

SAFETY ELEMENT



ALAMEDA COUNTY
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2026 UPDATE - CREDITS AND ACKNOWLEDGEMENTS



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INTRODUCTION

1.0 OVERVIEW

Planning Context

~~On January 8, 2013, the Alameda County Board of Supervisor approved The County has determined that there is a need to conduct a comprehensive update of its Seismic Safety and the Safety Elements of the County's General Plan. (approved by the Board of Supervisors in 1982). Updating this document will provided an invaluable opportunity to create a consistent policy framework that can be applied throughout unincorporated Alameda County. This document presents the new and updated Safety Element of the Alameda County General Plan.~~

2013 Safety Element Update Process

~~Alameda County's The 2013 update process to update the Safety Element~~ occurred in three phases. During the first phase, staff compiled information regarding known seismic/geologic, flood, hazardous waste, and fire hazards. In addition, staff researched current, planned and ongoing disaster preparation efforts occurring within the County. Drafts of these reports were circulated internally and to the public for comment at various stages of development from May 2012 to November 2012.

In the second phase, existing County policies and implementation programs were evaluated to determine whether they adequately addressed the issues and needs identified in the inventory reports. The following documents were reviewed to identify existing policies that might be included in the new and updated elements and to assess gaps in the County's policies and programs.

- The Eden Area General Plan (March 2010)
- East County Area Plan as amended by Measure D (May 2002).
- The Castro Valley Plan (March 2012)

The ~~final~~ third phase of the project was the public participation process which is documented below:

- **Citizen Participation:** The inclusion of community stakeholders helps to ensure that appropriate disaster mitigation strategies are efficiently and effectively evaluated, developed, and implemented. The public outreach process consisted of the following strategies:
- **Public Meetings:** The Planning Commission reviewed draft sections of the document. In total, the Commission hosted five meetings to discuss the Safety Element. In order to provide adequate opportunities for the public to provide input on the Safety Element text, the Commission agreed that staff would bring a working draft of each chapter for review. The Safety Element was also

discussed at the Transportation and Planning Committee of the Board of Supervisors on December 3, 2012 and by the Unincorporated Services Committee of the Board on December 5, 2012.

- **Public Hearings:** The Planning Commission held public hearings on May 21, 2012 to initiate the preparation of the Safety Element and on November 5 and November 19, 2012 to discuss the draft Safety Element in its entirety. In addition, the Board of Supervisors met on January 8, 2013 to discuss the adoption of the Safety Element. Public input was permitted at both of these meetings.

- **Outreach:** Alameda County created a web page to keep the community informed about the preparation of the Safety Element. This web page provided links to the previous element, as well as documents from each of the meetings held by the Planning Commission.

Scope and Organization

The Safety Element is organized into four chapters which are described as follows:

- The *Introduction* provides an overview of the document and describes its purpose and authority.
- The *Natural Hazards* chapter discusses hazards arising from faults and geologic conditions, fires and flood related hazards, **and climate change impacts**, and provides development standards **and adaptation strategies** intended to **increase resilience and** reduce risks associated with: ground shaking; structural failures; surface rupture; liquefaction; tsunamis or seiches; landslides/slope instability, fires, floods, **and extreme heat**.
- The *Man Made Hazards* chapter identifies policies and programs to reduce risks associated with the creation, storage, transport and disposal of hazardous wastes. In addition, it provides information about the public airports operating within the County and development standards for airports or activities occurring within the vicinity of an airport.
- The *Emergency Preparedness* chapter describes how disaster planning and emergency response are coordinated within the County.

Amendments to the Safety Element

February 2014 – The Board of Supervisors adopted amendments to Chapter 4 of the Safety Element to incorporate Central Valley Flood Protection Plan (CVFPP) measures, as required by AB 162 (2007). The measures apply only to the northeast corner of the County, which is included within the Systemwide Planning Area (SPA) of the CVFPP.

April 2017 – In compliance with the California Disaster Assistance Act of 2006 (Government Code Section 8680 et seq.), to maximize the funding available to the County in case of disaster, the Board of

Supervisors approved the incorporation of the 2016 Local Hazard Mitigation Plan (LHMP) into the Safety Element as Appendix A. The Board also approved amendments to address the risk of fire in state responsibility areas and very high fire hazard severity zones, as required by SB 1241 (2012) (Government Code Sections 65302 and 65302.5).

March 2022 – The Board of Supervisors approved the incorporation of the 2021 LHMP into the Safety Element as Appendix A. The Alameda County Local Hazard Mitigation Plan (LHMP) was developed in accordance with the Disaster Mitigation Act of 2000 (DMA 2000) and followed FEMA’s Local Hazard Mitigation Plan guidance. The LHMP incorporates a process where hazards are identified and profiled, the people and facilities at risk are analyzed, and mitigation actions are developed to reduce or eliminate hazard risk. The implementation of these mitigation actions, which include both short and long-term strategies, involve planning, policy changes, programs, projects, and other activities. The Local Hazard Mitigation Plan can be found at this location: <https://www.acgov.org/cda/planning/generalplans/index.htm>.

~~MONTH~~ February 2026 – The Board of Supervisors approved incorporation of the 2025 Alameda County Emergency Operations Plan Annex: Mass Care and Shelter Plan into the Safety Element as Appendix G and adopted amendments to the Safety Element to comply with:

- SB 379 (2016), which requires cities and counties to integrate climate adaptation into their general plans;
- SB 99 (2019), which requires safety elements to identify residential developments in any hazard area identified in the safety element that do not have at least two emergency evacuation routes;
- AB 747 (2019) and AB 1409 (2021), which require safety elements to identify evacuation locations and evacuation routes and their capacity, safety, and viability under a range of emergency scenarios; and
- AB 2684 (2024), which requires safety elements to address the hazard of extreme heat.

2026 Safety Element Amendment Process

The 2026 Safety Element amendment process occurred in tandem with an update to the 2014 Community Climate Action Plan (CCAP), allowing staff to comprehensively address topical overlaps related to climate adaptation and resilience between the two documents. Staff approached this project, which began in 2022, in six phases: 1) Project Initiation; 2) Technical Assessment; 3) Policy Development; 4) Draft Development and Review; 5) Adoption; and 6) Implementation, Monitoring, & Reporting. Community and stakeholder engagement occurred throughout the entirety of the project and included:

- **Community Workshops:** The County hosted community workshops on February 16, 2023, and June 15, 2023, to engage residents, organizations, and other interested stakeholders and provide

an opportunity to participate in the planning process. Workshops were held virtually via Zoom and were conducted to accommodate both English and Spanish speakers.

- **Community Meetings and Events:** County staff presented at over 30 community meetings and events to engage residents, community organizations, and other stakeholders interested in the planning process. These included presentations to the Castro Valley Municipal Advisory Council (MAC), Eden Area MAC, Fairview MAC, Sunol Citizens' Advisory Council, Agricultural Advisory Committee, and Planning Commission, and participation in community events such as street fairs. Engagement also included interactive posters at the Cherryland Community Center and Castro Valley and San Lorenzo libraries, and outreach to the Ashland Community Association, Cherryland Community Association, San Lorenzo Village Homes Association, and Padres Unidos de Cherryland.
- **Climate Action Team:** The County convened a Climate Action Team (CAT), consisting of staff from various County agencies. Engagement with the CAT during the development of the Safety Element amendments and CCAP update included a series of virtual meetings with the goal of fostering a clear understanding of the project, providing updates on the project's technical components, soliciting feedback on policy strategies, and preparing for implementation.
- **Peer Educators/Promotores de Salud:** The County partnered with the Tiburcio Vasquez Health Center (TVHC) in Ashland to support equitable engagement of historically underrepresented communities. Through TVHC's Promotores de Salud program, a team of trained peer educators conducted paid outreach to TVHC patients and community members. The Promotores provided information about the project in Spanish and/or English and helped interested participants complete an online survey. The Promotores provided translation and distributed gift cards to community members who completed the survey.
- **Online Engagement:** The County posted all project materials to the Planning Department's website, where community members could learn about upcoming events, review materials from previous events, and connect to the online survey. The County provided community members with an opportunity to prioritize and comment on proposed policy strategies through the online platform, Consider.it from May 15, 2023 through July 21, 2023.
- **Advisory body recommendations regarding the Watercourse Protection Ordinance:** During the outreach and adoption process for the 2026 Safety Element amendments, the Fairview Municipal Advisory Council (MAC), Eden Area MAC, and Sunol Citizens' Advisory Council voted to recommend inserting language into the Safety Element indicating their concern about the definition and recognition of creeks in the Alameda County Public Works Agency's Watercourse

Protection Ordinance, and the corresponding protection that recognition affords to impacted watercourses. This recommendation was supported by the Planning Commission.

- **Engagement around flooding in Sunol:** The community of Sunol experienced unprecedented and destructive flooding during the storms of January 2023, causing damage to private buildings, businesses, and the Sunol Glen School. Throughout the 2026 Safety Element amendment process, which was underway at the time of the flooding event, the community of Sunol and members of the Board-appointed Sunol Citizens' Advisory Council (CAC) demanded action on the part of the County to determine responsibility for preventing and responding to future flood events, and expressed ongoing disappointment in the response of local agencies following these floods. At hearings held on May 20, 2024, and December 2, 2024, the Planning Commission requested that staff further revise the draft Safety Element amendments to clearly address jurisdictional responsibility for flood control and flood response in the Sunol area, and to include measures related to employing redundant emergency notification systems in rural areas.

To help fulfil the requests of the Planning Commission, the Sunol CAC, and the Sunol community, the Planning Department sought the support of Alameda County District 1 Supervisor David Haubert, who represents the community of Sunol. At Supervisor Haubert's direction, Supervisorial District 1 staff convened town hall meetings about flooding in Sunol on March 26, 2025, and October 2, 2025, with guests from the Zone 7 Water Agency, Alameda County Flood Control and Water Conservation District, Alameda County Public Works Agency, Alameda County Sheriff's Office (Office of Emergency Services), San Francisco Public Utilities Commission, Caltrans, the Alameda County Community Development Agency, and the offices of state Senator Jerry McNerney, state Assembly Member Alex Lee, and Congressman Eric Swalwell. Supervisor Haubert also convened relevant agencies in a series of working meetings over the course of 2025 to discuss jurisdictional responsibility for flood control and response in Sunol. Supervisorial District 1 staff presented a report detailing these efforts to the Planning Commission on December 1, 2025.

In response to Sunol's concerns, these additions have been made to the Safety Element:

- The addition of Sinbad Creek to the list of potential flooding risks (Chapter 1, Section 4.1)
- An acknowledgement that flood control systems may require additional evaluation in climate change scenarios (Chapter 1, Section 4.1)
- An expanded discussion of Alameda County's flood control agencies, their service boundaries, and their governing structures (Chapter 1, Section 4.2)
- A map illustrating the jurisdictional boundaries of the flood control agencies serving unincorporated Alameda County (Chapter 1, Section 4, Figure S-9)

- Policies aimed at reducing flood hazards in Sunol (Chapter 1, Section 4.7: P24, P25, P26, P27, and P28) and promoting redundant emergency communication systems in hazard areas (Chapter 3, Section 1.2: P4)

2.0 AUTHORITY AND PURPOSE

Authority for the General Plan and Its Constituent Elements

State law (Article 5, Section 65300 et seq.) requires the County to have a General Plan which contains seven elements: Land Use; Transportation; Housing; Open Space; Conservation; Safety; and Noise. The plan expresses the County's vision for the future and is the roadmap for achieving the community's desired quality of life. It is an assessment of current and future needs, and the resources needed to implement the goals and policies established. As the needs of the County change, the Planning Department with citizen comment and input makes recommendations to the Board of Supervisors to reflect the direction for the future and to update the General Plan.

Element Purpose and Focus

This document comprises the required Safety Element of the Alameda County General Plan. The primary purpose of a safety element is to resolve development issues that arise from known or previously unknown hazards.

This Element includes descriptive information, analysis and policies pertaining to geologic, seismic, flood, and fire, extreme heat, and other climate change-related hazards within the County. The focus of the Safety Element is to minimize human injury, loss of life, property damage, and economic and social dislocation due to natural and human-made hazards. The policies included in this Element set forth general and broad goals, policies and implementation actions that are intended to provide more specific direction to current and future actions undertaken by the public and private sectors.

~~Furthermore, in October 2007, Governor Schwarzenegger signed Assembly Bill (AB) 162 which strengthens flood protections in California by requiring jurisdictions, upon the next revision of the mandatory Housing Element, on or after January 1, 2009, to update flood related information in its General Plan, including but not limited to the Conservation Element, Housing Element, Safety Element, and the Land Use Element. This update of the Safety Element is intended to comply with AB 162.~~

Relationship to the General Plan

Alameda County's existing General Plan comprises area plans for the County's unincorporated rural and urbanized areas as well as the required County-wide elements. The area plans contain the land use and

circulation policies for their specific areas. The Housing, Open Space, Resource, Conservation, Seismic Safety and Safety, and Noise Elements contain general policies that pertain to the entire unincorporated area of Alameda County. This document updates and supersedes the ~~existing~~ Seismic Safety and Safety Elements (1982).

Consistency with Other Portions of the General Plan

The Safety Element is part of the Alameda County General Plan. The Element presents background data and analysis, and policies and implementation recommendations which supplement materials contained in other portions of the General Plan. The Safety Element taken together with these other documents comprise the Alameda County General Plan.

State law requires the elements of the General Plan to be consistent. The Safety Element is consistent with all of the other elements of the General Plan, in that it does not require any significant changes to the other elements of the General Plan, or recommend policies and programs that would contradict the goals and policies contained therein. The Safety Element's goals should be interpreted and implemented consistent with those in other portions of the General Plan. As the General Plan may be amended over time, goals, policies, and implementing programs in other General Plan elements will be comprehensively reviewed for internal consistency.

The following text provides a brief overview of the General Plan Elements, as well as the County's process for maintaining consistency between each document.

The Alameda County General Plan consists of a number of elements, both geographic and functional. The Safety Element developed as a separate document containing background and policy information that is useful in guiding public and private decisions affecting safety. In the event that policies conflict with earlier elements, the more recently adopted policies will prevail.

