risk to the community from any accidental spill.

Hazardous Material Emergency Response

The California Health and Safety Code requires the City to adopt a Hazardous Material Area Plan for Emergency Response. This plan is for emergency preparedness in the event of a disaster related to hazardous material use, storage or movement. The Fremont City Council adopted a plan in January 1987 (subsequently amended in 1991, 2001, and updated in 2005 and 2009) and it has been approved by the California Emergency Management Agency.

The plan sets forth responsibilities within City government for responding to a hazardous materials emergency. The plan also includes a detailed checklist for actions, training programs, procedures for requesting State and Federal funding assistance and incident reporting procedures. Also included in the plan are lists and maps showing where significant quantities of hazardous materials are stored, and in some instances, evacuation routes and the location of sensitive receptors such as schools, hospitals, and nursing homes.

Community Emergency Preparedness

Cities must be prepared for all emergencies. The responsibility for immediate response to emergencies, such as fires and earthquakes, rests with local government agencies and segments of the private sector, with support services provided by other jurisdictions and State and Federal agencies.

The California Emergency Management Agency is responsible for preparing the California State Emergency Plan and for coordinating and supporting emergency services provided by local governments. The State requires every community to prepare a local emergency preparedness plan to respond to such natural disasters as floods and earthquakes, and man-made disasters such as a hazardous materials spill. These plans are to be reviewed and updated every four years and approved by the California Emergency Management Agency. This section of this Chapter focuses on the City's Emergency Plan, referred to as the Disaster Management Operations Plan.

Disaster Management Operations Plan

The City of Fremont's Disaster Management Operations Plan (DMOP) was developed in compliance with State requirements. The Plan is a comprehensive approach to emergency preparedness, addressing possible hazards which might result from an emergency such as a natural disaster, technological incident, nuclear defense, and civil disorder or terrorism. The Plan provides the basic guidelines for organization, authority, duties, services and staff during a disaster and is intended to be coordinated with State, regional and county emergency plans. The role of every organization, agency or activity expected to contribute to an emergency response is identified in the plan. The Plan utilizes the California Standardized Emergency Management System (SEMS) which is based on the National Incident Management System (NIMS). SEMS is designed to ensure that response agencies in California have a single, integrated emergency management system. Other components of SEMS/NIMS include:

- Utilization of the Incident Command System (ICS);
- Use of the Operational Area concept;

STANDARDIZED EMERGENCY MANAGEMENT SYSTEM

As a result of lessons learned from the Loma Prieta Earthquake in 1989 and the Oakland Hills Fire in 1991, the State enacted the Standardized Emergency Management System, SEMS, referenced in California Government Code Section 8607. SEMS was designed to ensure that response agencies in California had a single, integrated emergency management system.

FIRE SERVICES AND RATINGS

Fremont has 11 Fire Stations located strategically throughout the city to ensure the best response times to an emergency.

In 2007, The City of Fremont received a #2 rating from the Insurance Service Organization for emergency response capabilities. Ratings are within a 1-10 range with #1 being the best. This helps contribute to reduced homeowner insurance premiums to single-family home owners.

- Use of Mutual Aid
- Multi-agency coordination.

The Plan is designed to not only consider the immediate impacts of a catastrophe such as an earthquake, but also the secondary effects. For example, an earthquake could also cause massive failure of an upstream dam or loss of water pressure needed to fight fires, each of which require a specific type of response to reduce community risk. Another important component of emergency response planning involves provisions for existing businesses and ensuring a network of support services that allows businesses to re-open after a natural disaster.

Emergency Response

The Fremont Fire Department responds to approximately 13,000 emergency incidents annually. Of these, approximately 58% are medical aid incidents and 4% are fire incidents (i.e., structure, vehicle, trash, fence, grass, etc.). The Fire Department expects the number of incidents to continue to gradually increase in the coming years. While fire responses represent only four percent of responses, fires consumed nearly 14 percent of the Department's staff hours (number of responding personnel multiplied by the amount of time required to abate an incident) and resources during this time period. Approximately half of emergency incidents occur in three fire districts; District 1 (Central), 3 (Irvington) and 6 (Centerville).

The five volunteer fire companies of the original townships formed the core of the Fremont Fire Department upon incorporation in 1956. Soon afterwards in 1959, a sixth station was added in South Irvington, then a seventh in 1963 in the growing central business district. Station 8 was obtained in 1978 to accommodate the growth in the North Plain. In 1985, the Council adopted a plan calling for expansion of the then eight stations to an eleven-station model for fire and emergency medical services; the city began deploying paramedics on fire engines and was the first in the Bay Area to do so. The city also adopted a more stringent fire sprinkler ordinance to allow a leaner staffing model than what would otherwise be necessary without built in fire protection of buildings. In 1990, Stations 9 and 10 were added to address long response times in Ardenwood and Mission Blvd/Canyon Heights. Around the same time, Stations 4 and 5 were rebuilt into modern facilities from the original volunteer quarters. In 2003, on the heels of a discussion regarding fire engine staffing, and a seismic study of fire station construction, the city created and adopted a Standard of Response Cover (SOC) policy into this General Plan Safety

Element. The SOC also was the basis for the fire bond program and resulted in moving three fire stations in order to optimize the spacing of the eleven-station plan. Finally, in 2009, Station 11 was completed in the Bayside Business District to complete the eleven-station master plan articulated in fire and general plans since 1985.

Fremont's fire stations are dispersed throughout the community to ensure acceptable response times. Response time is the most important measurement of fire department performance. The Department has identified response criteria primarily based upon two occurrences; flashover in the case of structure fires and irreversible brain damage in emergency medical incidents.

In 2004, the City adopted a goal of a 6 minute 40 second response to 90% of emergency service calls below the Toe of the Hill. Given available staff resources and fire stations, this goal is ambitious but achievable, and is meant to prevent flashover and to maximize resuscitation rates in emergency medical situations.

Emergency Operations Center

In the event of a large scale disaster or emergency, the City's Emergency Operations Center (EOC) would be activated. The City's EOC is located at the City Maintenance Center on Osgood Road. In addition to the EOC, several other secondary emergency facilities could be opened to provide other types of community assistance in the event of an emergency. These facilities would be established in existing City buildings such as City Hall, all fire stations, the Police Station, various community centers, the Fremont Main Library, the Animal Shelter, the Senior Multi-Service Center and the Development Services Center. The type of use for each facility would depend on the disaster and the particular needs of the community at that time. The American Red Cross has a national charter to establish post-disaster emergency shelters, and would coordinate with the city to use these facilities as emergency housing if necessary.

Emergency Operations Training

City staff members receive training in the SEMS/NIMS. In addition, the city has established Community Emergency Response Teams (CERT) and a Personal Emergency Preparedness Program (PEP) to help Fremont residents prepare for disasters. Both programs assist residents in readying their homes and families for disasters, addressing broken utilities and fire hazards, and responding to urgent medical needs.

Emergency Evacuation Routes

Fremont's DMOP provides policies and procedures for the evacuation, dispersal, or relocation of people from hazardous areas during natural disasters to less threatened areas. The plan also describes the organization and responsibilities for conducting movement operations. The need for evacuation routes and the appropriate routes will vary for each type of disaster. For example, if the James Turner dam fails, evacuation would be directed away from Niles Canyon, the most likely course for floodwater. On the other hand, Niles Canyon could be an appropriate evacuation route for other types of disasters. Evacuation routes suited for different types of potential disasters are shown in the City's DMOP. Several areas of the City could become isolated during an emergency due to road closure. Because routes may be impassable, alternate evacuation routes out of potentially affected areas are also suggested in the DMOP.

