

Health and Safety Background

Seismic and Geologic Hazards	2
Geologic Hazards	3
Seismic Hazards	6
Flooding Hazards	9
Wildland Fire Hazards	12
Hazardous Materials and Waste	15
Emergency Response Preparedness	18
Air Quality	19
Historical Background and Air Quality Programs	20
Air Pollutants of Concern in the Bay Area and Pinole	21
Ozone	21
Carbon Monoxide.....	21
Particulate Matter.....	22
Wood Smoke.....	23
Toxic Air Contaminants.....	23
Diesel Exhaust	24
Greenhouse Gases.....	24
Other Air Quality Issues	26
Sensitive Receptors and Pollution Sources.....	26
Noise	27
Roadways and Railroads	27
Non-Transportation Noise Sources	29
General Service Commercial and Light Industrial Uses.....	30
Parks and School Playing Fields	30
Airports	30
Homeland Security	31
References	33

Health and Safety Background



Flat-lying areas along San Pablo Bay

The Hayward Fault poses the greatest threat to the City due to its location.

SEISMIC AND GEOLOGIC HAZARDS

The Pinole Planning Area is situated at the end of the northwesterly-trending East Bay Hills, next to San Pablo Bay. Pinole is dominated by moderate to steeply sloping hillsides, which extend northwestward to relatively flat-lying areas along San Pablo Bay. The geologic units mapped in the Planning Area include existing fill, landslide deposits, colluviums, younger alluvial fan deposits, bay mud, older alluvial fan deposits, and undifferentiated bedrock. Potential Geologic Hazards are shown on **Figure 7.1**.

The Planning Area is located approximately 1.5 miles to 3.9 miles northeast of the northwest-trending Hayward fault zone, which apparently steps eastward to the Rodgers Creek/Healdsburg fault zone underneath San Pablo Bay. The Hayward fault zone includes the Antioch, Calaveras, Concord, Greenville and Hayward Faults which crisscross Contra Costa County and are active. Due to its location, the Hayward Fault poses the greatest threat to the City.

The Planning Area is located about 18 to 20 miles northeast of the San Andreas Fault zone. The Green Valley-Concord fault trend is located approximately 12 miles east of the Planning Area. These fault zones are part of the San Andreas Fault system, which forms the boundary between the North American and Pacific plates and is the principal source of earthquakes in California.

The Planning Area is bisected by the Pinole fault, which may be the southeastern most, onshore continuation of the Rodgers Creek fault. The Pinole fault in the Planning Area branches northward, forming a "Y." The trunk and eastern leg of the "Y" essentially follow the Pinole Creek drainage, and the western leg extends from Pinole Creek northwestward to the Bay margin just west of Wilson Point.

Ground movement, soil liquefaction and landslides in susceptible areas can be expected to increase the amount of damage. The City's 1995 General Plan identifies the following primary geologic and geotechni-

Health and Safety Background

cal concerns in Pinole as: (1) slope stability; (2) earthquake ground shaking; and (3) fault ground rupture.

GEOLOGIC HAZARDS

Geologic hazard concerns identified in the 1995 General Plan's Safety Background Report include:

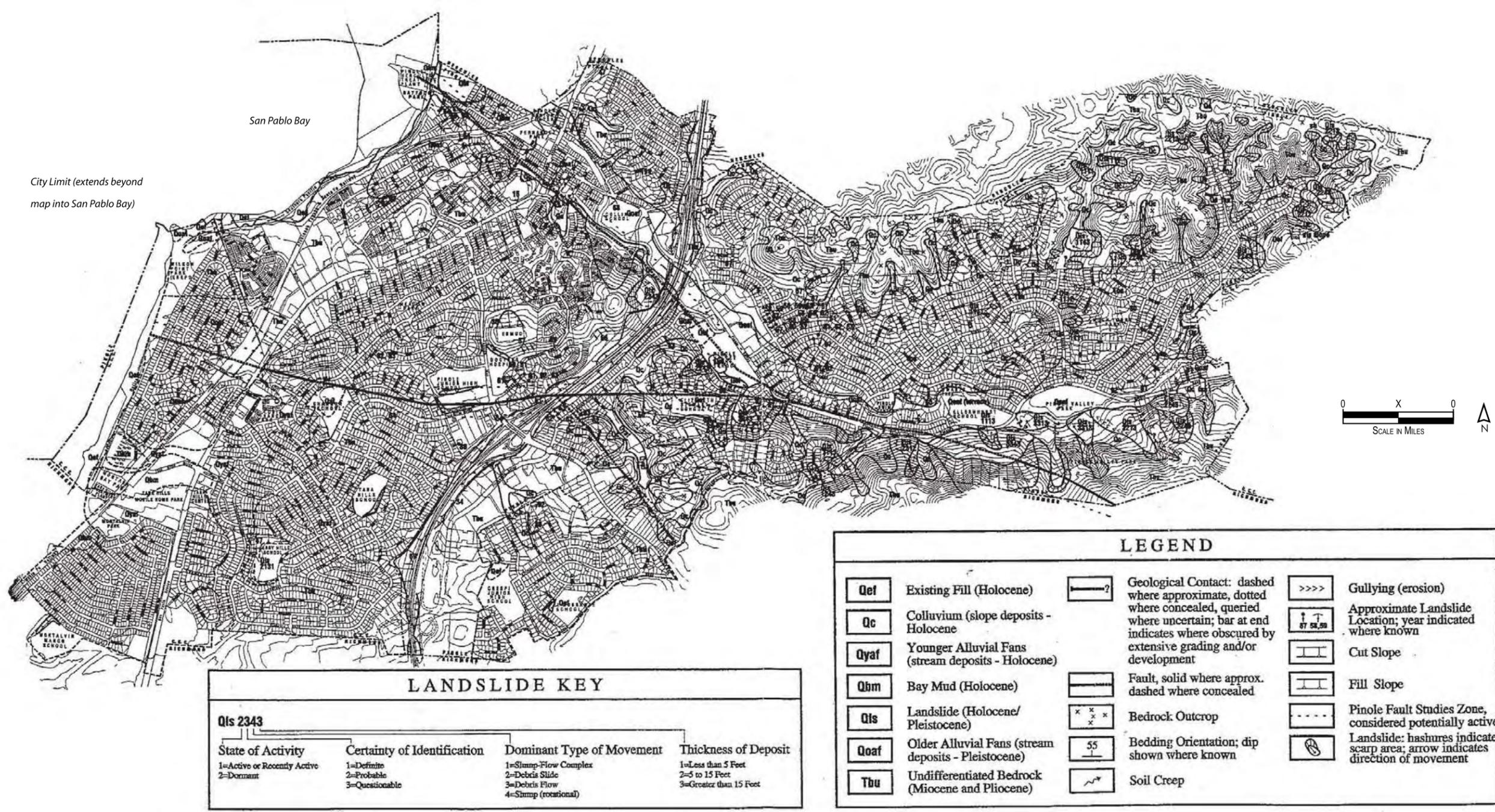
- (1) **Ground Subsidence and Settlement.** Widespread ground subsidence due to ground water withdrawal is not a significant potential hazard in the Planning Area. The compaction and settlement of unconsolidated material due to loading should not present a potential hazard where foundations are properly designed and engineered.
- (5) **Erosion.** In the undeveloped hillside areas, there is a high potential for erosion associated with dirt roads and heavily used trails, and with any unprotected channels and stream banks of the major streams traversing the flatland area.
- (6) **Slope Stability.** Slope stability is primarily a concern in hillside areas, and is generally greater in areas of steeper slopes. There is a high potential for slope stability problems in areas of: (a) steep slopes; (b) previous land sliding or soil creep; (c) unengineered grading and uncontrolled drainage on slopes; and (d) deep colluvial deposits. There is a high potential for debris flows within colluvial-filled swales to affect development located at the mouths of swales.
- (7) **Foundation Conditions.** Foundation conditions are generally good in the Planning Area. The chief concerns are: (1) areas of weak bedrock, particularly those susceptible to slaking (breakdown upon exposure to air or water) or expansion; (2) areas of expansive soils; (3) areas underlain by deposits of Bay Mud; and (4) areas underlain by colluvial and landslide deposits.