Supplemented by background information, analysis and policy statements, the following Elements and Plans, including the updated Safety Element, comprise the comprehensive General Plan for the County:

- Environmental Justice Element, adopted August 2024
- Castro Valley Plan, adopted March 2012
- ~~Alameda County Housing Element, adopted April 2011~~
- Eden Area General Plan, adopted March 2010
- East County Area Plan, adopted May 1994; modified by voters through Measure D November, 2000, codified by Board of Supervisors May, 2002, and Measure D 2022, November, 2000-2022, codified by Board of Supervisors ~~May April, 2002~~ 2023, and amended May 2025

- Community Climate Action Plan Element, adopted February 2014 (undergoing revision, adoption expected mid-2026)
- Conservation Element, adopted January 1976, and amended May 1994
- Housing Element 2023-2031, adopted December 2024
- Noise Element, adopted January 1976, and amended May 1994
- Open Space Element, adopted May 1973, and amended May 1994 **(undergoing revision, adoption expected early 2026)**
- Park and Recreation Element, adopted June 1956, and amended May 1994
- Scenic Route Element, adopted May 1966, and amended May 1994

Parts of the 2002 revised East County Area Plan (ECAP) evolved out of voter support for Measure D 2000 and Measure D 2022, and therefore will not be superseded by the Safety Element. In this case, the County has made a concerted effort to ensure that the Safety Element is consistent with Measure D 2000 and Measure D 2022.

In addition, the County is ~~currently~~ revising its Resource, Conservation and Open Space Elements and is working on an additional Agriculture Element to the General Plan. These Elements will be cross-referenced with the Safety Element to ensure that they are consistent with one another.

State Required Consultation

Pursuant to Government Code Section 65302 (g), staff contacted the ~~State Division of Mines and Geology~~ California Geological Survey of the Department of Conservation and the State Office of Emergency Services to advise them that preparation of the County Safety Element was about to commence and to solicit advice concerning plan preparation. Pursuant to Government Code Section 65302.5, staff consulted with the State Board of Forestry and Fire (CAL FIRE) and Alameda County Fire Department. ~~In September 2012, drafts of the Safety Element were sent to their offices for consideration, and no further action is needed.~~

3.0 REGIONAL AND LOCAL CONTEXT

Regional Setting

Alameda County, one of the nine San Francisco Bay Area counties, is located along the eastern shore of the San Francisco Bay. The County covers approximately 738 square miles, and is one of only two Bay Area counties that spans an area that reaches from the Bay to California's Central Valley. The western portion of Alameda County is located generally on the East Bay Plain between the coastal hills and the Bay. The area is heavily urbanized and contains the incorporated cities of Albany, Berkeley, Emeryville, Piedmont, Oakland, Alameda, San Leandro, Hayward, Union City, Newark, and Fremont, as well as the

unincorporated ~~urban areas~~ communities of Castro Valley, Fairview, San Lorenzo, Hayward Acres, Ashland, and Cherryland.

Eastern Alameda County is primarily composed of the coastal range's rough terrain that extends from the hills above the Bay Plain to the border with San Joaquin County in the Central Valley. It is comprised mainly of non-urban uses including agriculture, parkland, watershed, and open space. This area has relatively low population density except for the Livermore-Amador Valley, in which the incorporated cities of Dublin, Pleasanton, and Livermore are located. A map of the county in its regional context is provided as Figure i-1.

Planning Area

The Safety Element covers the unincorporated areas of Alameda County which include the communities of Ashland, Castro Valley, Cherryland, Fairview, Hayward Acres, ~~unincorporated Livermore~~, San Lorenzo, ~~and Sunol~~, and the unincorporated rural areas outside of Livermore, Pleasanton, and Dublin. A map of the Planning Area is provided as Figure i-2.

Intergovernmental Planning Coordination

In preparing the Element staff has consulted with the following departments to ensure that the proposed amendments are consistent with the County's disaster mitigation and preparation efforts:

- Alameda County Sherriff's Office
- Alameda County Fire Department
- Alameda County General Services Agency
- Alameda County Public Works Agency
- Alameda County Department of Public Health
- Alameda County Department of Environmental Health
- Alameda County Flood Control and Water Conservation District
- The Zone 7 Water Agency

4.0 RISK

Risk Determination

The efficiency of safety and noise programs lies in the definition of acceptable levels of risk for the community. The criteria for determination of risk are based upon:

- Reduction of loss in life and injuries
- Reduction or prevention of property damage

- Prevention of economic and social dislocations

Based upon these criteria a risk may be categorized as acceptable, unacceptable, and avoidable. The determination of acceptable and unacceptable risk requires judgments based on weighing several factors including the nature of the hazard, the frequency, or risk, of a damaging event associated with the hazard, and the relative number of persons exposed to the risk. The degree or intensity of any specific hazard is a major consideration in public mitigation efforts. Thus, hazards with a high life-loss potential are less acceptable than hazards which primarily affect property, and hazards which could impact entire communities are less acceptable than hazards which may impact relatively few persons. Only minimal risk to critical facilities and functions (including water supply, emergency services, evacuation routes, and medical and mass care facilities) is considered acceptable since these facilities and functions are critical to disaster recovery for entire communities.

The County is not able to guarantee that any particular development will not, at some time in the future, be adversely affected by the hazards identified in this element because such hazards, by their nature, defy precise prediction. In those instances where there is a significant factual question about whether a particular development has mitigated risks from natural hazards to an "acceptable" level and the property owner wishes to proceed in the face of such factual question, the County may require the owner of the property to provide indemnification to the County, insurance or other security and a recorded notice which will protect the interests of the County and provide notice of the potential problem to future purchasers.

5.0 CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA)

Overview of CEQA

The California Environmental Quality Act (CEQA) is a state law that requires state and local government to consider the potential environmental effects of a project before a decision is made. Under CEQA, a project is an activity undertaken by a public agency or a private activity which must receive some discretionary approval (meaning that the agency has the authority to deny the requested permit or approval) from a government agency which may cause either a direct physical change in the environment or a reasonably foreseeable indirect change in the environment. CEQA's purpose is to disclose the potential impacts of a project, suggest methods to minimize those impacts, and discuss project alternatives so that decision-makers will have full information upon which to base their decision. CEQA also provides for review of environmental documents by government agencies and the public in order to provide a thorough and transparent environmental review process.

Most proposals for physical development in California are subject to the provisions of CEQA, as are many governmental decisions which do not immediately result in physical development (such as adoption of a

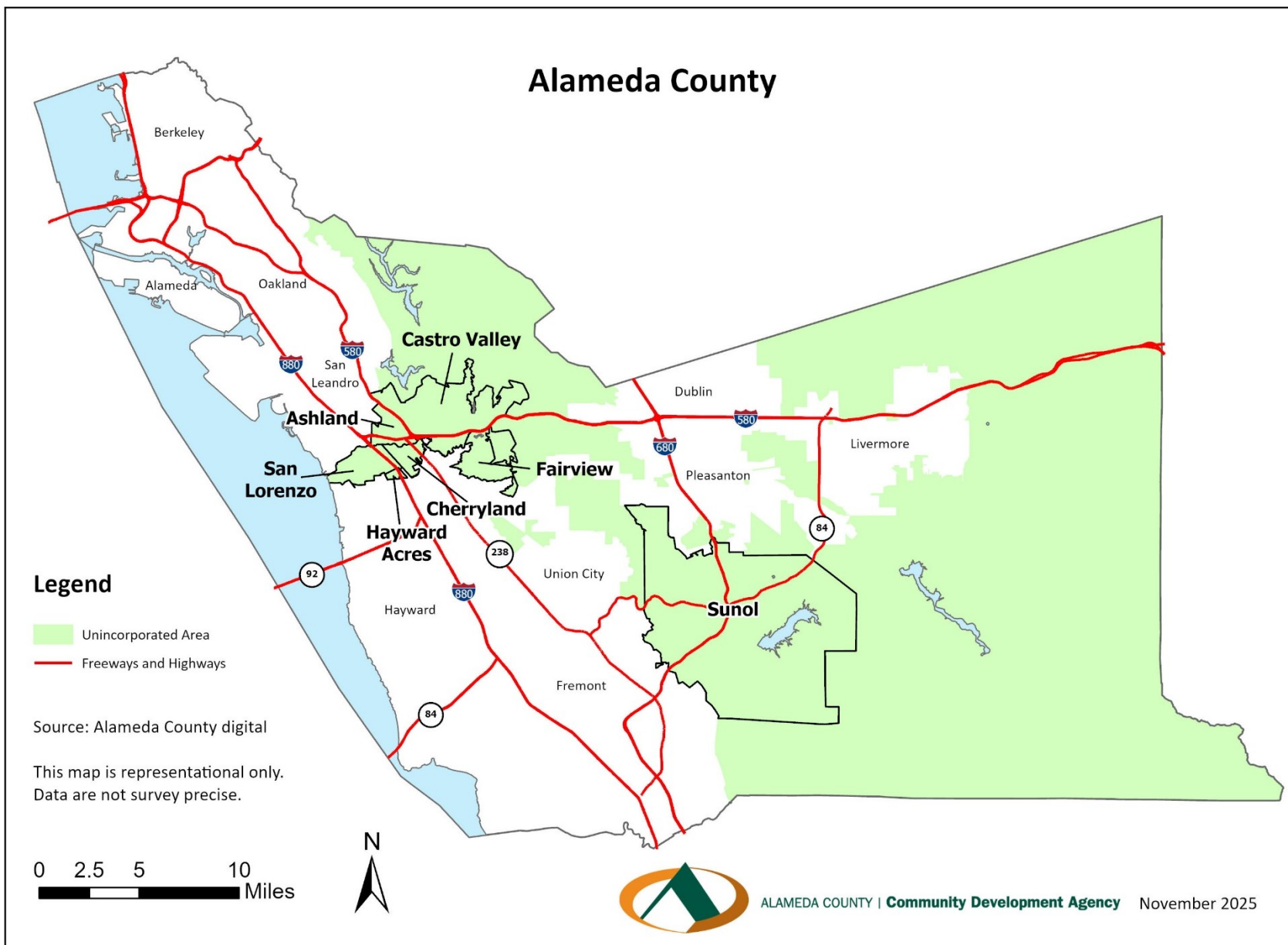
general or community plan). Every development project which requires a discretionary governmental approval will require at least some environmental review pursuant to CEQA, unless an exemption applies.

The Safety Element of the Alameda County General Plan has been analyzed in accordance with CEQA. The Initial Study and Negative Declaration (2012) and Notice of Exemption (2025) prepared for this element ~~is~~ are available as separate documents.

CEQA and Hazards

Projects that would result in a seismic/geologic, flood, fire, noise, or aviation hazard, or that involve hazardous materials generally require some discretionary level review. As such these projects will be reviewed in accordance with the provisions of the Act.





CHAPTER 1: NATURAL HAZARDS

1.0 PURPOSE AND INTENT

This chapter describes natural hazards present within unincorporated Alameda County and goals, policies and actions to minimize the losses due to seismic/geologic, fire, and flood, extreme heat and other climate change-related hazards.

2.0 SEISMIC/GEOLOGIC HAZARDS

2.1. Background

An earthquake is the release of stored energy from the earth's crust. The energy is released along a fault or a plane of weakness between two large masses of the earth's crust or its outer surface. The crust, between 10 to 15 miles thick in Alameda County, is fractured along fault lines. At a global scale, for reasons that are not completely known, pieces of the earth's crust are moving. Typically, two crustal masses move past one another at a rate of less than one inch per year. The energy released from an earthquake may be so small as to go unnoticed, except by sensitive measuring instruments or of an intensity so large it can destroy any structure within its range.

The Planning Area is located in the San Andreas and Hayward fault zones, one of the most seismically active regions in the United States. This site has been the location of numerous moderate to strong earthquakes. Due to the high level of seismic activity, much of the area has been classified as seismic risk Zone 4, the highest risk category specified under the California Building Code.

Earthquakes can lead to various seismic hazards including: ground shaking, liquefaction, ground rupture and the generation of large waves in bodies of water. Seismic hazards may vary from area to area, and the level of risk is tied to the geologic conditions and the extent of land use proposed for any given site.

The strength of an earthquake is measured using the Richter scale, a numerical scale for quantifying an earthquake's magnitude. The force of an earthquake at a particular place is measured on the Modified Mercalli (MM) Scale. The MM scale is a subjective ranking of the earthquake's effect on persons and structures. Table S-1 summarizes the relationship between these two measurements. Table S-2 provides an abbreviated description of the MM scale.

Table S-1: Relationship between the Richter and Modified Mercalli Scales¹

Richter Magnitude	Modified Mercalli Category
1.0 - 3.0	I
3.0 - 3.9	II-III
4.0 - 4.9	IV-V
5.0 - 5.9	VI-VII
6.0 - 6.9	VII-IX
7.0 and higher	VIII or higher
8+	X-XI

Table S-2: Abbreviated Modified Mercalli Scale²

Modified Mercalli Category	Description
I	Not felt except by a very few under especially favorable conditions.
II	Felt only by a few persons at rest, especially on upper floors of buildings.
III	Felt quite noticeably by persons indoors, especially on upper floors of buildings. Many people do not recognize it as an earthquake. Standing motor cars may rock slightly. Vibrations similar to the passing of a truck. Duration estimated.
IV	Felt indoors by many, outdoors by few during the day. At night, some awakened. Dishes, windows, doors disturbed; walls make cracking sound. Sensation like heavy truck striking building. Standing motor cars rocked noticeably.
V	Felt by nearly everyone; many awakened. Some dishes, windows broken. Unstable objects overturned. Pendulum clocks may stop.
VI	Felt by all, many frightened. Some heavy furniture moved; a few instances of fallen plaster. Damage slight.
VII	Damage negligible in buildings of good design and construction; slight to moderate in well-built ordinary structures; considerable damage in poorly built or badly designed structures; some chimneys broken.
VIII	Damage slight in specially designed structures; considerable damage in ordinary substantial buildings with partial collapse. Damage great in poorly built structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture overturned.
IX	Damage considerable in specially designed structures; well-designed frame structures thrown out of plumb. Damage great in substantial buildings, with partial collapse. Buildings shifted off foundations.
X	Some well-built wooden structures destroyed; most masonry and frame structures destroyed with foundations. Rails bent.
XI	Few, if any (masonry) structures remain standing. Bridges destroyed. Rails bent greatly.
XII	Damage total. Lines of sight and level are distorted. Objects thrown into the air.

¹ U.S. Geological Survey (USGS), http://earthquake.usgs.gov/learn/topics/mag_vs_int.php.

² Ibid.