Noise and Vibration

Excessive noise is a health concern for a community. At high levels noise can have damaging effects on human hearing and health. At lower levels noise can cause irritability, wakefulness and other conditions which have health implications and negatively affect quality of life. Vibration can also cause disturbance and interrupt everyday activities. The purpose of this section is to identify noise and vibration sources and impacts and provide policy guidance to minimize their effects.

This section follows the guidelines adopted by the State Office of Noise Control (section 46050.1 of the Health and Safety Code) and meets the requirements in section 65302(f) of the California Government Code. This section also evaluates vibration impacts based on federal guidelines.

Noise Characteristics

Noise is defined as unwanted sound. The magnitude of sound is measured in terms of decibels (dB). When sound is measured, electronic filters are used to emphasize the various frequencies or pitches people hear. The "A" filter is the most common, and is indicated by dB(A). Human hearing ranges from 0 dB(A) to 140-160 dB(A), with pain occurring at around 120 dB(A).

Sound varies throughout the day due to such factors as traffic or individual events like a honking horn. Because of the complexity of sound levels over the course of a day, and subjective human response, sound levels are generally described as a weighted average. Weighted averages place greater emphasis on night time and evening noise levels because people are usually at home and high noise levels are disruptive to activities such as sleeping. The weighted noise average used by the City of Fremont is the day/night average level (Ldn).

Impacts of Noise

The effects of noise can be grouped into three categories: 1) subjective effects; 2) interference with activities; and, 3) physiological effects. Subjective effects of noise are difficult to quantify. In a typical environment, about 10 percent of the population will object to any noise not of their own making regardless of the noise level. Subjective complaints increase when there is a large difference between the background noise and the noise source.

COMMON NOISE LEVELS (dBA)

115 dBA
- Rock Concert

100 dBA
- Pile Driver (at 60 feet)

85 dBA
- Truck Passing by (at 50 feet)

70 dBA
- Lawn Mower (at 90 feet)

65 dBA
- Normal Speech (at 3 feet)

45 dBA
- Office Environment

35 dBA
- Suburban Area (Nighttime)

20 dBA
- Wilderness Area

0 dBA
- Threshold of Human Hearing

Interference can occur at a number of different noise levels depending upon the activity. Face to face conversation can occur with background noise levels of up to 66 dB(A), and group conversations with background levels up to 50 or 60 dB(A). Sleep interference varies with the individual and the cycle of sleep. The California Office of Noise Control recommends that individual events or isolated noises not exceed 50 dB(A) in bedrooms.

Physiological symptoms of noise levels above 70 dB(A) can include constriction of the blood vessels, changes in breathing and dilation of the pupils. Steady noises of 90 dB(A) have been shown to increase muscle tension and impair decision making. Long term exposure to noises above 70 dB(A) can cause hearing loss.

Noise Conditions in Fremont

Various sources throughout Fremont contribute to the overall noise environment. The most significant sources are:

- Transportation noise from vehicular traffic
- Railroads and train noise
- Industrial uses
- Mechanical equipment

Most major transportation routes, including designated truck routes, are significant sources of noise. (See the Mobility Element for truck routes in the City). Rail lines are another source of transportation related noise. Fremont has several rail lines crossing through the City as well as the existing BART rail-transit line and future extensions. A train noise prediction model has been used to calculate the noise from railroads. The Health & Safety Background Report and EIR contain all background noise data and measurements conducted from roadways and railroads for the General Plan.

The noisiest roadways in Fremont are Interstates 680 and 880, State Route 84, Mission Boulevard, Auto Mall Parkway, Grimmer Boulevard, Decoto Road, portions of Paseo Padre Parkway, and Fremont Boulevard.

Industrial noise is another major noise source. Industrial noise sources are generally only significant in industrial areas. Other significant sources of noise include gas stations, car washes, fire stations, air conditioning units, mechanical equipment, child care centers and public schools. Although these sources do not usually produce sound levels as great as those from

industry, they are more frequently located near residential or other noise sensitive areas and are often sources of irritation and complaints. Additionally, temporary noise increases occur at the time of construction. The City controls construction noise through limitations on construction hours.

Industrial activity and noise will continue to increase as currently vacant industrial parcels are developed. This should have minimal affect on existing residential or other noise sensitive areas since the industrial area is generally isolated from residential areas. Noise from industry may become more of a problem if currently designated industrial land is converted to residential or other noise sensitive uses. See Table 10-1, Noise Level Standards for New Industrial and Commercial Noise Sources.

The City does not have commercial, military or general aviation airports. There are two heli-stops located in the City Center. Noise generated by helicopter activity is regulated by the use permits for these facilities. There are no other heliport operations, jet engine test stands, or any other ground facilities or maintenance functions related to airport operation in Fremont.

Table 10-1
Noise Level Standards for New Industrial and Commercial Noise Sources

Exterior Noise Level Standards, dB(A)1		
	Daytime - 7 AM – 10 PM	Nighttime - 10 PM – 7 AM
Hourly Leq	50	45
Hourly Lmax[2]	70	65

1. These standards apply on residential properties at locations where a lowered noise level would be beneficial
2. . Typical recurring maximum noise level.
Source: Illingworth & Rodkin, 2008

Railroad Quiet Zones

Railroad Quiet Zones are established to improve neighborhood quality of life for residents who live in the vicinity of railroad at-grade crossings by reducing the amount of noise generated by trains. There are three active rail lines in the City of Fremont with 15 public at-grade crossings. Of the 15 public at-grade crossings, six crossings are anticipated to be eliminated

because of grade separation projects. The City could establish railroad quiet zones for the other locations. A quiet zone is a segment of rail line comprising one or more at-grade highway-rail crossing where trains are ordered not to routinely sound the horn. Current rules require trains to sound their horns before the approach to an at-grade crossing (but not more than ¼-mile away) until the locomotive occupies the crossing location.

Federal regulations preempt state and local laws governing the sounding of locomotive horns and describe specific requirements for communities to create a "Quiet Zone". In order to establish a Quiet Zone the City needs to assess the risk of banning horn blowing and consider installation of supplemental safety measures at the grade crossings in order to mitigate the potential increase in collisions. Additional safety measures could include the installation of additional railroad gates and or median islands to prevent motorists from traveling around the gates. The establishment of Quiet Zones in the City will be coordinated as funding allows.

Future Noise Conditions

Transportation will continue to be the most significant source of noise in the future. The continued growth of Fremont and surrounding areas will add to traffic on existing roads and highways unless measures aimed at reducing vehicle trips are more successful than projected. The projected increases in noise will not be significant on most secondary roads as traffic levels generally must increase by 100% for a noise levels to increase by 3 decibels. A change in 3 dB(A) or less is barely noticed by most people. The effects of increased commute traffic on major thoroughfares may be more significant due to volume and speed of the traffic. Diagram 10-9 shows predicted traffic noise contours along Fremont's major transportation routes.

Construction of major roadways such as the East-West Connector (I-880 to Mission Boulevard) or a future I-680 to I-880 connector, if proposed, and widening of existing highways may lead to a significant increase in noise levels. The use of existing BART lines and the use of new lines extending through Fremont will also increase noise levels. Noise mitigation such as sound insulation and sound barriers will be needed to maintain acceptable noise levels in sensitive areas and throughout Fremont.