Health and Safety Background

Regional landslide mapping has indicated the presence of extensive slope stability hazards in Pinole, with the hazard typically more pronounced on steeper slopes. The hazards can include relatively large, loose debris flows. **Figure 7.1** includes landslide hazard classifications for portions in the City and in the City's Sphere of Influence. Recently, slope stability has been a prevalent issue in the City. In April, 2006, a large landslide was induced by heavy rainfall on Interstate Highway 80 between the Pinole Valley Road and Appian Way, closing westbound No. 4 lane.

A small area within the City of Pinole's Sphere of Influence, located between San Pablo Avenue and the Bayshore in the western portion of the City, was built on Bay Mud (see **Figure 7.1**). The Tara Hills Mobile Home Park is located in this portion of the Planning Area. Bay Mud has severe stability problems because the mud is highly compressible. It reacts by compaction to loads placed on it causing settlement of fill (differential settlement). When fills are placed over thick Bay Mud deposits, large amounts of settlement can take place over long periods of time (100 years).

Potential Geological Hazards



City Limit (extends beyond map into San Pablo Bay)

San Pablo Bay

0 X 0
SCALE IN MILES
N

LANDSLIDE KEY			
Qts 2343	State of Activity	Certainty of Identification	Dominant Type of Movement
	1=Active or Recently Active 2=Dormant	1=Definite 2=Probable 3=Questionable	1=Slump-Flow Complex 2=Debris Slide 3=Debris Flow 4=Slump (rotational)
			Thickness of Deposit
			1=Less than 5 Feet 2=5 to 15 Feet 3=Greater than 15 Feet

LEGEND			
Qef	Existing Fill (Holocene)		Geological Contact: dashed where approximate, dotted where concealed, queried where uncertain; bar at end indicates where obscured by extensive grading and/or development
Qc	Colluvium (slope deposits - Holocene)		
Qyaf	Younger Alluvial Fans (stream deposits - Holocene)		
Qbm	Bay Mud (Holocene)		
Qts	Landslide (Holocene/Pleistocene)		
Qoaf	Older Alluvial Fans (stream deposits - Pleistocene)		Bedrock Outcrop
Tbu	Undifferentiated Bedrock (Miocene and Pliocene)		Soil Creep
			Fault, solid where approx. dashed where concealed
			Bedding Orientation; dip shown where known
			Gully (erosion)
			Approximate Landslide Location; year indicated where known
			Cut Slope
			Fill Slope
			Pinole Fault Studies Zone, considered potentially active
			Landslide: hashures indicate scarp area; arrow indicates direction of movement

Health and Safety Background

SEISMIC HAZARDS

Seismic hazard concerns identified in the 1995 General Plan's Safety Background Report include:

- (1) **Fault Ground Rupture.** Recent studies suggest that fault ground rupture is a concern along the Pinole fault and warrant establishing a Fault Studies Zone along the fault (Harlan, Tait Associates). Fault studies would be required for certain projects within the Zone to investigate the potential for fault ground rupture.
- (2) **Greatest Potential Secondary Seismic Effects.** Large earthquakes along faults within the Bay Area, most probably as a result of a major earthquake on the Hayward or San Andreas faults located to the west, are likely in the foreseeable future. Severe earthquake ground shaking throughout the Planning Area is considered likely. The secondary effects of ground shaking in general will be greatest in areas underlain by Bay Mud, unengineered fill, and in marginally stable hillside areas. There is a high potential for seismically-induced land sliding within steep and intermediate hillside areas.
- (3) **Moderate to Low Potential Secondary Seismic Effects.** Large earthquakes will have a moderate potential for localized lurch cracking and liquefaction, in flatland and valley floor areas. Deposits subject to liquefaction are potentially present in cohesion less deposits of active/recently active stream channels, and Bay Mud. There is an unknown potential for seiche (earthquake-caused waves in lakes) and earthquake-related dam failure at stock ponds. There is a very low potential for significant effects from a tsunami (or earthquake-caused sea wave).

Figure 7.2 provides faults (both certain and concealed) and the Alquist Priolo Fault Zone in the City's region. Pinole is relatively close to known active earthquake faults, including the Pinole, Hayward and Rogers Creek Fault, and in the vicinity of other known active earthquake faults,

Health and Safety Background

including the San Andreas, San Gregorio, West Napa, Green Valley, Concord, Antioch, and Greenville Faults.