2.2. Setting and Geomorphology

Alameda County is located on the East Bay of the San Francisco Bay Region of Central Coastal California. Principal physiographic features include the Bay plain and Diablo Range. Alameda County lies within the bounds of the Coast Ranges geomorphic province. The Coast Range geomorphic province includes the northwest trending belt of mountain ranges, valleys, and basins that parallel the California coastline from Point Conception north to the Oregon border. It is bounded on the north by the south flank of Mount Diablo, one of the highest peaks in the Bay Area, reaching an elevation of 3,849 ft. San Francisco Bay forms the western boundary, the San Joaquin Valley borders it on the east and an arbitrary line from the Bay into the Diablo Range forms the southern boundary.³

The bay plain and the valley areas of Alameda County are underlain by Quaternary (from the present to 2 to 3 million years ago) unconsolidated deposits which, in turn, are underlain by sedimentary metamorphic and igneous rocks of up to 150 million years in age. The Quaternary deposits consist primarily of alluvial and estuarine sediments. The alluvial ranges from stream deposited sands, gravel, silts, clays and intermixtures to fine windblown sand. Estuarine sediments consist of silty clays and some sand and shell layers deposited in the bay and marshlands. Adjacent to the San Francisco Bay the younger alluvial deposits grade into younger bay mud, a variable, semi-fluid to firm silty clay with lenses of water-saturated fine sand. Younger bay mud is covered by landfills that vary from dense, engineered fills to trash accumulations of uncertain geotechnical properties.⁴

Bedrocks of various types and age underlie the areas within the Diablo Range. Almost all of the hills have a mantle of topsoil and weathered bedrock. These soil materials vary in depth from a few to many feet and present a substantial slope instability hazard. Where the bedrock is well bedded and erosion of man-made excavation undercuts the bedding, slope instability problems exist.⁵

2.3. Active and Potentially Active Faults

The County has been subjected to numerous seismic events, originating both on faults within the County and in other parts of the region. Six major Bay Area earthquakes have occurred since 1800 that have affected the County, and at least two of the faults that produced them run through or into the County. These earthquakes and the originating faults include the 1836 and 1868 earthquakes on the Hayward-Rogers Creek fault, and the 1861 earthquake on the Calaveras fault. Three earthquakes, in 1838, 1906

³ E.J. Helley and R.W. Graymer, 1997, Quaternary Geology of Alameda County, and Parts of Contra Costa, Santa Clara, San Mateo, San Francisco, Stanislaus, and San Joaquin Counties, California: A Digital Database, U.S. Geological Survey, <http://geopubs.wr.usgs.gov/open-file/of97-97/alqgeo.pdf>.

⁴ Ibid.

⁵ Ibid.

and 1989 originated on the San Andreas fault, west of the county near San Francisco or to the south. The Working Group of California Earthquake Probabilities has determined that earthquakes of equally destructive forces are a certainty within the region.⁶ According to their findings, the Hayward-Rodgers Creek fault system is estimated to have a probability of 31% of producing an earthquake of a magnitude of 6.7 or higher within the next 30 years, this probability is the highest of the Bay Area faults.

Faults that have been active during the Holocene period, approximately the last 11,000 years, are considered to be active faults, and those faults that have been active during the Quaternary period, approximately the last 1.8 million years, are considered to be potentially active faults.⁷ This serves to differentiate faults for which sufficient evidence of recent activity has been noted to explicitly include them as known geologic hazards, distinct from those faults for which recent displacement is known or suspected, and whose latest activity has not been determined, but may have been within approximately the last 11,000 years. In addition to faults that have been classified as active or potentially active, there are others whose activity has not been clearly established by presently available information. Some of these faults are shown on Table S-2; others remain to be studied. Figure S-1 maps the location of active and potentially active faults within the County.

Other active faults within the unincorporated areas include the Calaveras, Greenville, and Las Positas faults, as well as several potentially active faults and unnamed secondary faults adjacent to these faults. There are few or no studies pertaining to these additional secondary faults; therefore it is unknown if these faults may or may not experience secondary ground rupture during a large earthquake. Table S-3 summarizes the active faults within the planning area and Table S-4 provides a summary of potentially active faults.

Scientists have yet to determine a way in which to predict the precise day and time of the next earthquake; however, past evidence points to the conclusion that areas of historically high seismicity⁸ are the locations where damaging earthquakes are most likely to occur in the future.

⁶ Working Group of California Earthquake Probabilities, 2008, *The Uniform California Earthquake Rupture Forecast Version 2 (UCERF 2)*, U.S. Geological Survey Open-File Report 2007-1437 and California Geological Survey Special Report 203 <http://pubs.usgs.gov/of/2007/1437/>

⁷ California Geological Survey, *Note 31: Faults and Earthquakes in California*, 2003, http://www.consrv.ca.gov/CGS/information/publications/cgs_notes/note_31/note_31.pdf

⁸ Seismicity is earth movement phenomena as related to earthquakes and also a measure of an area's susceptibility to earthquakes.

S-1: Faults

Sect

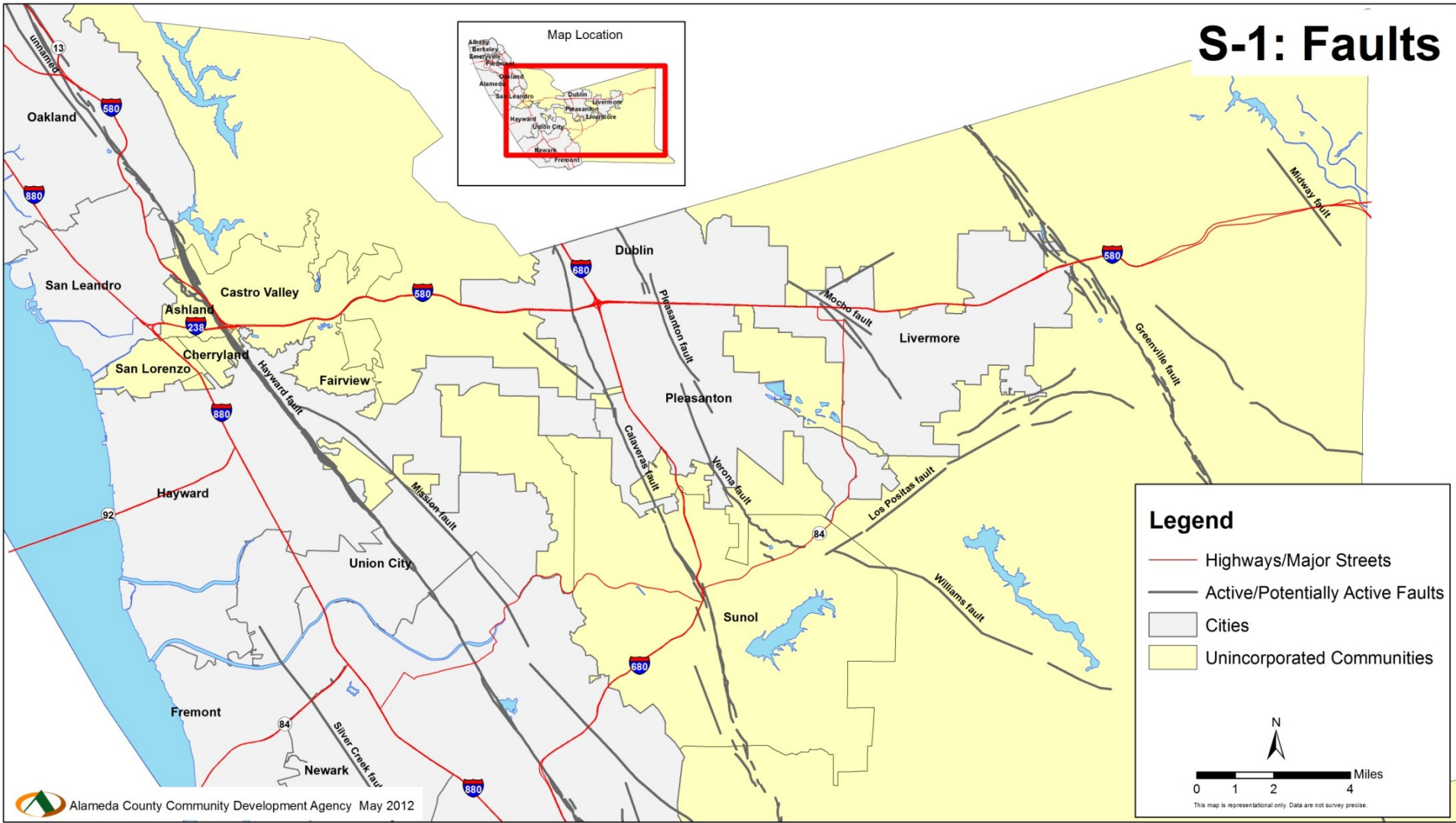


Table S-3: Active Faults within unincorporated Alameda County⁹

Fault	Classification	Criteria for Classification	Probability of Earthquake with a Magnitude \geq 6.7 (Richter)	Estimated Maximum Magnitude (Richter) ¹⁰
Hayward-Rogers Creek ¹¹	Active	Historical surface faulting, strong earthquakes	31%	6.5-7.3
Calaveras ¹²	Active	Historical surface faulting, strong earthquakes	7%	5.7-7.0
Greenville-Las Positas	Active	Surface faulting	3%	6.8-7.0

Note: This list is not exhaustive. Additional information may establish that other faults in the County to be active, potentially active, or inactive.

Table S-4: Potentially Active Faults within unincorporated Alameda County

Fault	Classification	Criteria for Classification	Probability of Earthquake with a Magnitude \geq 6.7 (Richter)	Estimated Maximum Magnitude (Richter)
Verona ¹³	Potentially Active	Offset of soil deposits	Undetermined	Undetermined
Williams ¹⁴	Potentially Active	Recent seismicity	Undetermined	Undetermined
Midway ¹⁵	Potentially Active	Field observations	Undetermined	Undetermined
Mocho ¹⁶	Activity Unknown	Field observations	Undetermined	Undetermined
Mission	Inactive	Geologic setting, microearthquake epicenters	Not Applicable	Not Applicable

⁹ 2007 Working Group on California Earthquake Probabilities, 2008, *The Uniform California Earthquake Rupture Forecast, Version 2 (UCERF 2)*, U.S. Geological Survey Open-File Report 2007-1437 and California Geological Survey Special Report 203 <http://pubs.usgs.gov/of/2007/1437/>.

¹⁰ Ibid. The ranges provide an estimate of the maximum intensity along various segments of the fault.

¹¹ Ibid. The Hayward-Rogers Creek Fault consists of three segments: the Hayward North, Hayward South, and Rogers Creek.

¹² Ibid. The Calaveras Fault is comprised of three segments: the Calaveras North, Calaveras Central and Calaveras South.

¹³ Unruh, Jeff and Sunderman, Sean, 2006, *Final Technical Report, Digital Compilation of Thrust and Reverse Fault Data for the Northern California Map Database: Collaborative Research with William Lettis & Associates, Inc., and the U.S. Geological Survey* http://www.deltarevision.com/2006_docs/2006thrust_final_report.pdf.

¹⁴ Ibid.

¹⁵ Clark, M. M., et al, 1984, *Preliminary Slip-rate Table and Map of Late Quaternary Faults of California*, U.S. Geological Survey.

¹⁶ Carpenter, D.W. et al, 1984, *Geology of the Lawrence Livermore National Laboratory Site and Adjacent Areas* <http://www-erd.llnl.gov/library/UCRL-53316.pdf>. This fault has also been associated with the Greenville fault.

2.4. Hazards

Ground Shaking

Ground shaking is the source of the most widespread earthquake damage. An earthquake produces seismic waves that emanate in all directions from the fault rupture surface. The seismic waves cause strong ground shaking, which typically is strongest near the fault and diminishes as the waves move through the earth away from the fault. The severity of ground shaking at a particular site is controlled by the interaction of several factors, including:

- the distance from the earthquake source; and
- earthquake magnitude; and
- the directivity (focusing of earthquake energy along the fault axis rather than perpendicular to the fault); and
- condition of underlying geologic materials (bedrock, sediment, soils, and man-made fill)¹⁷

Research occurring after the 1989 Loma Prieta earthquake has shown that areas underlain by unconsolidated, or man-made fill may amplify the strength and duration of strong ground motions, increasing the risk of damage.¹⁸ These findings are consistent with earlier evidence suggesting that structures placed on man-made fill are especially susceptible to earthquake hazards. Strong ground shaking caused by fault movement during an earthquake has the potential to result in significant loss of life and property damage throughout the Planning Area. Maximum ground shaking would be expected to result from a large earthquake on one of the nearby active faults as described in Table S-2, although strong ground shaking may also occur as a result of moderate or large earthquakes on other faults in the San Francisco Bay region.

Structural Failures

As was noted above, ground shaking intensity is highly variable from one site to another. In addition, the effect of ground shaking on structures is related to their form, structural design, materials, construction quality, and location. One of the objectives of the California Building Code (CBC) is to protect the life and safety of building occupants and the public. The County has adopted the CBC as the basis of the County Building Ordinance (Chapter 15.08 of its General Ordinance Code). The application of the design and construction standards of Chapter 15.08 should ensure that new construction will withstand the forces associated with a major earthquake. Since the 1970s, the CBC has used data on the response of structures to earthquakes as a basis for structural design. However, buildings constructed prior to the mid-1970's generally would not meet current design provisions for earthquake forces as prescribed in the

¹⁷ ABAG, *On Shaky Ground, 1995, 1998*, <http://www.abag.ca.gov/bayarea/eqmaps/doc/contents.html>.

¹⁸ Stewart, Jonathan, 1997, *Key Geotechnical Aspects of the 1989 Loma Prieta Earthquake*, http://nisee.berkeley.edu/loma_prieta/stewart.html.

Chapter 15.08 of the County's General Ordinance Code. Of these buildings, concrete tilt up structures, unreinforced masonry and soft story buildings, and older single family homes that have not been seismically retrofitted are the most susceptible to damage. Special occupancy buildings, including schools, hospitals, and other structures important to protecting public health and safety, are required by the State, and by Chapter 15.08, to meet more stringent design requirements.