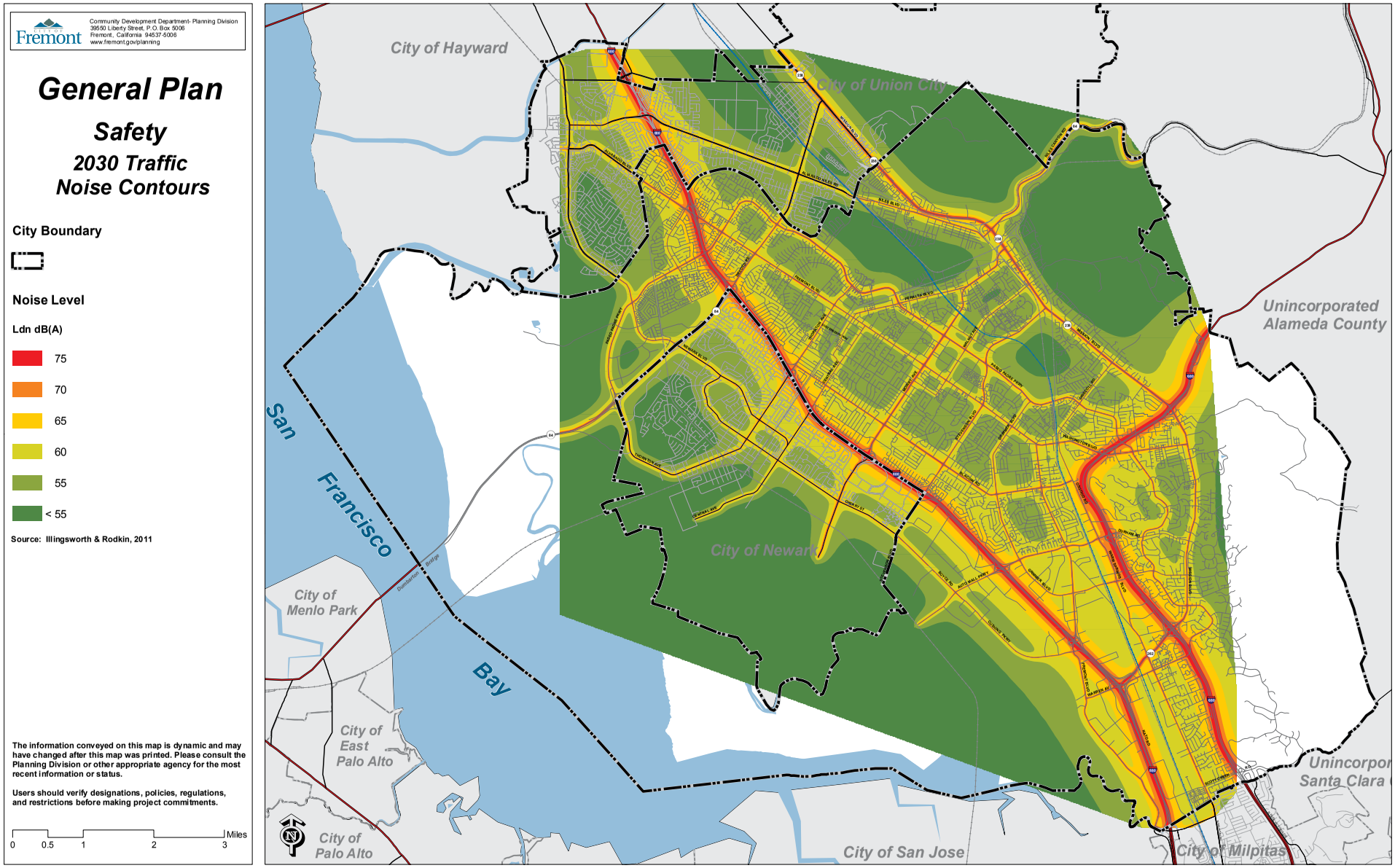

Diagram 10-9 Noise Contours

This is a reduced image. Please see the most current color full-size maps available at the Fremont Planning Division or online at www.fremont.gov/planning
The information on this diagram is dynamic and may have changed since this page was last printed.

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Ground Vibration Background

Ground vibration consists of rapidly fluctuating motions or waves with an average motion of zero. Several methods are typically used to quantify the amplitude of vibration including Peak Particle Velocity (PPV) and Root Mean Square (RMS) velocity. PPV is defined as the maximum instantaneous positive or negative peak of the vibration wave. RMS velocity is defined as the average of the squared amplitude of the signal. PPV and RMS vibration velocity amplitudes are used to evaluate human response to vibration.

Low-level vibrations frequently cause irritating secondary vibration, such as a slight rattling of windows, doors or stacked dishes. The rattling sound can give rise to exaggerated vibration complaints, even though there is very little risk of actual structural damage. In high noise environments, which are more prevalent where ground-borne vibration approaches perceptible levels, this rattling phenomenon may also be produced by loud airborne environmental noise causing induced vibration in exterior doors and windows. Ground vibration levels in buildings can be reduced due to coupling losses between the ground and the foundation, and amplified by resonances in the floor.

In Fremont, the primary sources of ground-borne vibration include railroads and rail transit, and construction activities.

Railroads and Rail Transit

Rail operations are potential sources of substantial ground-borne vibration depending on distance, the type and the speed of trains, and the type of railroad track. People's response to ground-borne vibration has been correlated best with the velocity of the ground. The velocity of the ground is expressed on the decibel scale. The reference velocity is 1 x 10-6 inches/second RMS, which equals 0 VdB, and 1 inch/second equals 120 VdB. Although not a universally accepted notation, the abbreviation "VdB" is used to indicate vibration decibels.

Typical background vibration levels in residential areas are usually 50 VdB or lower, well below the threshold of perception for most humans. Perceivable vibration levels inside residences are attributed to the operation of heating and air conditioning systems, appliances, door slams, and foot traffic. Construction activities (in particular, pile-driving for taller buildings in certain soil conditions), train operations, and street traffic are some of the most common external sources of perceptible vibration inside

residences. Table 10-2 identifies some common sources of vibration, corresponding VdB levels, and associated human perception and potential for structural damage.

Table 10-2
Typical Levels of Ground-borne Vibration

Human/Structural Response	Velocity Level, VdB (re 1µinch/sec, RMS)	Typical Events (50 –foot setback)
Threshold, minor cosmetic damage	100	Blasting, pile driving, vibratory compaction equipment
	95	Heavy tracked vehicles (Bulldozers, cranes, drill rigs)
Difficulty with tasks such as reading a video or computer screen	90	Commuter rail, upper range
Residential annoyance, infrequent events	80	Rapid transit, upper range
Residential annoyance, occasional events	75	Commuter rail, typical bus or truck over bump or on rough roads
Residential annoyance, frequent events	72	Rapid transit, typical
Approximate human threshold of perception to vibration	65	Buses, trucks and heavy street traffic
	60	Background vibration in residential settings in the absence of activity
Lower limit for equipment ultra-sensitive to vibration	50	

Source: U.S. Department of transportation, federal transit administration, transit noise and vibration impact assessment, may 2006, fta-va-90-1003-06.

Construction Vibration

Construction activities can cause vibration that varies in intensity depending on several factors. The use of pile-driving and vibratory compaction equipment typically generates the highest construction-related ground-borne vibration levels. Because of the impulsive nature of such activities, the use of the peak particle velocity descriptor (PPV) has been routinely used to measure and assess ground-borne vibration and almost exclusively to assess the potential of vibration to induce structural damage and the degree of annoyance for humans. As Fremont develops over time to reach its vision of becoming strategically urban, an increased number of people will be subject to short term, construction related, perceptible ground vibration levels.