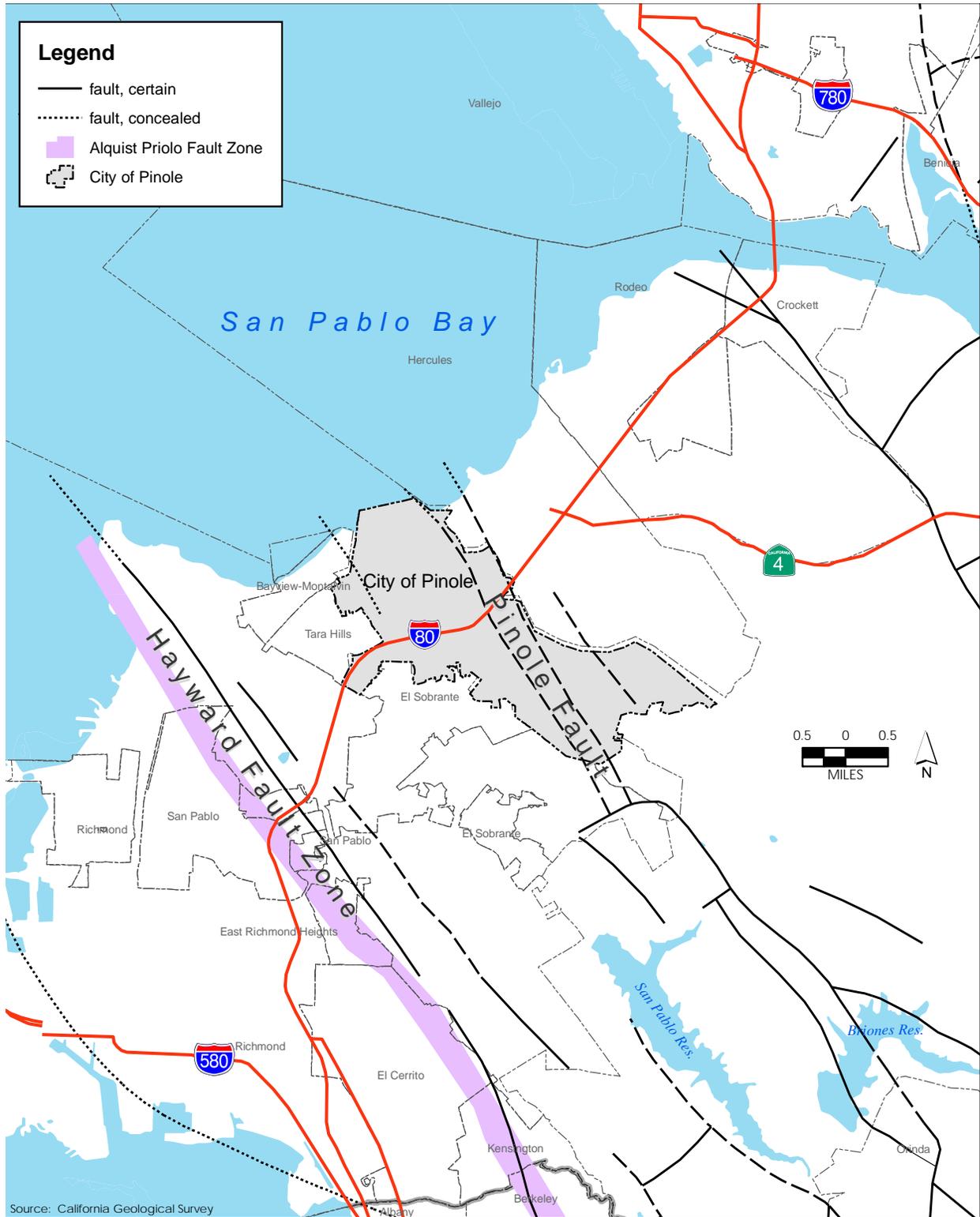
Earthquakes of high magnitude can be felt and cause damage. The Loma Prieta earthquake (6.9 magnitude) that struck on October 17, 1989 damaged the Bank of Pinole building. The Redevelopment Agency funded the retrofit and renovation of the building in 1995. The Pinole Fault is an active fault in Pinole making ground rupture a possible hazard. The intensity from ground shaking also poses a threat. A critical factor affecting the intensity of ground shaking is the geologic material underneath a site. Deep, loose soils will amplify and prolong the shaking, such the clays prevalent in the City. The type of rock that least amplifies ground shaking is granite. Ground shaking can be several times greater on sites underlain by weak sediments than on bedrock. Losses from shaking can occur where tall structures are built on thick, soft sediments. Damage from shaking is also influenced by the structural integrity of buildings before an earthquake. Damage to buildings and utilities in the City of Pinole is likely to be greatest on those sites underlain by deep, loose, compressible deposits.

Damage to buildings and utilities in Pinole is likely to be on those sites underlain by deep, loose compressible deposits.

A major earthquake may also trigger an industrial disaster. The City's Emergency Operations Plan identifies this as a particular concern for western Contra Costa County and Pinole. Western Contra Costa County contains a density of petroleum and chemical industries and military explosives are transported in this portion of the County. As a result, large quantities of potentially explosive, flammable and poisonous materials are being stored, processed and transported in the county. However, design and construction of industrial structures may sustain significant damage in a major earthquake.

The City's Emergency Operations Plan provides possible impacts on housing, population, transportation, medical services, communication, utilities, and facilities and buildings in Pinole in the case of a major earthquake.

City of Pinole Fault Hazard Map



Health and Safety Background

Localized flooding and standing water may occur during brief, intense storms; however, the risk of flooding in Pinole is minimal.



Pinole Creek near San Pablo Bay

The City's Development Conditions of Approval requires a soil report to be submitted with plans for all new construction and additions over 500 square feet or two stories in height that shall be prepared by a licensed soils engineer or geologist.

FLOODING HAZARDS

Flood hazards arise from natural rainstorms, failure of water storage facilities and from secondary effects of landslides. Flooding hazards were identified in the 1995 General Plan's Safety Background Report. Except for localized flooding and standing water, which may occur during brief, intense storms when runoff exceeds storm sewer capacity, the risk of flooding in Pinole is minimal. There is potential for Pinole Creek to flood. Creek flows along Pinole Creek would probably be contained within the existing creek bank during a 100-year storm.

Figure 7.3 illustrates the City's flood hazards, including areas within the 100-year Flood zone and areas between the 100-year and 500-year Flood zones. It is anticipated that existing flood maps will be changing to include additional areas of floodways.

Flooding within Pinole occurs infrequently and when it does occur, it is gradual and generally not life threatening from flooding directly.

Possibly impacted areas due to flooding in Pinole include: the Pinole Hercules Sanitation facility and the freeway underpass at Interstate 80 and Pinole Valley Road. The Pinole Hercules Sanitation facility is impacted by flooding of the creek when tidal surge and heavy rain runoff occurs. The ability for the sanitation facility to vent/drain is hampered by these conditions. Other conditions that cause flooding along Pinole Creek are when the creek bed is littered with debris. During heavy rains the debris is gathered into natural dams providing the opportunity for debris plugs adversely affecting the creeks normal flow. The backup created by debris flows then causes the water to flow over and around the infrastructure designed to accommodate the normal run off of water. During heavy rains when the storm drains are clogged with

Health and Safety Background

debris there is also the potential for the freeway underpass at Interstate 80 and Pinole Valley Road to flood.