Surface Rupture

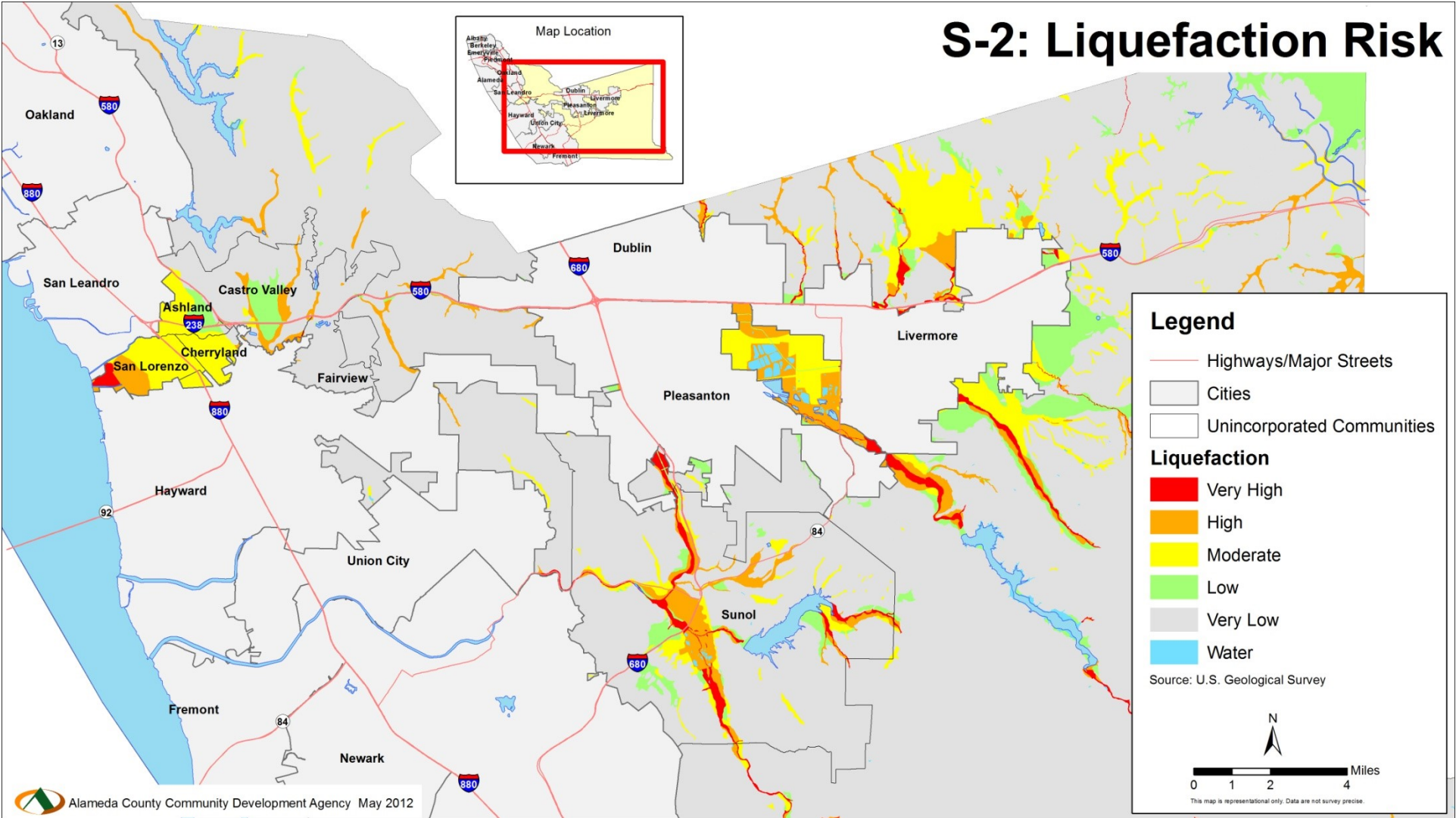
Surface fault rupture occurs when a movement on a fault deep within the earth breaks through the surface causing ground displacement. Ground rupture occurs along fault lines, and is normally limited to a fairly narrow zone along the trend of the primary fault, and to a lesser degree along secondary faults. The Alquist-Priolo Fault Zoning Act was developed by the State of California to regulate development occurring near active faults and to mitigate the risks associated with surface rupture.

Liquefaction

Liquefaction is the rapid transformation of saturated, loose, fine-grained sediment to a fluidlike state and is typically caused by strong ground shaking during an earthquake. Liquefaction can result in substantial loss of life, injury, and damage to property. In addition, liquefaction increases the hazard of fires because of explosions induced when underground gas lines break, and because the breakage of water mains substantially reduces fire suppression capability.

The potential for liquefaction to occur depends on both the susceptibility of near-surface deposits to liquefaction, and the likelihood that ground motions will exceed a specified threshold level. Much of the Planning Area is in the vicinity of an active fault (See Figure S-1); thus, the immediate area surrounding the earthquake epicenter will be exposed to strong ground shaking should a large earthquake occur. Areas most susceptible to liquefaction are underlain by loose granular sediments and low-lying lands adjacent to creeks and estuaries. Figure S-2 shows the liquefaction risk for the County.

S-2: Liquefaction Risk



Tsunamis or Seiches

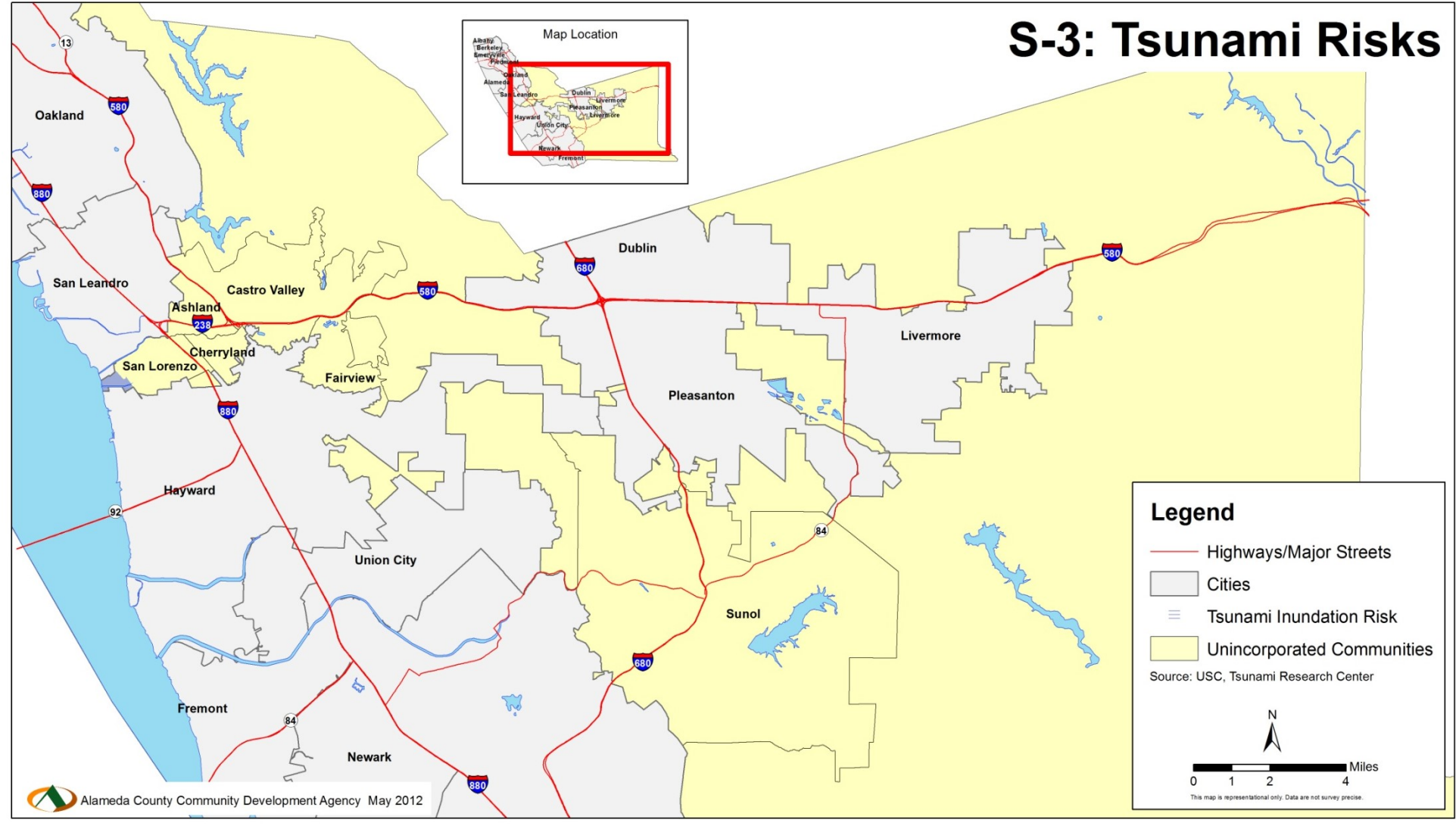
A major hazard associated with earthquakes is water inundation resulting from a tsunami or seiche. Tsunamis are a series of waves typically produced by an offshore earthquake, volcanic eruption, or landslide. A tsunami with a wave height of 20 feet at the Golden Gate Bridge, which is likely to occur approximately once every 200 years, would result in a runoff of less than 10 feet above sea level on lands surrounding the San Francisco Bay.¹⁹ Some areas of San Lorenzo may be subject to flooding if a tsunami were to occur. Figure S-3 is a map of tsunami hazards within unincorporated Alameda County.

A seiche is a long wave set up on an enclosed body of water such as a lake or reservoir. Seiches are inundations of the water surface that travel back and forth at regular periods determined by the depth and size of the water body. Seiches are usually caused by unusual tides, winds or currents, but may also be triggered by earthquake ground motion. The largest seiche wave ever measured in the San Francisco Bay, following the 1906 earthquake, was four inches high. Despite this occurrence, the Bay Area has not been adversely affected by seiches during its history within this seismically active region of California.²⁰ While damage caused by a seiche has not been reported since the 1906 earthquake, the various lakes and reservoirs within the unincorporated areas may be at risk of a seiche in the event of an earthquake.

¹⁹ Ritter, J. R.; Dupre, W. R., 1972, Maps Showing Areas of Potential Inundation by Tsunamis in the San Francisco Bay Region, California, U.S. Geological Survey.

²⁰ U.S. Army Corps of Engineers San Francisco District, Port of Oakland, May 1998, Updated January 2000, Oakland Harbor Navigation Improvement (-50 Foot) Project SCH No. 97072051 Final Environmental Impact Statement/Report.

S-3: Tsunami Risks

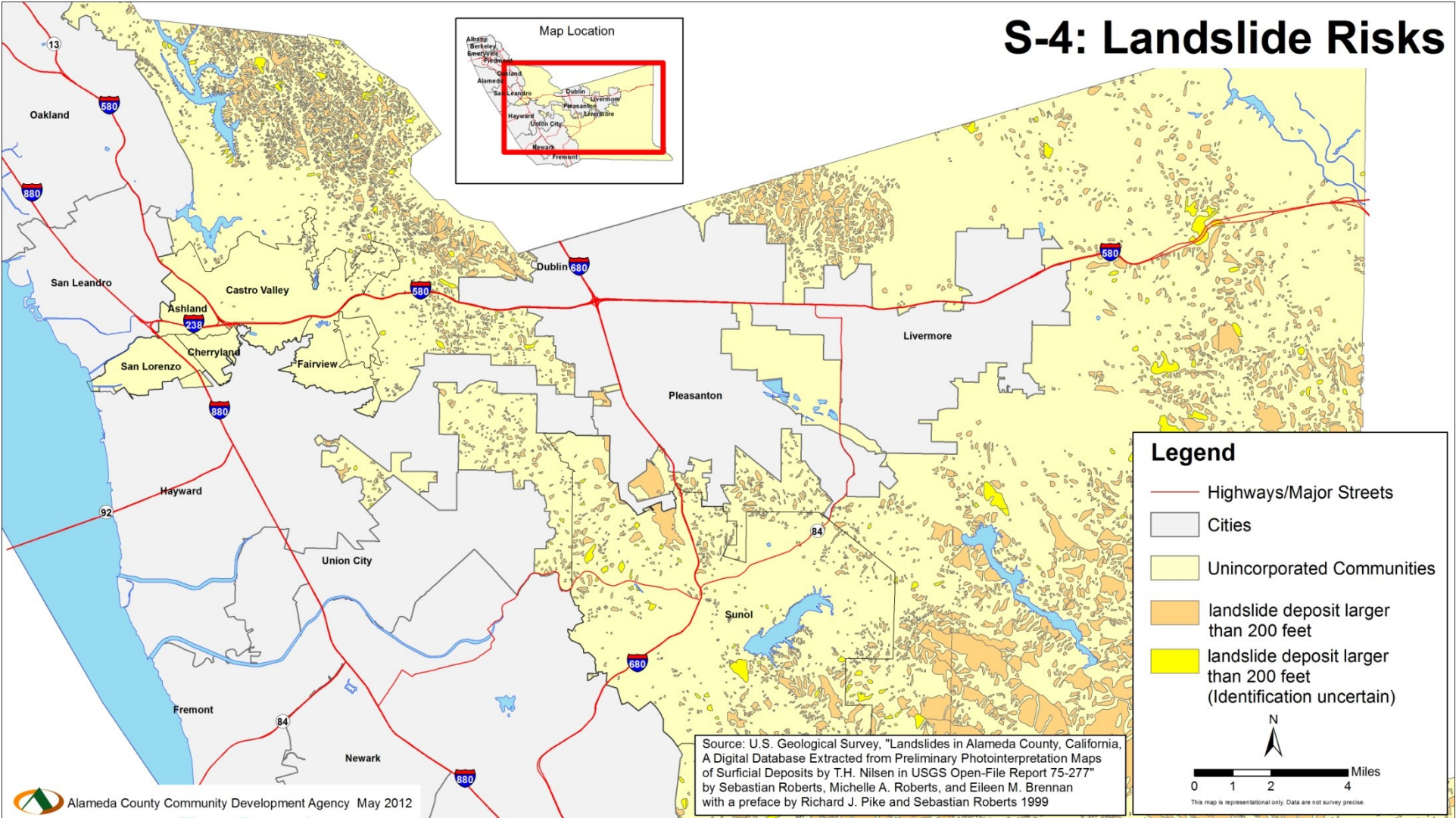


Landslides/Slope Instability

Landslides and slope instability are generally caused by earthquakes, weak materials, stream and coastal erosion, and heavy rainfall. The rate of landsliding is affected by the type and extent of vegetation, the slope angle, the degree of water saturation, the strength of the rocks, and the mass and thickness of the deposit. In addition, certain human activities tend to make the earth materials less stable and increase the chance of ground failure. Activities contributing to instability include extensive irrigation, poor drainage or ground-water withdrawal, removal of stabilizing vegetation and over-steepening of slopes by undercutting them or overloading them with artificial fill. The causes of failure, which normally produce landslides and differential settlement, are augmented during earthquakes. As a result of these potential risks, construction on slopes steeper than about 15 percent typically requires special grading, special foundation design, or site modification to mitigate slope ground conditions and reduce the potential for slope instability. Threats to structures would be greatest in areas that are close to natural channels or are situated on potentially unstable slopes.