FTA Criteria

Although there are no local standards, the U.S. Department of Transportation's Federal Transit Administration (FTA) has developed assessment criteria for evaluating vibration impacts associated with transit projects. The FTA has proposed criteria based on maximum overall levels for a single event. There are criteria for frequent events (more than 70 events of the same source per day), occasional events (30 to 70 vibration events of the same source per day), and infrequent events (less than 30 vibration events of the same source per day). The thresholds for homes and buildings where people normally sleep (e.g., nearby residences) are 72 VdB for frequent events, 75 VdB for occasional events, and 80 VdB for infrequent events. The City will utilize these standards to evaluate vibration impacts throughout the City. The criteria is summarized in Table 10-3.

Table 10-3
Groundborne Vibration Impact Criteria

	Groundborne Vibration Impact Levels (VdB re 1 µinch/sec, RMS)		
Land Use Category	Frequent Events[1]	Occasional Events[2]	Infrequent Events[3]
Category 1: Buildings where vibration would interfere with interior operations.	65 VdB	65 VdB	65 VdB
Category 2: Residences and buildings where people normally sleep.	72 VdB	75 VdB	80 VdB
Category 3: Institutional land uses with primarily daytime use.	75 VdB	78 VdB	83 VdB

Notes:

1. "Frequent Events" is defined as more than 70 vibration events of the same source per day. Most rapid transit projects fall into this category.
2. "Occasional Events" is defined as between 30 and 70 vibration events of the same source per day. Most commuter rail lines have this many operations.
3. "Infrequent Events" is defined as fewer than 30 vibration events of the same kind per day. This category includes most commuter rail branch lines.

This criterion limit is based on levels that are acceptable for most moderately sensitive equipment such as optical microscopes. Vibration sensitive manufacturing or research should always require detailed evaluation to define the acceptable vibration levels. Ensuring low vibration levels in a building requires special design of HVAC systems and stiffened floors.

Source: U.S. Department of transportation, federal transit administration, transit noise and vibration impact assessment, May 2006, fta-va-90-1003-06

Vibration Conditions in Fremont

Ground vibration levels in Fremont are caused primarily by railroads, BART and construction activity. Vibration levels are routinely measured as a part of residential development applications when these uses are proposed near these sources of vibration. Previous data indicates that percep-

tible ground vibration levels typically occur at distances within 150 feet from the centerline of railroad tracks. The City will use this standard to evaluate future projects near railroads and evaluate projects near construction sites on a case by case basis.

Crime Preventative Community Planning

Good design can create settings that reduce criminal activity; poor design can encourage it. Crime Prevention Through Environmental Design (CPTED) is a national movement focusing on project design that eliminates or reduces criminal behavior, while encouraging people to become part of the solution and watch out for others. CPTED utilizes the following strategies to design a project with crime prevention in mind:

- **Surveillance** – Surveillance keeps potential intruders easily observable, providing "eyes on the street". Features maximizing visibility may include: doors/windows that look out to streets and parking lots; pedestrian friendly sidewalks and streets; front porches; and, adequate night time lighting.
- **Territoriality** – Creating a sense of territoriality encourages individuals to take control of their environment and defend it against perpetrators. Potential offenders recognize this sense of territory and are less inclined to engage in criminal activities in the area. Territoriality is promoted by incorporation of design features that define property lines and distinguish private spaces from public spaces using landscaping, fences, pavement designs and gateway treatments.
- **Natural Access Control** – Clear demarcation of public spaces from private spaces reduces potential targets, and perception of risk to potential offenders is increased as a deterrent. Natural access control can be achieved by designing streets, sidewalks, building entrances, and neighboring gateways to clearly indicate public routes, as well as discouraging access to private areas using landscaping, structural, or other design elements.
- **Physical Security** – The CPTED goal of increasing physical security of areas is not to create an impenetrable fortress, but rather to make it more difficult and time consuming to enter a location. Some common features that can be used include window locks, dead bolts and interior door hinges. Features that can be used outside of a building include

having an orderly environment where entry ways are exposed and well lighted. Landscaping can also deter intruders.

The City of Fremont Police Department regularly reviews new development and redevelopment projects for compliance with the City's Security Ordinance. This results in safer development that incorporates appropriate CPTED strategies.

Goals, Policies and Implementing Actions

GOAL 10-1: Geologic Hazards

Minimum feasible risk to life and property resulting from land instability and other geologic hazards

• Policy 10-1.1: Location of Buildings and Structures

Regulate new development and redevelopment in a manner that avoids geologic hazards to life and property.

> Implementation 10-1.1.A: Limit Development in the Hill Area

Maintain Hill Area regulations limiting the intensity and location of development in geologically unstable areas per the Hillside Initiatives and implementing ordinances.

> Implementation 10-1.1.B: Limit Development in Areas of Land Instability

Prohibit development in areas of potential land instability identified on State and/or local geologic hazard maps, or identified through other means, unless a geologic investigation demonstrates hazards can be mitigated to an acceptable level as defined by the State of California.

> Implementation 10-1.1.C: Owner Notification of Land Failure

Notify owners of land adjacent to City lands which may experience land failure as defined in Government Code Section 831.25.

> Implementation 10-1.1.D: Mitigation Hazards to Acceptable Levels

Ensure all development impacts associated with geologic hazards are mitigated to an acceptable level as defined by the State of California.

• Policy 10-1.2: Mitigation of Hazards

Require proposed development in areas of potential land instability to evaluate and sufficiently mitigate such hazards through site planning, appropriate construction techniques, building design and engineering.

> Implementation 10-1.2.A: Site Specific Geologic Studies

Require site-specific geologic and geotechnical studies for land development or construction in areas of potential land instability as shown on the State and/or local geologic hazard maps or identified through other means.

> Implementation 10-1.2.B: Peer Review of Site Specific Geologic Studies

Require City initiated peer review of all geologic and geotechnical hazard studies provided by project applicants.

• Policy 10-1.3: Limits on Grading

Prohibit excessive and unnecessary grading activity, especially in areas of potential landslide risk as identified on State and local geologic hazard area maps or as identified during site reconnaissance.

> Implementation 10-1.3.A: Grading Ordinance Consistency

Ensure all grading activity within the City is consistent with the Grading Ordinance.

> Implementation 10-1.3.B: Grading Plan Review

Review grading plans to ensure earth moving activity and site grading in areas near potential landslides is minimized.

GOAL 10-2: Seismic Hazards

Minimum feasible risk to life and property resulting from seismic hazards.

• Policy 10-2.1: Location of Buildings and Structures

Regulate new development and redevelopment in a manner to minimize potential damage and hazards related to expected seismic activity.

> Implementation 10-2.1.A: Consistency with Seismic Safety Criteria

Ensure all proposed development complies with the provisions of the Alquist-Priolo Earthquake Fault Zoning Act and the Seismic Hazards Mapping Act and all other seismic safety criteria established by the City of Fremont.

> Implementation 10-2.1.B: Mitigate Seismic Impacts

Ensure all development impacts associated with seismic hazards are mitigated to an acceptable level as defined by the State of California.

• Policy 10-2.2: Building Setbacks from Fault

Prohibit construction of structures for human occupancy (as defined by the State) including attached garages within 50 feet of an identified main fault trace, unless a setback less than 50 feet is approved through site specific geologic studies and associated peer review.

> Implementation 10-2.2.A: Identification of Fault Trace

Require site specific soils, seismic, geologic and/or geotechnical investigations to identify all fault traces in the vicinity of a project and require analysis of the site response to potential ground shaking prior to development approval in areas identified on the Alquist-Priolo Earthquake Fault Zoning maps.