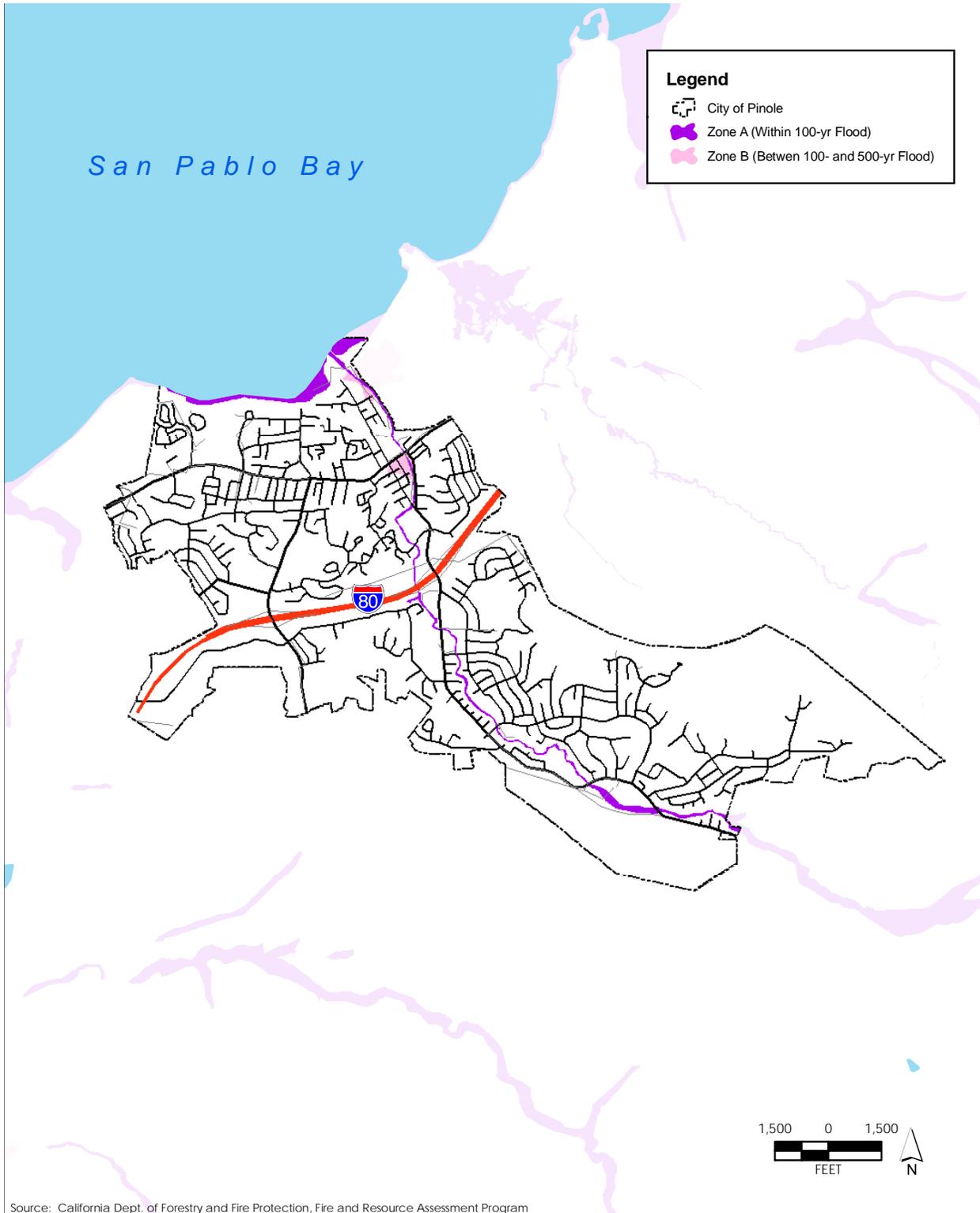
The Pinole Creek Watershed Vision Plan includes a proposed lower flood control channel restoration project that aims to improve creek habitat while providing flood protection. With funding from the Coastal Conservancy, the Urban Creeks Council, Pinole Redevelopment Agency, Contra Costa Flood Control District, and Friends of Pinole Creek Watershed partnered to develop two plans. One is a broad-based vision for the entire watershed; the other is a restoration concept for the Pinole Creek flood control channel (from Interstate 80 to San Pablo Bay). The Vision Plan was developed through a consensus-based community process and included the participation of a diverse set of stakeholders throughout the watershed. The flood control channel restoration design will be submitted to the Army Corps of Engineers for potential implementation under the Section 1135 program, which allows the Corps to revisit and restore prior projects that have had detrimental resource impacts.

Flood-related emergency situations are reported to the Office of Emergency Services (OES) Mutual Aid Region Office in Martinez. The Fire Department's Emergency Operations Plan addresses flooding in the City. The Plan was updated and adopted in May, 2006. The Plan also explores dam and storage tank failure possible impacts for the City of Pinole. Failure of Maloney Reservoir, Argyle #2 Reservoir, and Stott Water storage Tank could result in flooding in Pinole and its vicinity. East Bay Municipal Utility District (EBMUD) recently made improvements to these three sites.

The Public Works Department and County flood control maintain an inundation map of Pinole that includes the City and County. In addition, the Fire Department maintains checklists for specific addresses that have had recurring issues in past floods.

The City's existing Zoning Ordinance includes a special floodplain combining district. Crop and tree farming and truck gardening and buildings and structures may be permitted without requirement for a use permit in this Combining District.

Flood Hazards



Source: California Dept. of Forestry and Fire Protection, Fire and Resource Assessment Program

Health and Safety Background

Wildland fire is a persistent threat to residential neighborhoods in the hillside areas in Pinole.



Open space in Pinole poses wildland fire threat to residential neighborhoods.

WILDLAND FIRE HAZARDS

The City of Pinole does not encompass areas that correspond to the California Department of Forestry High Hazard Severity Zones. **Figure 7.4** provides fire hazard areas in the City's regions. Moderate fire severity areas are located directly south of the City's southern border.

The Fire Department has identified wildland fire as a persistent threat to residential neighborhoods in the hillside areas of the City, including homes in Pinole Valley. The interface between these residential areas and the large open space area on Pinole Ridge, as well as pockets of vegetation in smaller areas, presents a local fire hazard zone.

Vegetation management exists with inter-jurisdictional and inter-departmental cooperation. In order to maintain vegetation that may increase wildland fire risk, the Fire Department enforces the provisions of the Uniform Fire Code (Appendix II-A, Special Hazards), the Health and Safety Code and Pinole Municipal Code for exterior hazard abatement.

In general, the Fire Department manages the open-space boundary issues and requires a thirty-foot abated separation between the flammable vegetation and any property. Additional distances may be required depending upon the slope or other factors.

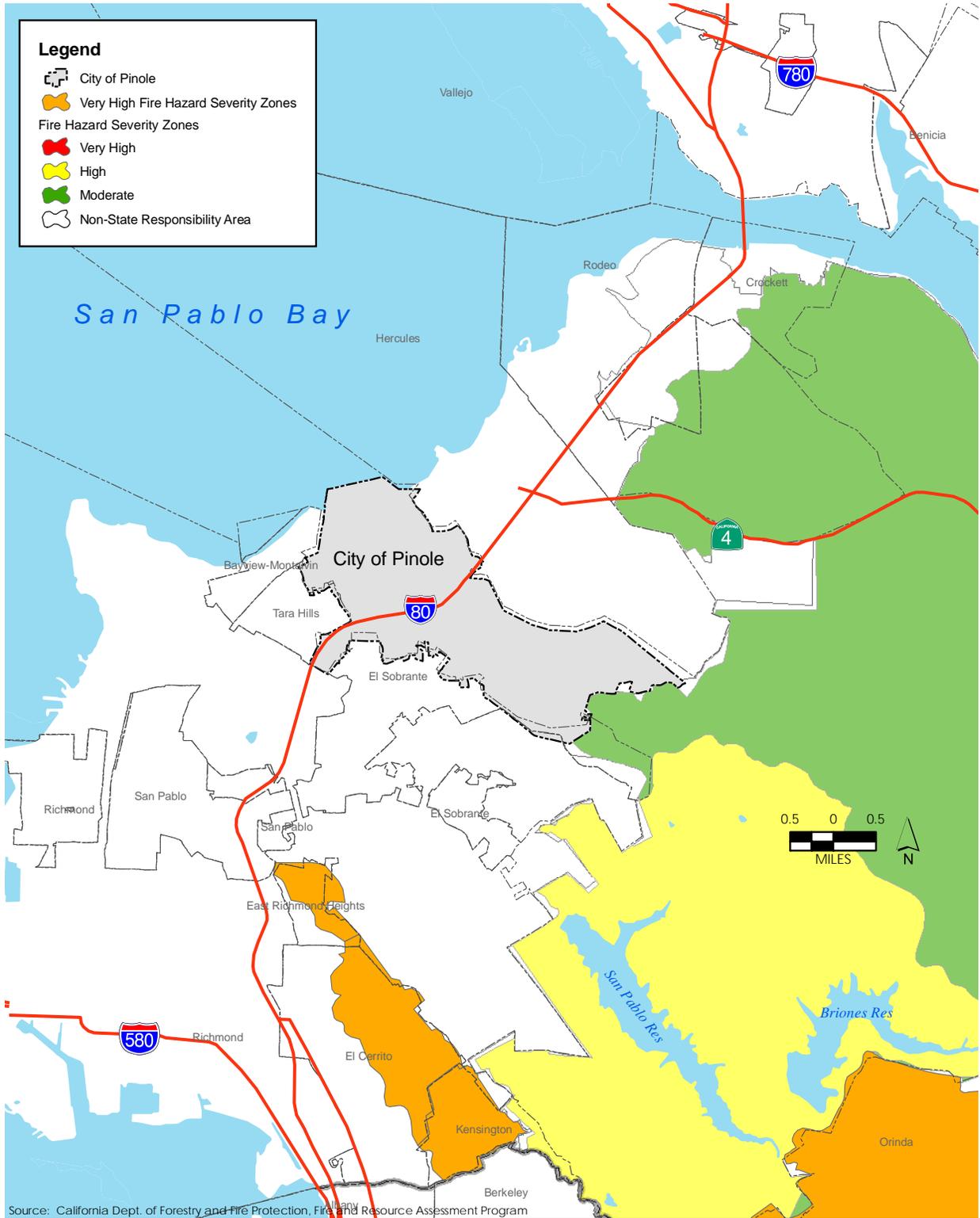
The Fire Department also maintains the fire roads and fire breaks in the City's open space areas with assistance from the Pinole Police Department. In order to maintain the fire roads and fire breaks, the Department's Fire Marshal periodically patrols the City's fire roads and issues warnings and/or citations to illegal vehicle operators that venture onto the hazardous open space area. The Fire Department also works with the Code Enforcement division, who is responsible for individual residence compliance pertaining to weed abatement.