Figure S-4 is a map of landslide risks within unincorporated Alameda County. The mapping indicates those areas that are considered “least susceptible,” “marginally susceptible,” “generally susceptible,” and “most susceptible” to slope failure. The criteria used to delineate the relative hazard areas included the nature of the geologic materials underlying the surface, the steepness of slopes, the presence or absence of visible slope failures, and the presence or absence of active forces that could cause failures, such as stream processes or shrink-swell potential soils.

S-4: Landslide Risks



2.5. Development Standards for Known Seismic and Geologic Hazards

The County is statutorily obligated to follow certain requirements with respect to the permitting and construction of new (or modifications to existing) buildings for human occupancy. Site specific investigations are required within Alquist-Priolo and Seismic Hazard Zones (both described below), and reports must be prepared that address hazards (mitigation for liquefaction and landslide potential) identified at the project site (please see Actions A3 and A12). The following is a summary of development guidelines and regulations pertaining to seismic and geologic hazards.

The Alquist-Priolo Earthquake Fault Zoning Act

The Alquist-Priolo Earthquake Fault Zoning Act (Public Resources Code 2621, et seq.) was passed in 1972 to mitigate the hazard of surface faulting to structures for human occupancy. The Alquist-Priolo Earthquake Fault Zoning Act's main purpose is to limit the construction of buildings used for human occupancy on the surface trace of active faults. The Act only addresses the hazard of surface fault rupture and is not directed toward other earthquake hazards. Under the Act, development of a building for human occupancy is generally restricted within 50 feet of an identified fault. A fault or fault zone is considered active under the provisions to the act if there is evidence of surface displacement in the last 11,000 years. The California Geological Survey has produced a document entitled *Fault-Rupture Hazard Zones in California: Alquist-Priolo Earthquake Fault Zoning Act with Index to Earthquake Fault Zones Maps* which may be accessed at the following webpage <ftp://ftp.consrv.ca.gov/pub/dmg/pubs/sp/Sp42.pdf> to clarify the roles and responsibilities of local jurisdictions and the State in implementing the Act.

The Seismic Hazards Mapping Act

The Seismic Hazards Mapping Act (Public Resources Code 2690, et seq.), (SHMA) passed in 1990, addresses non-surface fault rupture earthquake hazards, including liquefaction and seismically induced landslides. The SHMA requires the California Geological Survey (CGS) (formerly the Department of Mines and Geology, DMG) to prepare new Seismic Hazard Zone Maps showing areas where liquefaction or earthquake-induced landslides have historically occurred or where there is a high potential for such occurrences. The purpose of the maps is to help reduce and, where feasible, mitigate earthquake hazards in new construction. The County is required to use the maps in the regulatory process to mitigate the potential danger and high costs of such events. CGS has prepared a document entitled *Guidelines for Evaluating and Mitigating Seismic Hazards in California, 2008* which may be accessed here <http://www.conservation.ca.gov/cgs/shzp/webdocs/Documents/SP117.pdf> to ensure ongoing compliance with the SHMA.

The Alameda County General Ordinance Code

Section 15.08.070 of the Alameda County Building Ordinance mentions that the construction documents submitted with the application for permit shall be accompanied by a site plan showing to scale the size and location of new construction and existing structures on the site, distances from lot lines, the established street grades and the proposed finished grades and, as applicable, flood hazard areas, floodways, design flood elevations, seismic hazard areas, and earthquake fault zones; and it shall be drawn in accordance with an accurate boundary line survey. Section 15.08.240 notes that the building official shall have the authority to require that all prior soil and/or geologic reports prepared for a building site, whether prepared for the currently proposed project or not, be submitted to him/her for review, as a record of the conditions observed on the property at various times. Upon completion of rough grading work at the building site and prior to the approval of the foundation for any proposed building or structure, various final reports are also required to be submitted to the building official. The Grading, Erosion and Sediment Control Ordinance (Alameda County Code of Ordinance, Chapter 15.36) establishes standards for grading, construction and the control of erosion and sediments. In addition, Section 15.36.110 gives the Director of Public Works the authority to require a soils and geologic investigation, as well as require the said person or agent obtain a remedial permit or permits in support of any proposed development on private property. Chapter 16, the Subdivision Ordinance, contains various provisions relating to the investigation of seismic and geologic hazards, and the design and construction of improvements relating to the subdivision of property.

~~Section 15.08.240 of the Alameda County Building Ordinance requires applicants for new construction to submit soils or geologic reports for sites affected by a number of seismic and geologic hazards. In addition, new structures are required to incorporate design elements to reduce building failures. The Grading, Erosion and Sediment Control Ordinance (Alameda County General Ordinance Code, Chapter 15.36) establishes standards for grading, construction and the control of erosion and sediments. In addition, Section 15.36.110 of the County Grading Ordinance gives the Director of Public Works the authority to require a soils and geologic investigation in support of any proposed development on private property. Chapter 16, the Subdivision Ordinance, contains various provisions relating to the investigation of seismic and geologic hazards, and the design and construction of improvements relating to the subdivision of property.~~

The California Environmental Quality Act (CEQA)

CEQA requires that all projects be evaluated to determine if they “expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:”

1. Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault.

2. Strong seismic ground shaking.
3. Seismic-related ground failure, including liquefaction.
4. Landslides.

Projects must also be evaluated for their potential to:

- Result in substantial soil erosion or the loss of topsoil.
- Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse.
- Be located on expansive soil, as defined in the California Building Code, creating substantial risks to life or property.
- Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water.

2.6. Goals, Policies and Implementing Actions

Goal 1. To minimize risks to lives and property due to seismic and geologic hazards.

Policies

- P1. To the extent possible, projects should be designed to accommodate seismic shaking and should be sited away from areas subject to hazards induced by seismic shaking (landsliding, liquefaction, lurking, etc.) where design measures to mitigate the hazards will be uneconomic or will not achieve a satisfactory degree of risk reduction. (Source: Seismic Safety and Safety Element, pg. 6)
- P2. Structures should be located at an adequate distance away from active fault traces, such that surface faulting is not an unreasonable hazard. (Source: Seismic Safety and Safety Element, pg. 6)
- P3. Aspects of all development in hillside areas, including grading, vegetation removal and drainage, should be carefully controlled in order to minimize erosion, disruption to natural slope stability, and landslide hazards. (Source: Seismic Safety and Safety Element, pg. 6)
- P4. Within areas of demonstrated or potential slope instability, development should be undertaken with caution and only after existing geological and soil conditions are known and considered. In areas subject to possible widespread major landsliding, only very low density development should be permitted, consistent with site investigations; grading in these areas should be

restricted to minimal amounts required to provide access. (Source: Seismic Safety and Safety Element, pg. 7)

- P5. All existing structures or features of structures which are hazardous in terms of damage, threat to life or loss of critical and essential function in the event of an earthquake should be, to the extent feasible, brought into conformance with applicable seismic and related safety (fire, toxic materials storage and use) standards through rehabilitation, reconstruction, demolition, or the reduction in occupancy levels or change in use. (Source: Seismic Safety and Safety Element, pg. 7, with a minor revision)
- P6. The County shall not approve new development in areas with potential for seismic and geologic hazards unless the County can determine that feasible measures will be implemented to reduce the potential risk to acceptable levels, based on site-specific analysis. The County shall review new development proposals in terms of the risk caused by seismic and geologic activity. (Source: ECAP, pg. 74)
- P7. The County, prior to approving new development, shall evaluate the degree to which the development could result in loss of lives or property, both within the development and beyond its boundaries, in the event of a natural disaster. (Source: ECAP, pg. 74)
- P8. The County shall ensure that new major public facilities, including emergency response facilities (e.g., hospitals and fire stations), and water storage, wastewater treatment and communications facilities, are sited in areas of low geologic risk. (Source: ECAP, pg. 74)
- P9. Site specific geologic hazard assessments, conducted by a licensed geologist²¹, shall be completed prior to development approval in areas with landslide and liquefaction hazards as indicated in Figures S-2 and S-4 and for development proposals submitted in Alquist-Priolo Zones as indicated in Figure S-1, hazards to be mapped include:
- Seismic features
 - Landslide potential
 - Liquefaction potential

²¹ In staff correspondence dated July 25, 2012, John Rogers of the Public Works Agency provided the following clarification pertaining to this policy “Soils studies within areas of earthquake-induced landslide and liquefaction are not required to be performed by a licensed geologist. The rule is that any portion of the study that is defined as civil engineering should be conducted by a geotechnical engineer, and that any portion classified as the practice of geology should be conducted by an engineering geologist or a geologist. Most soils studies are performed by geotechnical engineers. Geologists typically perform fault zone studies.”

Mitigation measures needed to reduce the risk to life and property from earthquake induced hazards should be included. (Source: Eden Area Plan, pg. 8-11)

- P10. Buildings shall be designed and constructed to withstand ground shaking forces of a minor earthquake (1-4 magnitude) without damage, of a moderate (5 magnitude) earthquake without structural damage, and of a major earthquake (6-8 magnitude) without collapse of the structure. The County shall require that critical facilities and structures (e.g. hospitals, emergency operations centers) be designed and constructed to remain standing and functional following an earthquake. (Source: ECAP, pg. 75)
- P11. All construction in unincorporated areas shall conform to the Alameda County Building Ordinance, which specifies requirements for the structural design of foundations and other building elements within seismic hazard areas.
- P12. To the extent feasible, major infrastructure including transportation, pipelines, and water and natural gas mains, shall be designed to avoid or minimize crossings of active fault traces and to accommodate fault displacement without major damage that could result in long-term service disruptions. (Source: Eden Area Plan, pg. 8-12)
- P13. The County shall encourage the retrofitting of existing structures and other seismically unsafe buildings and structures to withstand earthquake ground-shaking. (Source: Eden Area Plan, pg. 8-12)
- P14. In order to minimize off-site impacts of hillside development, new construction on landslide-prone or potentially unstable slopes shall be required to implement drainage and erosion control provisions to avoid slope failure and mitigate potential hazards. (Source: Eden Area Plan, pg. 8-12)
- P15. The County shall identify roadways that require seismic evaluation and retrofit that also function as evacuation routes to ensure these route improvements are prioritized.
- P16. The County shall identify and propose mitigation actions for evacuation routes located in proximity to active or potential landslide zones.
- P17. The County shall require new residential developments to include at least two points of ingress/egress to the development.
- P18. The County shall require development to provide additional access roads where feasible to provide for safe access of emergency equipment and civilian evacuation concurrently. The width,

surface, grade, radius, turnarounds, turnouts, bridge construction, and lengths of fire apparatus access roads shall meet the requirements of the State and existing County requirements.

- P19. The County shall advise, and where appropriate, require all new developments to help eliminate impediments to evacuation within existing community plan areas, where limited ingress/egress conditions could impede evacuation events.
- P20. The County shall implement warning systems and evacuation plans for developed areas located within known hazard areas, as well as unincorporated County areas without adequate communication methods but are located within known hazard areas. Periodically analyze the capacity, safety, and viability of the County's evacuation routes under a range of emergency scenarios during updates to the County's Emergency Operations Plan.
- P21. The County shall develop, implement, and maintain an effective evacuation program, available in commonly-spoken languages, for areas of risk in the event of a natural or human-caused disaster.
- P22. The County shall coordinate with State and Federal landowners regarding joint use and access agreements for roadways located on state and federal lands that can be used for evacuation purposes.
- P23. The County shall support the creation of resilience hubs and other place-based resilience resources to provide community members with essential services before, during, and after seismic related hazard events, partnering with community groups and residents of frontline communities to establish location, programming and activation of resource hubs and other place-based resilience resources.

Actions

- A1. Require all new construction to meet the most current, applicable, lateral force requirements. (Source: Seismic Safety and Safety Element, pg. 6)
- A2. Require applications for development within Alquist-Priolo Study Zones to include geological data that the subject property is not traversed by an active or potentially active fault, or that an adequate setback can be maintained between the fault trace and the proposed new construction. (Source: Seismic Safety and Safety Element, pg. 6)
- A3. Require sites to be developed in accordance with recommendations contained in the soil and geologic investigations reports. (Source: Seismic Safety and Safety Element, pg. 6)

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- A4. Establish standards for areas previously in Alquist-Priolo Study Zones, and eliminated in the last update. (Source: Seismic Safety and Safety Element, pg. 6)
- A5. Regulate, with collaboration from utility owners, the extension of utility lines in fault zones. (Source: Seismic Safety and Safety Element, pg. 6, with minor revisions)
- A6. Establish (with collaboration from utility owners) and enforce design standards for transportation facilities and underground utility lines to be located in fault zones. (Source: Seismic Safety and Safety Element, pg. 6)
- A7. Require soils and/or geologic reports for development proposed in areas of erodible soils and potential slope instability. (Source: Seismic Safety and Safety Element, pg. 7)
- A8. Pursue programs to identify and correct existing structural hazards, with priority given to hazards in critical, essential and high occupancy structures and in structures built prior to the enactment of applicable local or state earthquake design standards. (Source: Seismic Safety and Safety Element, pg. 7)
- A9. Support regional or statewide programs providing funding or technical assistance to local governments to allow identification of existing structural hazards in private development and providing assistance to public and private sectors to facilitate and to minimize the social and economic costs of hazards abatement. (Source: Seismic Safety and Safety Element, pg. 7)
- A10. Continue to require the upgrading of buildings and facilities to achieve compliance with current earthquake bracing requirements as a condition of granting building permits for major additions and repairs. (Source: Seismic Safety and Safety Element, pg. 7)
- A11. Continue, and as required, expand programs to provide the public information regarding seismic hazards and related structural hazards. (Source: Seismic Safety and Safety Element, pg. 7)
- A12. Require geotechnical studies prior to development approval in geologic and/or seismic hazard areas as identified by future studies by federal, state, and regional agencies. Require or undertake comprehensive geologic and engineering studies for critical structures regardless of location. (Source: Castro Valley Plan, pg. 10-30)
- A13. Adopt and amend as needed the most current version of the California Building Code (CBC) to ensure that new construction and renovation projects incorporate Earthquake-resistant design and materials that meet or exceed the current seismic engineering standards of the CBC. (Source: Castro Valley Plan, pg. 10-30, with minor revision)

- A14. Periodically update detailed guidelines for preparation of site-specific geologic hazard assessments. These guidelines shall be prepared in consultation with the County Building Official, County Engineer, County Counsel and the County Risk Manager and shall ensure that site-specific assessments for development requiring discretionary permits are prepared according to consistent criteria. (Source: Eden Area Plan, pg. 8-13, with revisions)
- A15. Develop and implement an earthquake retrofit plan to reduce hazards from earthquakes. The plan should identify and tally the seismically unsafe buildings and structures, including unreinforced masonry, unreinforced concrete and soft-story buildings, and require inspection for these structures. It should also identify sources of funding to help reconstruct or replace inadequate structures and assist homeowners with earthquake retrofitting. (Source: Eden Area Plan, pg. 8-13)
- A16. On sites with slopes greater than 30 percent, require all development to be clustered outside of the 30 percent slope area. (Source: Castro Valley Plan, pg. 10-31) With the exception that development²² upon any area outside of the Urban Growth Boundary where the slope exceeds 25% shall not be permitted. (Source: ECAP, pg. 74)
- A17. Aspects of all development in hillside areas, including grading, vegetation removal and drainage, should be carefully controlled in order to minimize erosion, disruption to natural slope stability, and landslide hazards. The County's development standards and guidelines, permit application review process, Section 15.08.240 of its Building Ordinance, the Grading Erosion and Sediment Control Ordinance (Chapter 15.36 of the Alameda County General Ordinance Code), the Stormwater Management and Discharge Control Ordinance (Chapter 13.08), and Subdivision Ordinance (Title 16) shall serve to implement this policy.