> Implementation 10-2.2.B: Peer Review of Seismic Hazard Studies

Require City initiated peer review of all seismic hazard studies provided by project applicants.

• Policy 10-2.3: Soil Engineering Standards

Maintain and continually update construction and soil engineering standards that minimize seismic hazards to structures and building occupants.

> Implementation 10-2.3.A: Seismic Mitigation

Require appropriate engineering and design mitigation measures to reduce hazards for structures located in seismic hazard zones and other areas outside identified seismic hazard zones if information suggests there are seismic issues.

• Policy 10-2.4: Location of Critical Facilities

Locate critical facilities and systems vital to public health and safety (e.g., water, power and waste disposal systems, police and fire stations, hospitals, bridges and communication facilities) away from the areas of greatest seismic hazards and land instability, and require that such facilities are designed to mitigate any hazards associated with their sites.

> Implementation 10-2.4.A: Retrofit Existing Facilities

Encourage special districts and private utilities to retrofit existing facilities within seismic hazard zones.

> Implementation 10-2.4.B: Utility Lines

Equip utility lines that cross active faults with automatic shutoff devices or other means to minimize damage during possible surface rupture.

> Implementation 10-2.4.C: Critical Facility Locations

Maintain a list of critical facilities and systems located within seismic hazard zones and identify alternative locations for facilities located within a seismic hazard zone.

• Policy 10-2.5: Removal of Susceptible Structures

Comply with State law related to rehabilitation or removal of structures susceptible to seismic hazards and damage.

> Implementation 10-2.5.A: Seismic Retrofit Programs

Continue implementation of various seismic retrofit programs (unreinforced masonry, soft-story, tilt up, etc) related to structures requiring seismic upgrades.

GOAL 10-3: Flood Hazards

Minimum feasible risks to life and property resulting from flooding and flood induced hazards.

• Policy 10-3.1: Limit Construction in Floodplain

Prohibit new buildings in the 100 year flood zone as determined by the Federal Emergency Management Agency (FEMA) and as shown on the FEMA Flood Insurance Rate Maps (FIRM) unless sufficient mitigation can be provided or the area is removed from the flood zone.

> Implementation 10-3.1.A: Flood Control Ordinance

Enforce the City's existing flood control ordinances and regulations, amending them as necessary to conform to the National Flood Insurance Program criteria and any appropriate model ordinance.

> Implementation 10-3.1.B: National Flood Insurance Program

Remain an active participant in the National Flood Insurance Program to ensure the availability of federally sponsored flood insurance for City residents.

> Implementation 10-3.1.C: Efforts to Reduce Flood Insurance Costs

Continue efforts to reduce flood insurance premiums for City residents by remaining an active participant in the Community Rating System program and by restricting development in the floodplain.

> Implementation 10-3.1.D: Minor Encroachments in Floodplain

Strictly limit development in areas subject to flooding from a 100-year storm event. Allow minor encroachments into floodplains only if it can be demonstrated that such encroachments will not impact other properties or significantly contribute to a cumulative effect of other encroachments.

> Implementation 10-3.1.E: Flood Control System Impacts

The City shall evaluate the potential impacts to the flood control system during the environmental review process for new development. Hydrologic studies may be required to help determine potential impacts and all impacts shall be fully mitigated.

> Implementation 10-3.1.F: Flood Resistant Construction

Require flood resistant construction techniques as a condition of development or redevelopment approval, in areas subject to flooding.

> Implementation 10-3.1.G: Impervious Surface Area

Limit amount of impervious coverage by new development or redevelopment to reduce potential hazards of excessive runoff. Strongly encourage pervious pavement for driveways and other hardscape surfaces.

> Implementation 10-3.1.H: Flood Maps

Make maps available to the public showing updated flood protected areas from a 100-year storm event.

> Implementation 10-3.1.I: Project Referral

Refer all proposed projects adjacent to or within floodways and floodplains to the Alameda County Flood Control District for review and comments.

> Implementation 10-3.1.J: Critical Facilities

Discourage additions to, or reconstruction, of critical facilities if such facilities are located in a flood zone, unless it can be demonstrated that the proposed project and any occupants will be protected.

> Implementation 10-3.1.K: Public Agency Projects

Review all public agency projects to ensure that appropriate sized drainage facilities are used, or that existing inadequate facilities are replaced as needed.

> Implementation 10-3.1.L: Creek Restoration

Facilitate creek restoration throughout the City to help mitigate the effects of flooding.

See also the Conservation Element for goals and policies related to creek restoration.

• Policy 10-3.2: Design to Minimize Flooding

Design new development and redevelopment projects to minimize hazards associated with flooding and limit the amount of runoff that contributes to flooding.

> Implementation 10-3.2.A: Infrastructure to Accommodate Development

Require new development to demonstrate that existing and/or planned (on- or off-site) drainage facilities area sized to accommodate project storm runoff and to prevent off-site increase in peak runoff rates and flood elevations.

See also the Conservation Element for goals and policies related to reducing stormwater runoff.

• Policy 10-3.3: Public Facility Operation

Ensure satisfactory operation of public facilities in the event of localized or regional flooding.

> Implementation 10-3.3.A: Location of Public Facilities

Annually evaluate emergency operation plans and locations of facilities for compliance with this policy and update when necessary.

> Implementation 10-3.3.B: Evacuation Plan for Inundation

Prepare an evacuation plan in the event of inundation related to dam failure that considers use of automatic phone call-warning and direction system.

> Implementation 10-3.3.C: Levee Certification

Continue cooperation with ACFC/WCD for the maintenance and certification of existing levees in Fremont.

• Policy 10-3.4: Mitigate Flood Hazards

Require appropriate mitigation of flood hazards associated with failing water storage tanks and other water supply and storage facilities.

> Implementation 10-3.4.A: Water Storage Facilities

Evaluate risk and potential damage resulting from failure of water storage facilities. Consider impacts on down-stream property owners and require appropriate mitigation measures to minimize risks. Consider such risk in reviewing proposed subdivisions and site plans for potentially affected properties.

> Implementation 10-3.4.B: Water Storage Inventory

Maintain a list and map of water storage tanks and other water supply and storage facilities within and near the City.

• Policy 10-3.5: Critical Facilities Locations

Locate critical facilities and systems vital to public health and safety (e.g., water, power and waste disposal systems, police and fire stations, hospitals, bridges and communication facilities) away from the areas subject to 100 or 500 year flood.

> Implementation 10-3.5.A: Utility District Facilities

Encourage utility districts to retrofit existing facilities within flood zones.

> Implementation 10-3.5.B: Critical Facilities List

Maintain a list and map of critical facilities and systems located within flood zones and identify alternative locations for facilities located within a flood zone.

• Policy 10-3.6: Flood Impacts from Sea-Level Rise

Evaluate proposed development in areas of the City subject to flooding impacts caused by rising sea levels.

> Implementation 10-3.6.A: Development Planning

Evaluate building locations, street construction, utilities and other construction related issues that are proposed above potential flood heights for development in the Baylands and other areas subject to rising sea levels. Proposed buildings may be subject to raised building pads and other methods to mitigate flood impacts.

> Implementation 10-3.6.B: Land Use Designations

Periodically re-evaluate land use designations in areas subject to flooding from sea level rise to minimize risk to life and property.

> Implementation 10-3.6.C: Interagency Coordination for Sea Level Rise Adaptation

Participate in regional planning efforts and coordinate with local, regional and state agencies to plan for sea level rise and other effects of climate change.

> Implementation 10-3.6.D: Climate Action Plan

Include discussion and policies regarding climate change adaptation in the City's Climate Action Plan (CAP). Periodically review implementation measures in the CAP as more information becomes available and a regional response is formulated.