Health and Safety Background

East Bay Municipal Utility Division (EBMUD) maintains a Fire Management Plan which includes the Pinole Valley watershed basin located within Pinole's Sphere of Influence (see *Chapter 3: Land Use and Economic Development* for a discussion and diagram of Pinole's Sphere of Influence). EBMUD provides fire suppression and protection services on watershed lands.

Additional preventative measures were identified by the Fire Department for funding with the passage of the sales tax supplement.

Fire Hazard Severity Map



Health and Safety Background

The City does not experience any significant threat from the use of storage of hazardous materials.

HAZARDOUS MATERIALS AND WASTE

Hazardous materials consist of any substance which has the potential to cause injury, and can include flammable liquids and gases, poisons, corrosives, explosives, radioactive materials, and medical supplies and wastes. They are also commonly transported over highways. Hazardous sites in Pinole include: underground storage tanks (USTs); leaking underground storage tanks (LUST); spills, leaks, investigations, and cleanup programs. **Figure 7.5** includes the location of hazardous sites in the City of Pinole.

The storage and clean-up (remediation) of hazardous sites is largely regulated by a series of federal, State and local agencies, including the U.S. Environmental Protection Agency, Cal EPA, and the State Department of Toxic Substance Control. The latter maintains a list of hazardous waste and substances list. The Contra Costa County Health Department, Hazardous Materials Division specifically administers permitting and land use of hazardous materials in the City of Pinole. The Fire Department works within the recently adopted County Hazardous Materials Plan.

Because of a general lack of significant industrial operations, the City does not experience any significant threat from the use or storage of hazardous materials. However, the State has identified over 40 hazardous waste sites in Pinole, 1 of which 24 sites involve leaking underground storage tanks (LUSTs). These sites typically are associated with past automobile-related activities and tend to be located in proximity to Interstate Highway 80 and along San Pablo Avenue. The primary risk they pose is leaking of gasoline and diesel fuel hydrocarbons and related compounds into the soil and groundwater. Six of the sites have undergone successful remediation which usually involves removal of the LUST and any contaminated soil. Several of the remaining LUSTs in the City have undergone interim remediation.

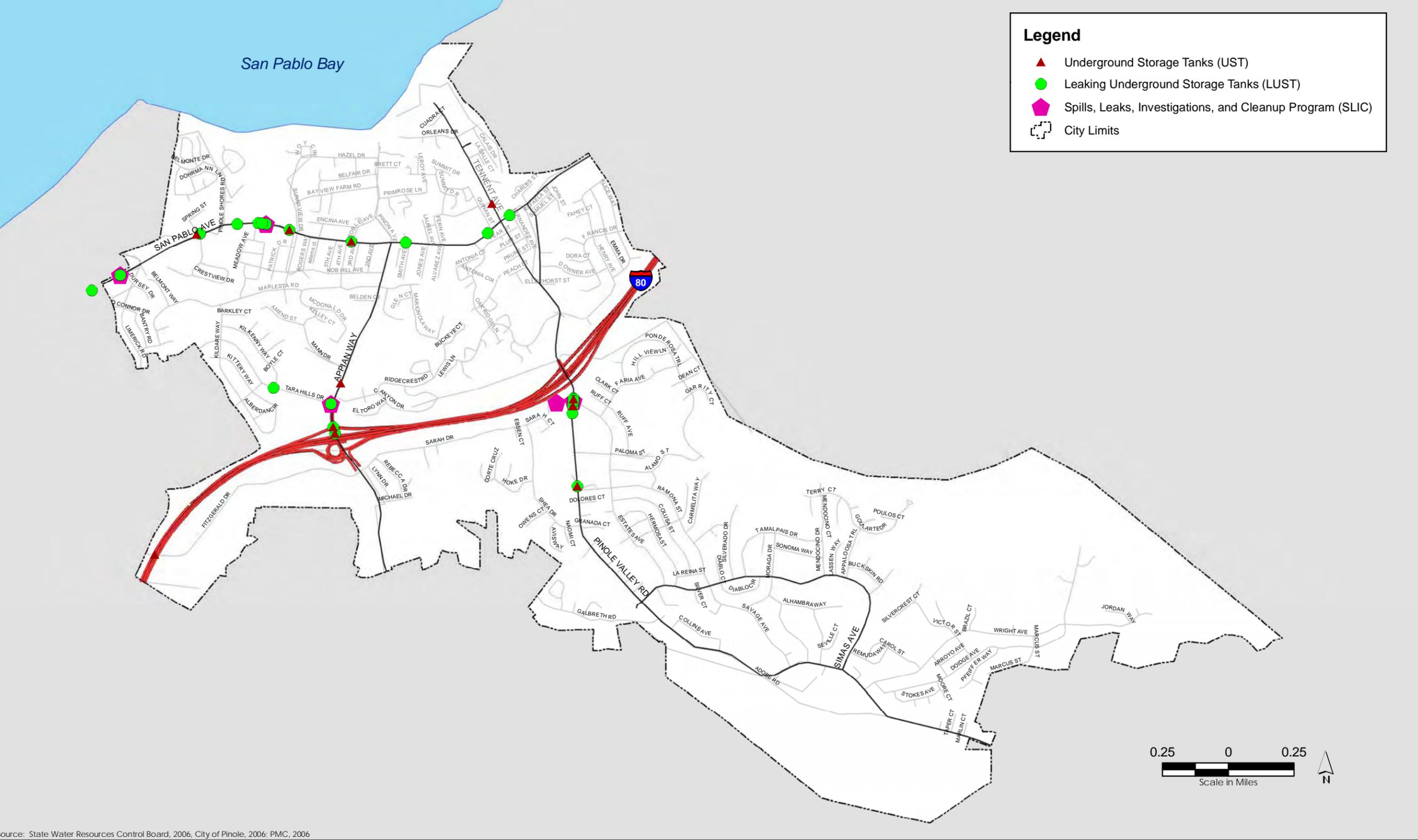
Health and Safety Background

The transport of hazardous materials, particularly along the Interstate Highway 80 corridor, presents possible hazards in the event of a materials leak or if a transport truck experiences an accident. The City's Emergency Operations Plan highlights hazardous materials spills as the most frequently occurring threat to health and safety. Site development in the City may also involve use and transport of hazardous materials. Activities during site development, such as removal or replacement of underground storage tanks could result in the discovery of contaminated materials and in accidental releases of hazardous materials during transportation of contaminated materials off-site. Two major pipelines traverse the railroad right-of-way which borders Pinole.