3.0 FIRE HAZARDS

3.1 Fire-Related Hazards

Fire hazards exist in both developed and undeveloped areas. Those occurring in developed areas typically include buildings, rubbish, automobiles, and grass fires on vacant lots. Those in undeveloped areas often include large brush and grass fires. Alameda County is subject to the threat from urban fires, and especially wildland fires, due to its hilly terrain, weather conditions, and the nature of its plant

²² Development, as defined by the "Save Open Space and Agricultural Lands" initiative, or commonly referred to as Measure D, is the placement or erection of any solid material or structure; construction, reconstruction or alteration of any structure; change in the density or intensity of any use of land, including any division of land; grading, removing, extraction or deposition of any materials; and disposal of any waste.

coverage. The areas most susceptible to wildfire across the entirety of Alameda County are the central and southeastern portions of the unincorporated county, largely because of their topography. Under moderate and high possible greenhouse gas scenarios, the average annual area burned is projected to increase by approximately 200 acres to 500 acres, respectively. There are approximately 33,000 unincorporated county residents that are at risk of being directly affected by wildfire that reside within a “High” or “Very High” fire hazard severity zones (as determined by CAL FIRE). Thousands of homes and dozens of critical facilities are directly threatened by wildfire events. In addition, wildfire-induced loss of power affecting facilities could diminish emergency dispatching, communications, and response capabilities, especially when coupled with evacuation-related traffic congestion. Historical data on wildfires is maintained by the California Department of Forestry and Fire Protection and accessible via this webmap: <https://calfire-forestry.maps.arcgis.com/home/item.html?id=e3802d2abf8741a187e73a9db49d68fe&sublayer=0>. CAL FIRE maintains maps of current approved Fire Hazard Severity Zones on its website at <https://osfm.fire.ca.gov/what-we-do/community-wildfire-preparedness-and-mitigation/fire-hazard-severity-zones>.

Due to the intensity of development, the number of the potentially affected populations, and the difficulties of containment, the County must also devote major resources to controlling potential fire hazards in its urban areas. In order to quantify this potential risk, California Department of Forestry and Fire Protection (**CalFireCAL FIRE**) has developed a Fire Hazard Severity Scale which utilizes three criteria in order to evaluate and designate potential fire hazards in wildland areas. The criteria are fuel loading (vegetation), fire weather (winds, temperatures, humidity levels and fuel moisture contents) and topography (degree of slope). A map based upon this data has been included as Figure S-5. Government Code Section 65302 requires the County to identify the general location and distribution of existing and planned uses of land in very high fire hazard severity zones and in State Responsibility Areas (SRAs), including structures, roads, utilities, and essential public facilities. Figures S-5a and S-5b display the required data within the **urban** unincorporated communities and the eastern portion of the County.

3.2. Provision of Fire Services

Fire services in unincorporated Alameda County are provided by Alameda County Fire Department, the Fairview Fire Department, and/or CAL FIRE, as described below. No areas of unincorporated Alameda County lack fire service, though response times may vary depending upon location. The Alameda County Fire Department (ACFD), a dependent Special District with the Board of Supervisors serving as its Board of Directors, is responsible for providing emergency fire and medical response, as well as fire prevention services, to all residents in the Local Responsibility (LRA) areas of the unincorporated areas of Alameda County, exclusive of the Fairview area. In addition, ACFD provides fire and emergency services are

provided under contractual agreements with the cities of Dublin, Emeryville, Newark, San Leandro, and Union City, and the Lawrence Berkeley National Laboratory and Lawrence Livermore National Laboratory. The Department's total service area encompasses approximately 508 square miles and has a daytime population of 394,000. The area contains a number of major roadways, highways, and interstates that carry thousands of private and commercial vehicles on a daily basis; large suburban and commercial centers; agricultural and wildland areas; and lakes and marinas. The geography and demography of the unincorporated area excluding Fairview is served by nine stations, encompasses 431 square miles with a population of 126,397 and poses significant operational challenges. The eastern and southern areas include large portions of wildland, grazing land, and rural farmlands. The majority of the population is centered in the western area which is heavily urbanized with a mix of residential, commercial, and light industrial. The Department staffs one station as Lawrence Berkeley National Laboratory (Site 100) and two stations that serve the two sites (Sites 200 & 300) of the Lawrence Livermore National Laboratory. First responder paramedic services are available on a 24-hour per day, 365 day per year basis throughout the entire ACFD service area. The Department also has contractual agreements with a number of other agencies including the cities of Pleasanton and Hayward to optimize service delivery to unincorporated island areas of the County.

The Department is responsible for the administration and operation of the Alameda County Regional Emergency Communications Center (ACRECC)²³, which dispatches over 180,000 calls annually and retains historical data on fires and emergency medical services within the County. The dispatch center provides fire, medical and rescue dispatch and communication center services for the Cities of Alameda, Dublin, Emeryville, Fremont, Livermore, Newark, Pleasanton, San Leandro, and Union City; the unincorporated communities of Castro Valley, Ashland, Cherryland, Hayward Acres, San Lorenzo, and Sunol; the Lawrence Livermore, Lawrence Berkeley, and Sandia National Laboratories, Camp Parks Combat Support Training Center, all of unincorporated Alameda County; and is the Dispatch/System Status Management Center for Paramedics Plus ambulance service; and Medical Priority Dispatch System (MPDS) for all of Alameda County except the City of Oakland. The goal of the ACRECC is to enhance the regional dispatch and communication system through the consolidation of fire and medical dispatch.

Fairview Fire Protection District (FFPD)²⁴ provides fire and emergency medical services to the Fairview community of Alameda County. The FFPD is an independent Special District as defined under the Fire Protection District Law of 1987, Health and Safety Code, Section 13800, of the State of California. The District also provides emergency medical services at the Advanced Life Support (Paramedic) level. Within the boundaries of the District are expansive rural wildland areas, single-family homes, multi-family

²³ The information was obtained from the ACRECC.
<https://www.acgov.org/fire/about/stationf.htm>

²⁴ The information was obtained from the FFPD.
<http://fairviewfiredistrict.org>

residential complexes, agricultural, and equestrian areas. The District's service area encompasses 4.2 square miles and serves a population that exceeded 14,000 in 2014. The FFPD has contracted with the City of Hayward since 1993 to provide fire protection and emergency medical services within the boundaries of the District.

The California Department of Forestry and Fire Protection (**CalFireCAL FIRE**) is responsible for fire prevention and suppression in their "state responsibility areas" (SRAs). **CalFire-CAL FIRE** also provides protection against structural and wildland fire hazards to unincorporated Sunol through a "Schedule A" contract with the Alameda County Fire Department. Areas that are not SRAs are commonly referred to as "local responsibility areas" (LRAs). In Alameda County, LRA fire protection is provided by city fire departments, **or the ACFD, or the Fairview Fire District, as applicable.**

The ACFD has established several mutual aid agreements with a variety of agencies to ensure a high level of fire and medical services throughout the unincorporated areas in the event of a local or regional disaster. Currently, automatic aid agreements exist with the City of Berkeley, the City of Oakland, the San Ramon Valley Fire Protection District, and the Livermore-Pleasanton Fire Department. The ACFD agreement with the City of Berkeley and City of Oakland includes a mutual aid response to cover the Berkeley-Oakland Hills area, and a shared automatic agreement for Interstates 80, 580, and 880. All fire departments within Alameda County share a countywide mutual aid agreement and are a part of the State Master Mutual Aid Plan.²⁵

The Alameda County Ordinance Code

Title 6 – Health and Safety of the Alameda County Code of Ordinance contains both the Alameda County Fire Code and the Fire Severity Map Ordinance. Per the County's Fire Code, ~~The Uniform Fire Code (Section 6.04 of the County Ordinance Code) and the Building Code (Title 15) form the basis of the County's fire prevention standards.~~ the County adopts the 2022 **current** California Fire Code. Chapter 6.05 is a specific Fire Severity Map Ordinance that designates those areas within the County limits that the California Department of Forestry and Fire Protection has determined as very high fire hazard severity zones (VHFHS zones). These codes also call for the installation, maintenance, and ongoing inspection of fire protection systems under the Alameda County Fire Department and ~~direction of the local fire chief as the Fire Code Official.~~ In addition, it is noted in Chapter 15.08 – Building Code that fire protection systems shall comply with the Special Fire District Code. Roof assemblies and rooftop structures shall comply with the Special Fire District Code for the roof covering classification requirements for the area designated by the fire chief as fire hazard zones. Furthermore, ~~In addition, the Fire Code authorizes the Fire Chief to specify water supply and road design standards (such as the number of roads required for access to the site, the road width, and weight capacity).~~ Under under Section 16.20.020(G) of the Subdivisions

²⁵ Excerpted from the Eden Area General Plan, page 5-12

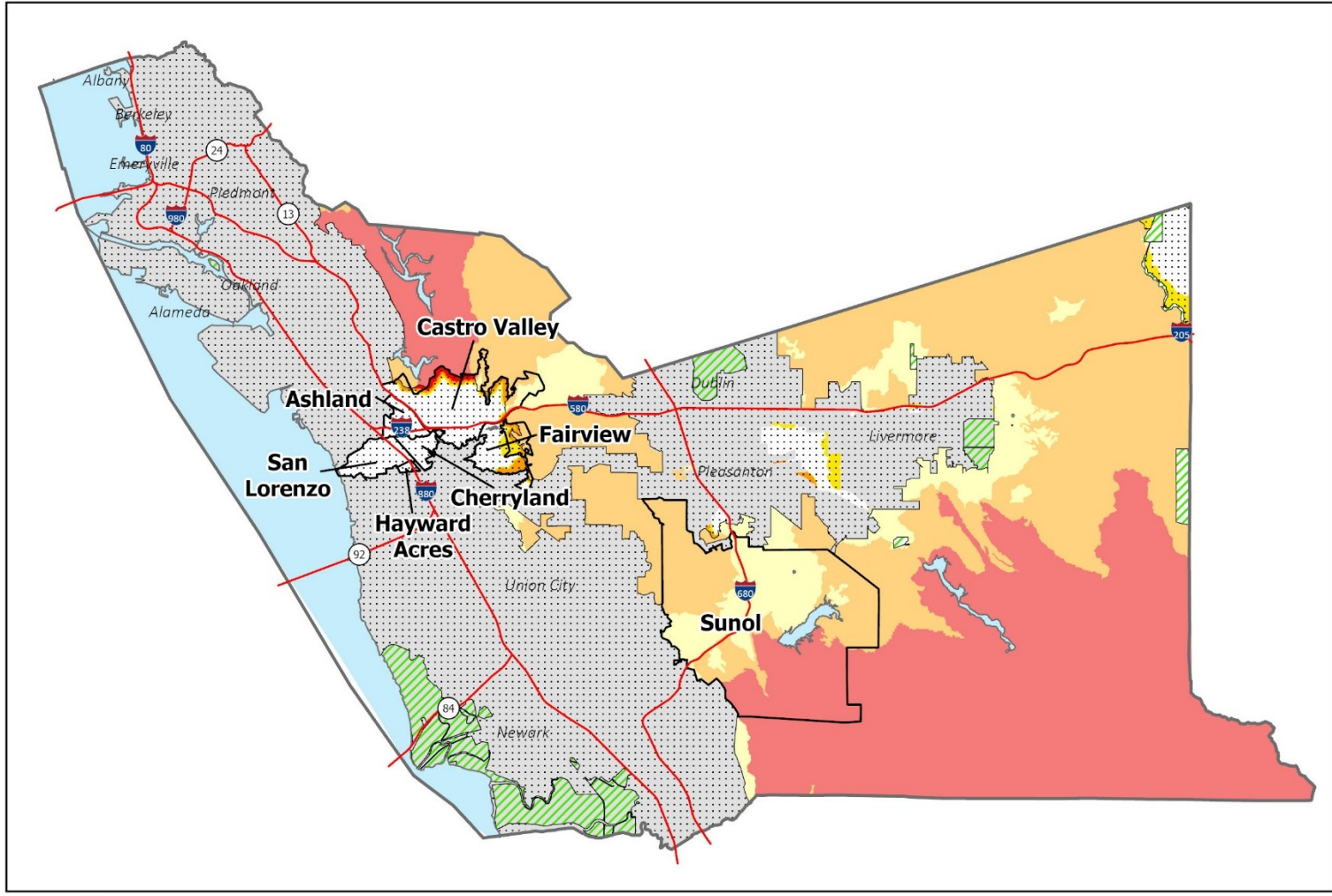
Ordinance (Title 16), the landowner or developer must install water mains, fire hydrants, gated connections and fire appurtenances to supply water for fire suppression in conformance with district standards.