See also the Conservation Element for additional goals and policies related to climate change.

GOAL 10-4: Fire Hazards

Minimum risk to life and property resulting from fire hazards

• Policy 10-4.1: Fire Safety and Prevention

Promote fire safety and fire prevention in the community.

> Implementation 10-4.1.A: Public Demonstrations

Provide fire safety demonstrations and presentations at public schools, civic and social organizations and other public gatherings.

> Implementation 10-4.1.B: Fire Safety Training

Provide fire safety training at local businesses, industries and institutions.

> Implementation 10-4.1.C: Fire Safety Evaluation

Perform necessary evaluations to focus fire prevention activities on current fire safety problems in Fremont.

> Implementation 10-4.1.D: Public Outreach

Provide outreach and educational materials that inform residents in the Very High Fire Hazard Severity Zone of their responsibilities to maintain defensible space and keep vegetation trimmed around their properties.

• Policy 10-4.2: Development Standards

Maintain development standards that limit potential health and safety risks, and the risks of structure damage and severe economic loss due to fire hazards.

> Implementation 10-4.2.A: Fire Code Compliance

Require all new development and renovations to comply with the California Building Code, Fire Code, and all local ordinances for construction and adequacy of water flow and pressure, ingress/egress and other measures for fire protection.

> Implementation 10-4.2.B: Designation of Very High Fire Hazard Severity Zones

Designate areas of the City due to location, topography, vegetative cover, or other physical characteristics as Very High Fire Hazard Severity Zones. Require these areas to meet more stringent building code standards for exterior materials and construction methods for wildfire exposure.

• Policy 10-4.3: Access and Clearance

Require adequate access and clearance for fire equipment, fire suppression personnel, and evacuation for new development.

> Implementation 10-4.3.A: Development Review

Review new projects for necessary fire access, street widths and clearances.

> Implementation 10-4.3.B: Development Criteria

Require all development to provide adequate access and clearance and other fire safety measures as appropriate, and require additional vehicular access or clearance areas as determined by the Fire Department and local amendments to the Fire Code.

> Implementation 10-4.3.C: Fire Resistant Construction

Enforce regulations related to fire resistant construction, sprinkler systems and early warning fire detection system installation. Maintain accurate information on construction methods of structures and location and number of structures on a site.

> Implementation 10-4.3.D: Balance Amenities with Fire Safety

Use creative design solutions to create human-scale pedestrian environments while also ensuring fire safety in new developments.

• Policy 10-4.4: Supplemental Fire Mitigation

Require supplemental fire mitigation measures in new development proposed above the Toe of the Hill or other locations which are outside a 6 minute 40 second response time area. Limit development in those areas where, despite fire mitigation measures, an acceptable level of protection is considered unattainable.

> Implementation 10-4.4.A: Supplemental Mitigation

Require supplemental mitigation measures such as wetbands, fire resistant landscaping, defensible space, fire resistant construction, sprinkler systems vegetation management and early warning fire detection systems for properties in the Very High Fire Hazard Severity Zone or as determined necessary by the Fire Department.

GOAL 10-5: Emergency Response

A 6 minute 40 second response 90% of the time for emergencies in areas located below the Toe of the Hill (TOH)

• Policy 10-5.1: Standard of Cover

Provide an adequate level of fire equipment and personnel to protect the City in accordance with the adopted Standard of Cover (SOC).

> Implementation 10-5.1.A: Fire Station Location Review

Periodically review existing and projected land uses within the City and implement plans for improving fire service through expansion and proper location of the City's fire stations, and appropriate equipment and personnel and other improvements in accordance with the adopted SOC.

> Implementation 10-5.1.B: Fire Station Improvement

Continue to implement plans for improving service delivery through station expansion, relocation and/or other improvements as necessary.

• Policy 10-5.2: 6 minute 40 second Response Time

Strive to maintain a 6 minute 40 second response time for areas below the Toe of the Hill.

> Implementation 10-5.2.A: Response Time Evaluation

Continually evaluate response time and make improvements to equipment and personnel when necessary to ensure goals are met.

> Implementation 10-5.2.B: Traffic Signal Override

Periodically evaluate the costs and benefits of equipping City emergency response vehicles with traffic signal override capabilities to speed responses and expand the program when appropriate.

• Policy 10-5.3: Emergency Response Training

Provide emergency response training services throughout the City.

> Implementation 10-5.3.A: Maintain Training

Continue to provide fire suppression, emergency medical, hazardous materials, and rescue service training.

> Implementation 10-5.3.B: Adequate Training Facilities

Periodically review the adequacy of Fremont's training facilities to evaluate the need for expansion or construction of new facilities.

> Implementation 10-5.3.C: SEMS/NIMS Training

Provide training to City staff to identify responsibilities and actions in the event of a disaster, consistent with the Standardized Emergency Management System (SEMS) and/or National Incident Management System (NIMS).

• Policy 10-5.4: Emergency Operation Center (EOC)

Maintain a dedicated Emergency Operations Center (EOC) to accommodate efficient and effective City response in the event of a large scale disaster.

> Implementation 10-5.4.A: EOC Annual Evaluation

Evaluate the City's Maintenance Center on an annual basis to verify that it adequately equipped to act as the City's Emergency Operations Center.

• Policy 10-5.5: Local Hazard Mitigation Plan

Participate in regional disaster planning initiatives and maintain and update the City's Local Hazard Mitigation Plan (LHMP) every five years, as prescribed by FEMA.

> Implementation 10-5.5.A: LHMP Evaluation

Evaluate the City's Local Hazard Mitigation Plan and update mitigation strategies every five years to maintain a current and accurate plan consistent with FEMA guidelines. The updated adn adopted LHMP shall be an implementation measure of the Fremont General Plan Safety Element and attached to the General Plan as an Appendix. The updated LHMP shall be reviewed by the Planning Commission and adopted by the City Council, but shall not require subsequent amendment to the General Plan wehn required updates occur.

GOAL 10-6: Hazardous Materials and Waste

Minimum feasible risks to life, property and the environment resulting from the use, storage, transportation and disposal of hazardous materials

• Policy 10-6.1: Hazardous Material Regulation

Maintain sufficient regulation of land use and construction to minimize potential health and safety risks associated with future, current or past use of hazardous materials in Fremont.

> Implementation 10-6.1.A: Land Use Evaluation

Periodically evaluate and update existing land use designations and regulations to minimize risks associated with hazardous materials.

• Policy 10-6.2: Sensitive Receptors

Prohibit locating new residential uses or other sensitive receptors in areas which could be exposed to unacceptable health and safety risks resulting from hazardous materials.

> Implementation 10-6.2.A: Proximity to Hazardous Materials Users

Assess risks related to development or other sensitive and environmental receptors are considered within or in proximity to an industrial area with hazardous materials users. Maintain land use regulations that maintain adequate separation between uses.

• Policy 10-6.3: Remediation

Encourage site investigation and cleanup on properties where contamination is likely.

> Implementation 10-6.3.A: Environmental Site Assessments

Require environmental site assessments for past use of hazardous materials on potential development sites where contamination could reasonably have occurred and a change in use is proposed. Require appropriate clean-up of contaminated sites prior to development.

> Implementation 10-6.3.B: Regulatory Agency Coordination

Collaborate with regulatory agencies to facilitate identification and clean-up of hazardous materials of properties with known or suspected contamination.

> Implementation 10-6.3.C: Existing Hazard Remediation

Facilitate remediation of existing known hazards, such as contaminated soils and clean-up of leaking or abandoned underground storage tanks.