The City's Emergency Operations Plan states that if an incident endangers the City, whether it occurs from an airborne plume, along a transportation route near or in the City of Pinole, it is possible that extensive County assistance may not be available for one to two hours. Therefore, the burden of responding immediately rests upon the City's resources. The Pinole Fire Department (who would serve as the first responder) and the Decontamination Unit for the Hazmat Team would respond to any such incidents.

The County Hazardous Waste Management Plan (HWMP) establishes a comprehensive approach to management of hazardous wastes in Contra Costa County, including siting criteria for new waste management facilities, educational and enforcement efforts to minimize and control the waste stream, and maintenance of a unified data base on waste generators.

City of Pinole - Hazardous Sites Map



Source: State Water Resources Control Board, 2006; City of Pinole, 2006; PMC, 2006

Health and Safety Background

EMERGENCY RESPONSE PREPAREDNESS

In 2006, the City of Pinole prepared an Emergency Operations Plan (EOP). The goal of the EOP is to effectively and efficiently organize and coordinate the City's response to major emergencies. The Plan is designed to be implemented and exercised prior to an emergency. The EOP identifies four phases of emergency management including: preparedness, mitigation, response and recovery.

The Emergency Operations Plan aims to organize and coordinate the City's response to major emergencies.

To ensure preparedness for an emergency, the EOP identifies the responsibilities of the following departments in an emergency situation: the Fire; Police; Public Works; Finance Departments the City Manager's Office; the Community Development Group; Administrative Services and the Emergency Operations Center. These departments, as directed by the Plan, are responsible for developing and maintaining standard operational procedures (SOPs). These SOPs detail how each Department's assigned responsibilities will be performed and how each Department will support implementation of the Emergency Operations Plan. The SOPs act as each department's emergency response plan in the case of an emergency.

The EOP organizes actions to mitigate an emergency situation into six categories including: prevention; property protection; natural resource protection; emergency services; structural projects and public information. The EOP explores Pinole's ability to mitigate emergency responses.

The EOP identifies the organizational structure response to an emergency. The emergency management organizational structure includes five functions including: management; operations; planning intelligence; logistics and finance/administration. The EOP identifies systems and facilities also necessary to the City's response to emergencies. The EOP also identifies possible recovery activities.

The City of Pinole Emergency Operations Center (EOC) will be activated in an emergency. The EOC consists of the Public Safety Building Training Room and surrounding offices. The EOC will be used to

Health and Safety Background

coordinate, manage and provide mitigation planning for large-scale emergencies. Collectively, the building is equipped with phones, video, computer and fax equipment, Radio Amateur Civil Emergency Services (RACES) radios, maps, status display boards and work station locations to accommodate various functions when fully staffed. The EOC's alternative location is Fire Station 74, located at 3700 Pinole Valley Road in Pinole.

The City's "Mutual Aid System" is the system which allows for the mobilization of resources to and from emergency response agencies, local governments, operational areas, regions and the State, with the intent of providing adequate resources to requesting agencies. The City of Pinole is in the Contra Costa County Operational Area, which is in OES Coastal Region (Administratively), and Fire/Rescue Region II and requests mutual aid through this region. The City's EOP describes Pinole's Mutual Aid System extensively.

The City's EOP is consistent with the County EOP, State EOP and the Master Mutual Aid Agreement.

AIR QUALITY

Pinole is located in western Contra Costa County, which is part of the nine-county San Francisco Bay Air Basin and the Northern Alameda and Western Contra Costa Counties Climatological Subregion. This Subregion stretches 20 miles from the Richmond area through Oakland to San Leandro. Its western boundary is defined by the San Francisco Bay and its eastern boundary by the Oakland-Berkeley Hills. The hills are a significant barrier to air flow since they have an approximate ridge line height of 1,500 feet.

In this area, marine intrusion through the Golden Gate, across San Francisco and through the San Bruno Gap is a dominant weather factor throughout the year. The divergent wind field in this area results in a higher frequency of near calm conditions than areas located to the west

Health and Safety Background

and temperatures have a narrower range. The maximum temperatures in the summer are in the upper 60's to low 70's on average, with minimum temperatures in the mid 50's. Winter high temperatures are in the mid to high 50's and winter lows are in the low to mid 40's.

The air pollution potential of areas close to the marine air is minor, due to frequent ventilation and less influx of high pollutant concentrations from upwind sources. However, the occurrence of light winds (mainly during the night and early morning) may set the scene for occasional elevated pollutant levels. The air pollution potential south and north of this region is higher and might be termed marginal. The location of this subregion downwind and surrounded by air pollution sources, coupled with a relatively high frequency of light winds, mainly in the nighttime and early morning hours, could augment higher pollutant levels.

HISTORICAL BACKGROUND AND AIR QUALITY PROGRAMS

The Bay Area exceeds the air quality standards for ozone and particulate matter 10.

Efforts to combat air pollution began in the Bay Area in 1955 with the formation of the Bay Area Air Pollution Control District (currently the Bay Area Air Quality Management District [BAAQMD]). The Bay Area was initially classified as a federal non-attainment area (standards are not attained) for carbon monoxide and ozone, and a State non-attainment area for carbon monoxide, ozone and PM10. The entire Bay Area is currently designated as a federal and State attainment area for carbon monoxide, but remains an ozone non-attainment area.

Passing of the California Clean Air Act in 1988 recognized the relative intractability of the PM10 problem and excluded it from the basic planning requirements of the Act.

Health and Safety Background

AIR POLLUTANTS OF CONCERN IN THE BAY AREA AND PINOLE

Most of the federal ambient air quality standards are met in the Bay Area. In June 2004, the Bay Area was designated as a marginal non-attainment area of the federal 8-hour ozone standard. The more stringent State standards for ozone and particulate matter (PM10 and PM2.5) are exceeded.

There are several air quality monitoring stations located in the proximity of Pinole including:

- Richmond – 7th Street,
- Richmond – Point Richmond,
- Rodeo – Third Street, and
- San Pablo – Rumrill.

The following is a description of problem pollutants in Pinole and the greater Bay Area.

Ozone

Ground level ozone, often referred to as smog, is not emitted directly, but is formed in the atmosphere through complex chemical reactions between nitrogen oxides (NO_x) and reactive organic gases (ROG) in the presence of sunlight. The principal sources of NO_x and ROG, often termed ozone precursors, are combustion processes (including automobiles) and evaporation of solvents, paints and fuels. Motor vehicles are the single largest source of ozone precursors emissions in the Bay Area. Exposure to ozone can cause eye irritation, aggravate respiratory diseases and damage lung tissue, as well as damage vegetation and reduce visibility.