CCR Title 24 Part 9 (current California Fire Code Appendix B and C) has been adopted and is enforced with all new development within the LRA or VHFHSZs. Title 14 is enforced within the SRA.

The California Environmental Quality Act (CEQA)

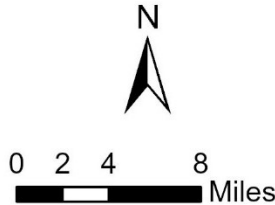
Under the California Environmental Quality Act (CEQA), a project sponsor must declare if the project would, “Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands.” Projects that would result in increased wildland fire risk should develop appropriate alternatives and mitigations that would prevent or reduce threats from wildland fires.

S-5: Fire Hazard Severity Zones



Legend

- Incorporated Cities
- Fire Protection Responsibility**
 - Local Responsibility Area (LRA)
 - Federal Responsibility Area (FRA)
 - Remainder State Responsibility Area (SRA)
- Fire Hazard Severity Zones (SRA)**
 - Very High
 - High
 - Moderate
- Fire Hazard Severity Zones (LRA)**
 - Very High
 - High
 - Moderate

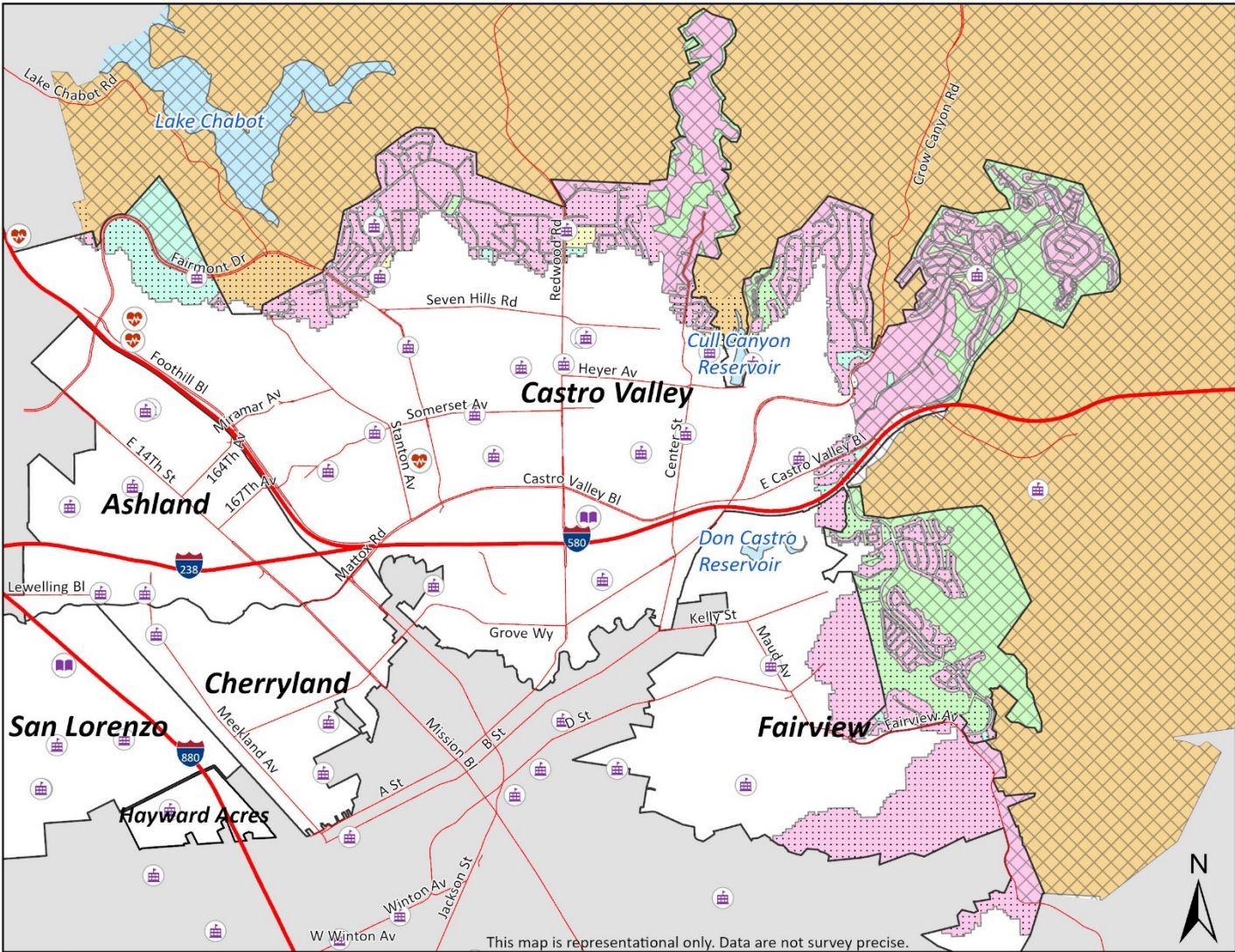


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Sources: Fire Hazard Severity Zones: CAL FIRE "FHSZ_SRA_LRA_Combined" accessed 8/21/25
All other data: Alameda County digital.

This map is representational only. Data are not survey precise.

S-5a: Land Use in Fire Hazard Zones – Urban



Legend

- Hospitals
- Schools
- County Libraries
- Roads/Freeways
- Incorporated Cities
- State Responsibility Area (SRA)
- Very High, High, and Moderate Severity Fire Hazard Zones in the Local Responsibility Area (LRA)
- Federal Responsibility Area (FRA)

Land Use (Generalized*)

- Residential
- Commercial/Mixed Use
- Public
- Parklands/Open Space
- Resource Management

*Generalized land use categories include any of the following land use designations that are applicable within the geographic area shown on the map:

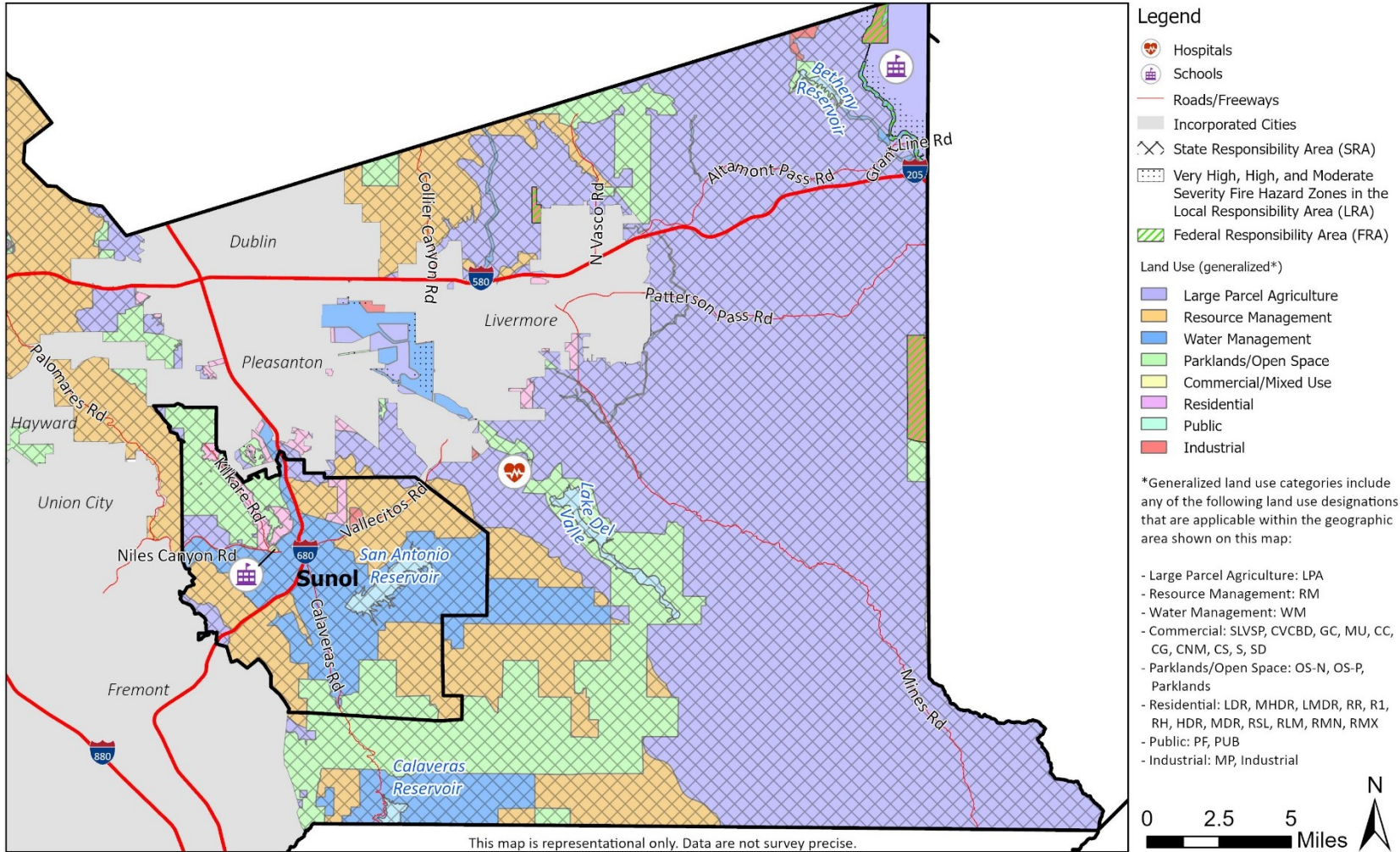
- Residential: LDR, MHDR, LMDR, RR, R1, RH, HDR, MDR, RSL, RLM, RMN, RMX
- Commercial: SLVSP, CVCBD, GC, MU, CC, CG, CNM, CS, S, SD
- Public: PF, PUB
- Parklands/Open Space: OS-N, OS-P, Parklands
- Resource Management: RM



This map is representational only. Data are not survey precise.



S-5b: Land Use in Fire Hazard Zones – Rural



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Sources: LRA zones: CAL FIRE "FHSZLRA25 Phase2 v1", adopted by ACFD 5/13/25. SRA: CAL FIRE "FHSZ_SRA_LRA_Combined" accessed 8/21/25. All other data: Alameda County digital.

S-5c: SB 99 and County Identified Vulnerable Developments

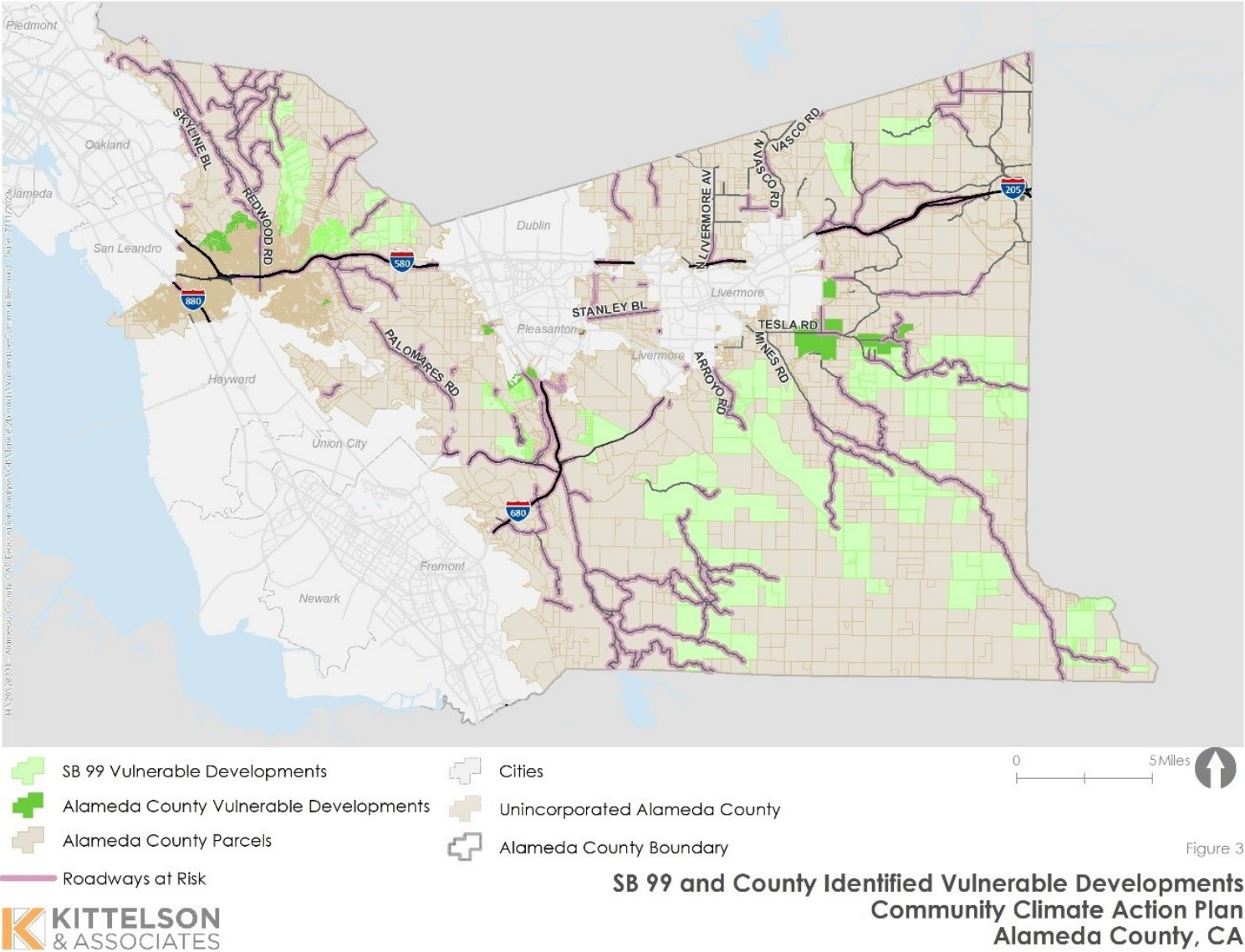


Figure 3

3.3. Goals, Policies and Implementing Actions

Goal 2. To reduce the risk of urban and wildland fire hazards.