• Policy 10-6.4: Hazardous Waste Management Plan

Comply with State law requiring adoption of a Hazardous Waste Management Plan.

> Implementation 10-6.4.A: County Plan as City Plan

Maintain the Alameda County Hazardous Waste Management Plan as the City's Plan.

• Policy 10-6.5: Hazardous Material Oversight

Maintain sufficient oversight regarding the storage, transport and handling of hazardous materials within the City.

> Implementation 10-6.5.A: Hazardous Material Enforcement

Enforce the provisions of the City's Fire and Building Codes, Certified Unified Program Agency (CUPA) elements and related Hazardous Materials Ordinances.

> Implementation 10-6.5.B: Hazardous Material Monitoring on SR-84

Monitor and maintain the ban on transport of hazardous materials on Highway 84 through Niles Canyon.

> Implementation 10-6.5.C: Truck Route Review

Periodically review and evaluate the City's truck routes to ensure minimum possible risk to the community from the transport of hazardous materials on City streets.

See also Policy 3-6.2 in the Mobility Element regarding Truck Routes.

• Policy 10-6.6: Hazardous Material Disclosure

Proper disclosure and management by employers that use hazardous materials to disclose risks to employees and nearby residents.

> Implementation 10-6.6.A: Disclosure and Emergency Action Plans

Require employers and businesses to submit Hazardous Material Disclosure statements and Emergency Action Plans for use in the event of a spill, release or incident.

• Policy 10-6.7: Emergency Action Plan

Maintain City Emergency Action Plans and sufficient response capability to respond to a hazardous material emergency.

> Implementation 10-6.7.A: Hazardous Material Emergency Response

Respond to hazardous materials related emergencies according to the guidelines in the Hazardous Materials Area Plan.

> Implementation 10-6.7.B: Hazardous Material Emergency Training

Provide appropriate training and preparation for a hazardous materials emergency within City departments.

GOAL 10-7: Community Emergency Preparedness

Provide effective, efficient, and immediately available Community Emergency Preparedness programs response in the event of a natural or man-made disaster

• Policy 10-7.1: Government Operation during Emergency

Maintain efficient and effective City government operation in case of any catastrophic emergency or disaster.

• Policy 10-7.2: DMOP Training

Maintain a current Disaster Management Operations Plan and adequately train personnel to respond to any catastrophic emergency or disaster.

> Implementation 10-7.2.A: Annual Review of DMOP

Annually review and update Fremont's Disaster Management Operations Plan.

> Implementation 10-7.2.B: Annual Training for DMOP

Provide annual training to City employees on Fremont's Disaster Management Operations Plan.

• Policy 10-7.3: Public Awareness of DMOP

Promote public awareness of Fremont's Disaster Management Operations Plan and encourage all citizens to take responsibility for their own safety in the event of a disaster.

> Implementation 10-7.3.A: Emergency Preparedness Outreach

Conduct seminars and make public presentations on personal, family, and neighborhood emergency preparedness

> Implementation 10-7.3.B: CERT Program

Encourage public participation in the Community Emergency Response Team (CERT) program.

• Policy 10-7.4: DMOP Coordination

Coordinate Fremont's Disaster Management Operation Plan (DMOP) with other local jurisdictions, utility districts and regional agencies to anticipate cumulative impacts and coordinated response during times of disaster.

> Implementation 10-7.4.A: Regional Consistency

Review adjacent jurisdictions' emergency plans and resolve areas of potential conflict.

> Implementation 10-7.4.B: Post-Disaster Recovery

Include post-disaster recovery operations for businesses and ensure a network of support services that allow businesses to re-open after a natural disaster into the next revision to the City's DMOP.

GOAL 10-8: Noise & Vibration

Minimal impacts to residents and property due to noise and ground vibration sources.

• Policy 10-8.1: Site Development Acceptable Noise Environment

A noise environment which meets acceptable standards as defined by the State of California Building Code and local policies contained herein.

> Implementation 10-8.1.A: Noise Standards

New development projects shall meet acceptable exterior noise level standards. The "normally acceptable" noise standards for new land uses established in Land Use Compatibility for Community Exterior Noise Environments shown in Figure 10-11 shall be used as modified by the following:

1. The goal for maximum acceptable noise levels in residential areas is an Ldn of 60 dB(A). This level shall guide the design of future development, and is a goal for the reduction of noise in existing development. A 60 Ldn goal will be applied where outdoor use is a major consideration (e.g., backyards in single family developments and recreation areas in multifamily projects). The outdoor standard will not normally be applied to small decks associated with apartments and condominiums, but these will be evaluated on a case-by-case basis. When the City determines that providing an outdoor Ldn of 60 dB(A) or lower cannot be achieved after the application of appropriate mitigations an Ldn of 65 dB(A) may be permitted at the discretion of the City Council.

2. Indoor noise level shall not exceed an Ldn of 45 dB(A) in new housing units. A noise insulation study, conforming to the methodology of the State Building Code, shall be prepared for all new housing, hotels, and motels exposed to an exterior Ldn of 60 dB(A) or greater and submitted to the building department prior to issuance of a permit.

3. Railroad noise sources may create instances when the outdoor noise exposure criterion can exceed 65 Ldn up to 70 Ldn for future development, recognizing that train noise is characterized by relatively few loud events. Railroad noise influence shall be evaluated independent of other noise sources. Indoor noise level shall not exceed an Ldn of 45 dB(A) in new housing units.

4. Typical maximum instantaneous noise level in bedrooms at night should not exceed 50 dB(A). Typical maximum instantaneous noise levels in other rooms and bedrooms during the daytime should not exceed 55 dB(A). The typical maximum noise level is the maximum level that is exceeded during 30 percent of the measured pass-bys, based on the measurement of at least 10 events during the daytime and the nighttime.

5. Appropriate interior noise levels in commercial, industrial, and office buildings are a function of the use of space and shall be evaluated on a case-by-case basis. Interior noise levels in offices generally should be maintained at 45 Leq (hourly average) or less.

Table 10-4
Land Use Compatibility for Community Exterior Noise Environments

Land Use Category	Exterior Noise Exposure (Ldn)															
	<55		55		60		65		70		75		80		>80	
Single-Family and Multi-Family Residential																
Hotels, Motels and other lodging																
Outdoor Sports and Recreation, Neighborhood Parks and Playgrounds																
Schools, Libraries, Museums, Hospitals, Personal Care, Meeting Halls, Churches																
Office Buildings, Business, Commercial, and Professional																
Auditoriums, Concert Halls, Amphitheaters																

NORMALLY ACCEPTABLE:
Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special insulation requirements

CONDITIONALLY ACCEPTABLE:
Specified land use may be permitted only after detailed analysis of the noise reduction requirements and needed noise insulation features included in the design.

UNACCEPTABLE:
New construction or development should generally not be undertaken because mitigation is usually not feasible to comply with noise element policies

> Implementation 10-8.1.B: Noise Studies Required

Continue to use noise guidelines and contours to determine if additional noise studies are needed for a proposed new development. Prepare a format and guidelines for noise studies.

> Implementation 10-8.1.C: Residential Noise Exposure

Limit new residential development, excepting vertically integrated mixed use development, where the ambient noise level due to commercial or industrial noise sources will exceed the noise level standards as set forth in Table 10-1, Noise and Land Use Compatibility Standards for New Industrial and Commercial Noise Sources, modified by the following as necessary unless effective mitigation measures are incorporated into the design of the project.