Carbon Monoxide

Carbon monoxide (CO) is an odorless, colorless gas that is formed by the incomplete combustion of fuels. Motor vehicles are by far the single largest source of CO in the Bay Area. In Corte Madera, vehicles

Health and Safety Background

traveling along Highway Interstate 80 contribute carbon monoxide to the local air quality conditions. At high concentrations, CO reduces the oxygen carrying capacity of blood and can cause headaches, dizziness, unconsciousness, and even death. CO is currently a minor concern in the Bay Area. While violations of the ambient air quality standards were recorded in all years prior to 1991, concentrations of this pollutant have been steadily declining, and the region has been designated an attainment area for both the State and federal ambient air quality standards.

Particulate Matter

Toxic Air Contaminants (TACs) are a group of pollutants in which no safe levels of exposure can be established. Suspended particulate matter (PM) is a complex mixture of tiny particles that consists of dry solid fragments, solid cores with liquid coatings, and small droplets of liquid. These particles vary greatly in shape, size, and chemical composition and can be made up of many different materials such as metals, soot, soil, and dust. “Inhalable” PM consists of particles less than 10 microns in diameter, and is defined as “suspended particulate matter” or PM10. Fine particles are less than 2.5 microns in diameter (PM2.5). PM2.5, by definition, is included in PM10. Particulate matter (PM) includes a wide range of solid or liquid particles, including smoke, dust, aerosols and metallic oxides. There are many sources of PM emissions, including combustion, industrial processes, grading and construction, and motor vehicles. Of the PM emissions associated with motor vehicle use, some are tailpipe and tire wear emissions, but greater quantities are generated by re suspended road dust. Consequently, improvements in motor vehicle engines and fuels have not reduced PM emissions as significantly as they have reduced emissions of other pollutants. Reductions in motor vehicle use are needed to significantly reduce PM emissions from re suspended road dust.

Particulate matter is a concern because it can bypass the body’s natural filtration system more easily than larger particles, and can lodge deep in the lungs. Health effects of PM vary depending on a number

Health and Safety Background

of factors, including the type and size of the particle. Research has shown a correlation between high PM₁₀ concentrations and increased mortality rates. Elevated levels can also aggravate chronic respiratory illness such as bronchitis and asthma.

Please refer to Appendix B for Air Quality Standards and current Air Quality Data from the San Pablo monitoring stations for Contra Costa County and Pinole

Wood Smoke

Wood burning in fireplaces and stoves is a significant source of PM, particularly during episodes when PM₁₀ levels are highest. Wood smoke has long been identified as a significant source of pollutants in urban and suburban areas as it contributes to particulate matter and carbon monoxide concentrations, reduces visibility and contains numerous Toxic Air Contaminants. Present controls on this source include the adoption of emission standards for wood stoves and fireplace inserts. Interest in wood smoke regulation is likely to increase in communities that experience substantial use of wood burning as a heating source.

Toxic Air Contaminants

In addition to the criteria pollutants discussed above, toxic air contaminants (TACs) are another group of pollutants of concern in the Bay Area. Unlike criteria pollutants, no safe levels of exposure to TACs can be established. There are many different types of TACs, with varying degrees of toxicity. Sources of TACs include industrial processes such as petroleum refining and chrome plating operations, commercial operations such as gasoline stations and dry cleaners, and motor vehicle exhaust. Public exposure to TACs can result from emissions of normal operations, as well as accidental releases of hazardous materials during upset conditions. The health effects of TACs include cancer, birth defects, neurological damage and death.

Health and Safety Background

Diesel Exhaust

In 1988, the California Air Resources Board identified diesel engine particulate matter as a toxic air contaminant and human carcinogen. The exhaust from diesel engines contains hundreds of different gaseous and particulate components, many of which are toxic and capable of penetrating deep into the lungs. Diesel exhaust is the most dangerous and ubiquitous TAC in the Bay Area, with high concentrations near heavily traveled highways and intersections.

Greenhouse Gases

Atmospheric Greenhouse Gases (GHGs) include, among others, carbon dioxide (CO₂), water vapor, methane, nitrous oxide, and chloro-fluorocarbons. One reason that these gases are of concern is because of their potential to enhance the Earth's atmospheric greenhouse effect, through selective absorption of infrared radiation emitted from the Earth's surface. This greenhouse effect keeps the Earth's atmosphere near the surface warmer than it would be otherwise and allows for successful habitation by humans and other forms of life. However, increases in these gases lead to more absorption of radiation and warm the lower atmosphere further, thereby increasing evaporation rates and temperatures near the surface.



Climate change could impact air quality, water resources and increased health problems in Pinole.

Current increases in global temperatures over the last century have been attributed, by most scientists¹, to the additional buildup in GHGs associated with human activities. In the U.S., these human activities include primarily the combustion of fossil fuels associated with electricity generation, transportation and the industrial sector¹. Since GHG emissions associated with human activities have contributed to the recent change in the global climate, climate change is likely to continue

¹ Environmental Protection Agency, *The U.S. Inventory of Greenhouse Gas Emissions and Sinks: 1990-2004*, April, 2006; California Climate Change Center, *Our Changing Climate Assessing the Risks to California*, July, 2006. Other reports produced by the California Climate Change Center can be found at: http://www.climatechange.ca.gov/biennial_reports/2006report/index.html.

Health and Safety Background

throughout the next century. Continued climate change as a result of the continued emissions of GHGs could include more extreme precipitation and faster evaporation of water, disruption of water supplies, energy supply and demand problems, agricultural failure, forestry issues, natural habitat losses, outdoor recreation changes, air quality changes, and public health issues.

In the City of Pinole, climate change could impact air quality, water resources and increase health problems. The State of California is undertaking programs and policies to decrease its GHG emissions. In June 2005, the State of California set targets to reduce its GHG emissions to 2000 levels by 2010, to 1990 levels by 2020, and 20 percent below 1990 levels by 2050. Existing policies, such as California's GHG emissions standards for passenger vehicles (AB 1493), as well as renewable energy and efficiency requirements for buildings, appliances, and waste management, will attempt to move the State towards its emissions reduction target. AB 32, the Global Warming Solutions Act of 2006, codifies the State's GHG emissions target by requiring the State's global warming emissions be reduced to 1990 levels by 2020 and directs CARB to enforce the statewide cap that would begin phasing in 2012.

The EPA's U.S. Inventory of Greenhouse Gas Emissions and Sinks demonstrates that electricity, transportation, and industrial sectors account for most of the U.S. anthropogenic emissions of criteria pollutants and GHG emissions between 1990 and 2004². Currently, there is no GHG emissions inventory for the City of Pinole, although the Bay Area Air Quality Management District (BAAQMD) recently produced the Source Inventory of Bay Area Greenhouse Gas Emissions by County; the California Air Resources Board (CARB) and BAAQMD do not maintain an inventory of any GHG emissions by City.

² Environmental Protection Agency, *The U.S. Inventory of Greenhouse Gas Emissions and Sinks: 1990-2004*, April, 2006.

Health and Safety Background

The inventory demonstrates that carbon dioxide emissions from various sources represent 89.9 percent of total greenhouse gas emissions in the nine Bay Area counties. Contra Costa County contributes the most GHG emissions of any other county (30 percent or 25.6 tons of carbon dioxide per year) in the Bay Area. The majority of the County's GHG emissions are from point sources such as power plants, oil refineries and other industrial and commercial activities such as waste management, cement manufacturing, fuel distribution, agriculture and forest management and other small sources. If current trends continue, the Bay Area's GHG emissions are expected to increase at a rate of approximately 1.4 percent per year.

Other Air Quality Issues

Other air quality issues of concern in the Bay Area include nuisance impacts of odors and dust. The BAAQMD has enacted an odorous substances control program as part of its effort to control the use and emission of odorous substances and nuisance dust within the Bay Area.

Sensitive Receptors and Pollution Sources

The BAAQMD defines sensitive receptors as facilities where sensitive receptor population groups (children, the elderly, the acutely ill and the chronically ill) are likely to be located. These land uses include schools, retirement homes, convalescent homes, hospitals and medical clinics. Such sensitive receptors are spread through most parts of Pinole.

The BAAQMD inventory lists no major emitting facilities for criteria pollutants in Pinole. The current inventory does, however, identify dry cleaners and gas stations as sources of TACs in Pinole. None of the sources of TACs in Pinole are considered as facilities with health risks requiring public notification under the BAAQMD's Air Toxics Hot Spots Program.

Health and Safety Background

NOISE



Vehicle traffic along San Pablo Avenue

The ambient noise environment in Pinole is defined primarily by traffic on Highway Interstate 80, which runs northeast to southwest through the community. At locations removed from Highway Interstate 80, the ambient noise environment tends to be defined by local traffic and typical neighborhood noise sources. No significant noise-producing commercial or industrial activities are identified within the City of Pinole. The only concentration of such activities is in proximity to Highway 80, which tends to mask noise generated by these sources.

The General Plan (1995) identifies methods commonly used to quantify environmental sounds.

ROADWAYS AND RAILROADS

The General Plan (1995) identifies major noise sources in the City of Pinole as vehicular and rail traffic. The level of vehicular noise generally varies with the volume of traffic, the number of trucks or buses, the speed of traffic, and the distance from the roadway. Noise generated by vehicular traffic in Pinole is greatest along Highway Interstate 80 and San Pablo Avenue. There are two rail lines through the city, the Atchison-Topeka and Santa Fe (AT & SF) and Southern Pacific. There are no significant sources aircraft or industrial noise within the City of Pinole. The existing General Plan (1995) noise contours are shown on **Figure 7.6**.

Major noise sources in the City of Pinole are vehicular and rail noise.

Health and Safety Background

NON-TRANSPORTATION NOISE SOURCES

Noise is an inevitable by-product of many activities, even when the best available noise control technology is applied. Although noise within industrial facilities are controlled by federal and State employee health and safety regulations (OSHA), exterior noise levels may exceed locally acceptable standards. Industrial noise sources (auto repair, wrecking yards, equipments lots, etc.) are generally significant only in industrial areas. However, there are locations where undeveloped lands, or current noise sensitive areas abut industrial activities. Commercial, recreational and public service facility activities can also produce noise that affects adjacent sensitive land uses.

From a land use planning perspective, there are two goals for controlling fixed-source noise: to prevent the introduction of new noise-producing uses in noise-sensitive areas and to prevent encroachment of noise-sensitive uses upon existing noise-producing facilities. The first goal can be achieved by applying noise performance standards to proposed new noise-producing uses. The second goal can be met by requiring that new noise-sensitive uses in proximity to noise-producing facilities include mitigation measures to ensure compliance with those noise performance standards.

Descriptions of some general types of existing fixed noise sources in the City of Pinole are provided below. These uses are intended to be representative of the relative noise generation of such uses, and are intended to identify specific noise sources that should be considered in the review of development proposals. Site-specific noise analyses should be performed where noise sensitive land uses are proposed in proximity to these (or similar) noise sources, or where similar sources are proposed to be located near noise-sensitive land uses.

Health and Safety Background

General Service Commercial and Light Industrial Uses

Noise sources associated with service commercial uses such as automotive and truck repair facilities, light industrial uses, etc., are found near the Bay Shore on San Pablo Avenue within City limits. The noise emissions of these types of uses are dependant on many factors, and are therefore, difficult to quantify precisely. Nonetheless, noise generated by the these uses contributes to the ambient noise environment in the immediate vicinity of these uses, and should be considered where either new noise-sensitive uses are proposed nearby or where similar uses are proposed in existing residential areas.

Parks and School Playing Fields

Parks and school playgrounds, and their associated uses, are located throughout the City. Noise generated by these uses depends on the age and number of people utilizing the respective facilities at a given time, and types of activities they are engaged in. School play field activities tend to generate more noise than those of neighborhood parks, because the intensity of school playground usage tends to be much higher. At a distance of 100 feet from an elementary school playground being used by 100 students, average and maximum noise levels of 60 and 75 dB, respectively, can be expected. At organized events such as high-school football games with large crowds and public address systems, the noise generation is often significantly higher. As with service commercial uses, the noise generation of parks and school playing fields is variable.

Airports

The Buchanan Field Airport is located on Sally Ride Drive in Concord. The Contra Costa County Airport Land Use Compatibility Plan addresses noise impacts. As a result, the existing ambient noise environment of the City is not significantly influenced by aircraft noise, although aircraft fly-overs are possible.

Health and Safety Background

HOMELAND SECURITY

The City's Emergency Operations Plan addresses national security issues related to the City.

Homeland security is of growing concern in the United States, and, therefore, homeland security is an important aspect of the City of Pinole's health and safety. Realized national security threats could potentially result in threats ranging from localized damage that could be expected to result from a terrorist attack to the catastrophic devastation that could be expected from a chemical, biological or nuclear attack on the United States. National security threats can be either predictable or unpredictable. National security threats include ballistic missile attack, chemical and biological attack, civil disorder, nuclear attack and terrorism. The City's Emergency Operations Plan addresses national security issues related to the City.

California has published a Terrorism Response Plan (1998) and Contra Costa County has developed a Terrorism Annex to the Operational Area EOP (1999). The Terrorism Working Group and the Terrorism Early Warning Group are two working groups have been developed in Contra Costa to address terrorism response planning.

The City's Emergency Operations Plan identifies sites within Contra Costa County which may be subject to attack. These sites include the large petroleum refineries and other industry, the Concord Naval Weapons Station, local, state or federal government facilities, power and communications facilities, other utilities, dense population areas and major transportation centers such as BART stations. Additionally, the population within the City and the County may be impacted by terrorist attacks outside the county that may impair power systems, telecommunications and transportation.

In 1990, the Federal Nuclear Attack Planning Base concluded that the risk of a nuclear weapon attack is high for all counties surrounding the San Francisco Bay, including Contra Costa County. The City's Emergency Operations Plan states that the effects of a nuclear detonation in the Pinole area would vary according to the strength of the bomb, the altitude at which the bomb was detonated. The Plan also addresses

Health and Safety Background

the risk from other types of weapons (conventional, chemical and biological) in Pinole. The Plan concludes that the degree of risk would also depend on the amount, type, proximity and protection at the time of the attack and any exposures post-attack, such as contamination of ambulances and/or hospital emergency rooms. The Federal Government is conducting research and training related to national security.

The Emergency Operations Plan concludes that the likelihood of occurrence per the Contra Costa Operational Area is considered to be infrequent.

Health and Safety Background

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