The noise level standards specified in Table 10-1 shall be reduced by 5 dBA for simple tone noises, noises consisting primarily of speech or music, or for recurring impulsive noises. Where the ambient noise level exceeds the noise level standards, the standards shall be adjusted upwards to the ambient levels.

> Implementation 10-8.1.D: Noise Mitigation

Encourage the use of site design, set backs, landscaping, earth berms and other non-structural methods to reduce and mitigate the effects of traffic noise and other sources. Building placement should also be utilized to mitigate noise impacts on outdoor areas. In general, the use and construction of sound walls is discouraged unless no other alternative exists. If landscaping is used then appropriate controls for irrigation and maintenance shall be provided.

• Policy 10-8.2: Acceptable Noise Environment

Guidelines articulated by Table 10-4 are not intended to be applied reciprocally. In other words, if an area currently is below the desired noise standards, an increase in noise up to the maximum should not necessarily be allowed. The impact of a proposed project on an existing land use should be evaluated in terms of potential for adverse community response based on a substantial increase in existing noise levels, regardless of the compatibility guidelines.

• Policy 10-8.3: Noise Environment Protection

Protect existing residential neighborhoods from noise. In general, the City will require the evaluation of mitigation measures for projects under the following circumstances:

1) The project would cause the Ldn to increase by 5 dB(A) or more but would remain below 60 dB(A), or;

2) The project would cause the Ldn to increase by 3 dB(A) or more and exceed 60 dB(A), or;

3) The project has the potential to generate significant adverse community response due to the unusual character of the noise.

• Policy 10-8.4: Commercial and Industrial Noise Sources

Control noise created by commercial or industrial sources associated with new projects or developments to not exceed the noise level standards set forth in Table 10-1 as measured at any affected residential land use property line.

• Policy 10-8.5: Construction Noise Levels

Control construction noise at its source to maintain existing noise levels, and in no case to exceed the acceptable noise levels.

> Implementation 10-8.5.A: Noise Ordinance

Consider creating and adopting a noise ordinance to control noise generating activities such as construction activity, heavy industrial equipment, roadway noise, horns, engines, loudspeakers, leaf blowers, and other sources.

> Implementation 10-8.5.B: Construction Noise Mitigation

Continue to apply the construction hours ordinance to new development to limit noise exposure created by construction activity. Apply best practices to further limit noise in sensitive areas and long term projects, such as maintaining construction equipment in good condition and use of mufflers on internal combustion engines, installation of temporary noise barriers, prohibiting extended idling time of internal combustion engines, locating staging areas away from sensitive receptors and other feasible best management practices.

• Policy 10-8.6: Sensitive Uses

Protect schools, hospitals, libraries, places of religious worship, convalescent homes, and other noise sensitive uses from noise levels exceeding those allowed in residential areas.

> Implementation 10-8.6.A: Location of Sensitive Uses

Locate noise sensitive uses away from noise sources unless mitigation measures are included in development plans.

• Policy 10-8.7: Street Design

Consider noise abatement when designing, maintaining or improving city streets.

> Implementation 10-8.7.A: Quiet Pavement

Design City streets utilizing a "quieter" pavement design, such as Open-Grade or Rubberized Asphalt Concrete, that also meets standards established by the City for pavement engineering design, when resurfacing streets to the extent feasible.

• Policy 10-8.8: Agency Coordination

Encourage other agencies to reduce noise levels generated by roadways, railways, airports, and other facilities.

> Implementation 10-8.8.A: Transit Agency Coordination

Work closely with appropriate transportation/transit agencies to adequately quantify and mitigate the noise impacts associated with any new or improved roadways and transportation improvements as well as bus and rail transit service.

• Policy 10-8.9: Unnecessary Noise Sources

Control unnecessary noise from vehicles and other sources.

> Implementation 10-8.9.A: Vehicle Amplification Systems

Control the sound of vehicle amplification systems (e.g., loud stereos) by encouraging enforcement of Section 27007 of the California Motor Vehicle Code. This section prohibits amplified sound which can be heard 50 or more feet from a vehicle.

> Implementation 10-8.9.B: Vehicle Exhaust Noise

Control excessive exhaust noise by encouraging enforcement of Section 27150 of the California Motor Vehicle Code.

> Implementation 10-8.9.C: Drive-Through Noise

Discourage drive-through facilities (e.g., food establishments, banks, pharmacies, car washes, etc.) when adjacent to residential uses. If allowed, limit hours of operation, ensuring proper location and direction of any external noise sources (e.g., speakers, mechanical equipment) and require proper noise attenuation.

• Policy 10-8.10: Vibration Environment

A vibration environment which meets acceptable guidelines as provided by the Federal Transit Administration (FTA).

> Implementation 10-8.10.A: New Development to Meet FTA Guidelines

New development projects shall meet acceptable vibration guidelines. These guidelines are those established by the U.S. Department of Transportation, Federal Transit Administration, as shown in Table 10-3.

Where new vibration sensitive development is proposed adjacent to an existing source of vibration (e.g., heavy rail or BART), the vibration guidelines shall be applied at the distance from the vibration source where the buildings are proposed. Normally, for development such as residences, the vibration velocity level measured in the vertical direction is sufficient for comparison to the guidelines. More detailed analyses may be required for highly vibration sensitive uses, such as microelectronics manufacturing. Adjust rail vibration standards to address high volumes of freight traffic if deemed necessary.

> Implementation 10-8.10.B: Vibration Studies

Residential projects proposed within 150 feet of the centerline of BART tracks or railroad tracks require a site-specific vibration study.

> Implementation 10-8.10.C: Evaluation of Vibration Impacts

The FTA Guidelines shall be used to evaluate vibration impacts from rail projects that could increase (i.e. BART extensions, changes to BART service, or changes to UPRR rail facilities) vibration levels due to a change in the horizontal or vertical alignment of the tracks or the train speeds.

> Implementation 10-8.10.D: Vibration Mitigation

Incorporate vibration mitigation measures when vibration levels would exceed the guidelines, including site planning (by increasing the distance between the vibration source and the vibration sensitive building), isolating buildings, or incorporating vibration isolation into new or modified rail transportation systems. Ensure building design does not substantially amplify vibration to upper levels.

GOAL 10-9: Crime Preventative Community Planning

Create and maintain a safe community through the incorporation of crime prevention design techniques into new development and redevelopment projects.

• Policy 10-9.1: Crime Preventive Design

Apply site and building design techniques and standards that are intended to deter criminal activity in new development and redevelopment projects.

> Implementation 10-9.1.A: Police Department Review

Include the Police Department in the review of development projects and solicit comments regarding implementation of crime prevention and CPTED concepts.

> Implementation 10-9.1.B: Crime Prevention Design Guidelines

In cooperation with the Police Department, create a set of Crime Prevention Design Guidelines consistent with Crime Prevention Through Environmental Design (CPTED) program strategies and incorporate these guidelines into existing or pending design guideline documents.

> Implementation 10-9.1.C: CPTED Guidelines

Conduct annual training from the Police Department for City staff on CPTED concepts and crime trends.

• Policy 10-9.2: Lighting

Ensure that adequate street and property lighting is provided and maintained.

> Implementation 10-9.2.A: Light Standards

Create quantifiable lighting standards identifying minimum and maximum light levels for varying development types (i.e. residential, commercial, industrial) for use in project review. Standards should also encourage use of LED's or other energy efficient lighting sources.

• Policy 10-9.3: Project Design

Encourage project design to focus eyes and attention on public areas and sidewalks.

> Implementation 10-9.3.A: Development Plan Review

Review development plans for new projects to ensure conformance with Crime Prevention Design Guidelines.

See also the Community Character Element for additional discussion of project design.