Policies

- P1. Urban and rural development and intensive recreational facilities should be discouraged in hill open space areas lacking an adequate water supply or nearby available fire protection facilities. ~~(Source: Seismic Safety and Safety Element, pg. 7)~~
- P2. Hill area development, and particularly that adjoining heavily vegetated open space area, should incorporate careful site design, use of fire retardant building materials and landscaping, development and maintenance of fuel breaks and vegetation management programs, and provisions to limit public access to open space areas in order to minimize wildland fire hazards. ~~(Source: Seismic Safety and Safety Element, pg. 7)~~
- P3. Development should generally be discouraged in areas of high wildland fire hazard where vegetation management programs, including the creation and maintenance of fuel breaks to separate urban uses would result in unacceptable impacts on open space, scenic and ecological conditions. ~~(Source: Seismic Safety and Safety Element, pg. 7)~~
- P4. All urban and rural development, existing and proposed, should be provided with adequate water supply and fire protection facilities and services. Facilities serving hill area development should be adequate to provide both structural and wildland fire protection. The primary responsibility falls upon the owner and the developer. ~~(Source: Seismic Safety and Safety Element, pg. 8)~~
- P5. Structures, features of structures, or uses which present an unacceptable risk of fire should be brought into conformance with applicable fire safety standards. ~~(Source: Seismic Safety and Safety Element, pg. 8)~~
- P6. Plan new public and private buildings to minimize the risk of fires and identify measures to reduce fire hazards to persons and property in all existing development. ~~(Source: Castro Valley Plan, pg. 9-13)~~
- ~~P7. The County shall adhere to the provisions of the Alameda County Fire Protection Master Plan and Fire Hazard Mitigation Plan. (Source: ECAP, pg. 76)~~
- P8. The County shall limit residential development to very low densities in high fire hazard zones identified in Figure 5. ~~(Source: ECAP, pg. 76)~~

- P9. The County shall require all new homes in rural residential areas that are located in “high” and “very high” fire hazard areas to be sited and designed to minimize risks to life and property. (Source: ECAP, pg. 76)
- P10. The County shall require the design of adequate infrastructure if a new development is located in a state responsibility area (SRA) or in a very high fire hazard severity zone, including safe access for emergency response vehicles, visible street signs, and water supplies for structural fire suppression. (Source: Government Code Section 65302 (g)(3)(C))
- P11. The County shall require the use of fire resistant building materials, fire resistant landscaping and, and adequate clearance around structures in “high” and “very high” fire hazard areas. (Source: ECAP, pg. 76)
- P12. The County shall require that open space within developed areas be designed and maintained to minimize fire hazards and ensure compatibility between development and any significant biological resources. (Source: ECAP, pg. 19)
- P13. The County shall work cooperatively with public agencies with responsibility for fire protection and refer development applications to the Alameda County Fire Department, or the local Fire District for review and recommendation. (Source: Government Code Section 65302 (g)(3)(C)) and ECAP, pg. 76)
- P14. The County shall support fire service agencies in maintaining and improving existing Insurance Safety Organization (ISO) ratings. (Source: ECAP, pg. 76)
- P15. The County shall protect the community from the unreasonable risk of wildfires. (Source: Government Code Section 65302(g)(3)(B))
- P16. The County shall enforce the Subdivision Map Act for development located within a State Responsibility Area (SRA) or a very high fire hazard severity zone. (Source: Government Code Section 66474.02)
- P17. The County shall avoid or minimize the wildfire hazards associated with new uses of land. (Source: Government Code Section 65302 (g)(3)(C))
- P18. The County shall locate, when feasible, new essential public facilities, including, but not limited to, hospitals and health care facilities, emergency shelters, emergency command centers, and emergency communications facilities, outside of high fire risk areas, or identify construction methods or other methods to minimize damage if these facilities are located in a state

responsibility area (SRA) or very high fire hazard severity zone. (Source: Government Code Section 65302 (g)(3)(C))

- P19. The County shall require new residential development to include at least two emergency evacuation routes.
- P20. The County shall require development to provide additional access roads where feasible to provide for safe access of emergency equipment and civilian evacuation concurrently. The width, surface, grade, radius, turnarounds, turnouts, bridge construction, and lengths of fire apparatus access roads shall meet the requirements of the State and existing County requirements.
- P21. The County shall advise, and where appropriate, require all new developments to help eliminate impediments to evacuation within existing community plan areas, where limited ingress/egress conditions could impede evacuation events.
- P22. The County shall implement warning systems and evacuation plans for developed areas located within known hazard areas, and periodically analyze the capacity, safety, and viability of the County's evacuation routes under a range of emergency scenarios during updates to the County's Emergency Operations Plan.
- P23. The County shall develop, implement, and maintain an effective evacuation program for areas of risk in the event of a natural or human-caused disaster.
- P24. The County shall coordinate with State and Federal landowners regarding joint use and access agreements for roadways located on state and federal lands that can be used for evacuation purposes.
- P25. The County shall support the creation of resilience hubs and other place-based resilience resources to provide community members with essential services before, during, and after wildfire related hazard events, partnering with community groups and residents of frontline communities to establish location, programming and activation of resource hubs and other place-based resilience resources.
- P26. In fire-prone communities with limited egress, the County shall explore options to minimize fire risk and threats to evacuation routes that may be posed by overgrown vegetation and other potential barriers along roadways.
- P27. The County shall encourage agencies that conduct vegetation management fire safety inspections to begin inspections as early as possible each year in order to ensure timely inspection of all impacted properties prior to peak fire season.

- P28. The County shall explore options for requiring utility companies to remove abandoned cable from utility poles in public rights-of-way.
- P29. The County shall identify and address gaps in existing fire prevention inspection programs.
- P30. The County shall ensure that development standards in applicable areas meet or exceed Title 14 CCR through continued enforcement of Title 14 specifically, or as referenced in CCR Title 24 Part 9 (current California Fire Code, Chapter 49), as adopted by Alameda County and other applicable fire districts.
- P31. The County shall ensure that all new residential development permitted in the VHFHSZ will meet or exceed the requirements of Title 14 through continued enforcement of Title 14 specifically, or as referenced in CCR Title 24 Part 9 (2022 California Fire Code, Chapter 49) and 2022 California Residential Code R337 and ~~California Building Code-Part 7 California Wildland-Urban Interface Code~~Chapter 7a, as adopted by Alameda County and other applicable fire districts.
- P32. The County shall ensure that fire safe design continues to be incorporated into future development requirements in applicable areas through continued enforcement of Title 14 specifically, or as referenced in CCR Title 24 Part 9 (2022 California Fire Code), Chapter 49 and 2022 California Residential Code R337 and ~~California Building Code-Part 7 California Wildland-Urban Interface Code~~Chapter 7a, as adopted by Alameda County and other applicable fire districts.
- P33. The County shall work with owners of existing non-conforming development to move toward conformance with contemporary fire safe standards, including road standards and vegetative hazards.
- P34. The County shall develop a policy stating, “the County will evaluate redevelopment standards after a large fire or disaster, where a State disaster declaration was issued.”
- P35. The County shall continue to review new development in SRAs or VHFHSZs to ensure that fuel around homes is in compliance with PRC 4291 and CCR Title 24 Part 9 (current California Fire Code, Chapter 49) as adopted by the State of California and local fire agencies.
- P36. The County shall ensure that fire protection plans are required for new development in VHFHSZs through continued enforcement of Title 14 specifically, or as referenced in CCR Title 24 Part 9 (current California Fire Code, Chapter 49), as adopted by Alameda County and other applicable fire districts.

- P37. The County shall seek funding and work with Fire Safe Councils, Community Organizations, County Road Dept. and other local agencies to provide long term maintenance of fire breaks and public road clearance.
- P38. The County shall require private road clearances for emergency vehicle access.
- P39. The County shall ensure that minimum standards for evacuation of residential areas in VHFHSZs are defined through continued enforcement of Title 14 specifically, or as referenced in CCR Title 24 Part 9 (current California Fire Code, Chapter 49), as adopted by Alameda County and other applicable fire districts.
- P40. The County shall identify possible mitigation measures for residential developments with limited egress consistent with Senate Bill 99.
- P41. The County shall continue to promote defensible space and evacuation planning with a focus on reaching at-risk populations.
- P42. The County shall work with local water companies to ensure future water supply needs are met.
- P43. The County shall work with local water companies to ensure maintenance and long-term integrity of water supply.
- P44. The County shall identify adequate infrastructure for new development related to evacuation and emergency vehicle access through continued enforcement of development standards under Title 14, CCR, division 1.5, chapter 7, subchapter 2, articles 1-5 (commencing with section 1270) (SRA Fire Safe Regulations) and title 14, CCR, division 1.5, chapter 7, subchapter 3, article 3 (commencing with section 1299.01) (Fire Hazard Reduction Around Buildings and Structures Regulations) in SRA, and CCR Title 24 Part 9 (2022 California Fire Code, Chapter 49) in LRA.
- P45. The County shall require visible home and street addressing and signage through continued enforcement of development standards under Title 14, CCR, division 1.5, chapter 7, subchapter 2, articles 1-5 (commencing with section 1270) (SRA Fire Safe Regulations) and title 14, CCR, division 1.5, chapter 7, subchapter 3, article 3 (commencing with section 1299.01) (Fire Hazard Reduction Around Buildings and Structures Regulations) in SRA, and CCR Title 24 Part 9 (2022 California Fire Code, Chapter 49) in LRA.

Actions

- A1. Limit or prohibit development and activities in areas lacking adequate water and firefighting facilities. (Source: Seismic Safety and Safety Element, pg. 7)

- A2. Enforce design standards and guidelines through the site development, planned development, and subdivision review process. (~~Source: Seismic Safety and Safety Element, pg. 7~~)
- A3. Require environmental impact assessment for development proposals in areas of severe fire hazard. (~~Source: Seismic Safety and Safety Element, pg. 8~~)
- A4. Enforce, and as required, revise development standards. (~~Source: Seismic Safety and Safety Element, pg. 8~~)
- A5. Enforce applicable provisions of the Alameda County Subdivision and Building Ordinances.
- A6. Encourage fire safety public education and information programs, offered in commonly-spoken languages. (~~Source: Seismic Safety and Safety Element, pg. 8~~)
- A7. Maintain a current map of areas subject to wildland fires.
- A8. Establish clearly in County zoning and other ordinances that the Fire Department has the authority to recommend denial or modification to proposed development projects, particularly for projects proposed within “high” or “very high” fire zone areas as identified in Figure 5, Fire Hazards, to reduce the risk of bodily harm, loss of life, or severe property damage and environmental degradation. (Source: Castro Valley Plan, pg. 10-7)
- A9. Establish clearly in County zoning and other ordinances that the Fire Department may require the use of appropriate fire resistant building materials, installation of fire sprinklers, home hardening, and/or vegetation management, and that such requirements shall be based on a property’s access, slope, water pressure, ~~and~~ proximity to wildland areas, and applicability of Part 7 of the California Wildland-Urban Interface Code. Such requirements shall apply particularly to projects proposed within Very High Fire Zone Areas as identified in Figure 5, Fire Hazards, but may also apply to other properties where access for emergency vehicles does not fully comply with adopted standards. (Source: Castro Valley Plan, pg. 10-7)
- A10. Establish an interdepartmental review process for proposed projects where Fire, Public Works, Planning, and other County Departments consult and establish reasonable and consistent requirements for streets, driveways, and emergency access prior to zoning approval. (Source: Castro Valley Plan, pg. 10-7)
- A11. Revise the review process for any project that proposes an increase in density so that any inadequacy of water pressure for fire hydrants and fire flows for fire suppression purposes is identified early in the development review process. Also identify if the roadway serving the project is deficient in terms of access for emergency vehicles. Identify any access improvements

that may be required, for example roadway widening along property frontage, or additional off-street parking. (Source: Castro Valley Plan, pg. 10-8)

A12. Upgrade and standardize fire hydrants to accept equipment from neighboring fire districts so that the County can accept assistance through a mutual aid request during an emergency. (Source: Castro Valley Plan, pg. 10-8)

A13. Enforce the requirement that Home Owners' Associations in Planned Unit Development areas are responsible for vegetation management by establishing a regular review schedule for areas subject to this requirement. (Source: Castro Valley Plan, pg. 10-8)

A14. Revise the County's Integrated Vegetation Management Program to require private property owners to maintain the vegetation on their property in a condition that will not contribute to the spread of a fire. Requirements for private property owners could include, but need not be limited to, the following:

- Maintain a 30-foot defensible space around all buildings and structures;
- Remove all portions of trees within 10 feet of chimneys and stovepipe outlets;
- Remove materials or plants that may act as a fuel or a conveyance of fire (such as dead/dying wood on trees adjacent to/overhanging structures, leaves, pine needles, etc. on rooftops or elsewhere on the property); and
- Install spark arrester in chimney and or stovepipe outlets. (Source: Castro Valley Plan, pg. 10-9)

A15. Consider establishing and funding an enforcement district for fire hazard areas and wildland, intermix and interface areas; and establish an inspection period to be conducted annually for properties located in these areas. Mail notices to the residents in these areas notifying them of the inspection period, listing the standards for vegetation management on their properties, and suggesting tips for compliance. Additional funding would be required, such as the formation of an assessment district or other means. (Source: Castro Valley Plan, pg. 10-9)

A16. In hillside areas where street widths are substantially below the minimum 20-foot width standard required for emergency access, one or more of the following requirements should be imposed to ensure adequate emergency access:

- Sprinklers;
- Turnouts along the paved roadway;

- Additional on-site parking;
- Increased roadway width along the front of the property; or
- Parking Restrictions. (Source: Castro Valley Plan, pg. 10-10)

A17. Establish consistent standards for private streets depending on the number of units that the street will serve the number of required parking spaces per unit, and reasonable access requirements and operational needs of emergency access vehicles and garbage trucks.

Standards should include:

- Minimum paved roadway width requirements (i.e., 20 feet for roads serving five or more units or when part of required fire apparatus access, and 12 feet for roads serving between two and five units that is not part of required fire apparatus access);
- Turnarounds;
- Landscaping;
- Red curbs and signage for no parking zones;
- Sidewalks; and
- Parking standards. (Source: Castro Valley Plan, pg. 10-10)

A18. ~~The County shall~~ Prepare a comprehensive wildland fire prevention program including fuelbreaks, brush management, controlled burning, and access for fire suppression equipment. (Source: ECAP, pg. 77)

A19. ~~The County shall~~ Prepare a disaster response plan for buildings exceeding 3 stories (or 30 feet, whichever is less), public assembly facilities, and facilities housing dependent populations. (Source: ECAP, pg. 77)

A20. ~~The County shall~~ Develop wildland fire regulations including site criteria building setbacks, construction standards, minimum road widths, maximum road grades, and evacuation routes. (Source: ECAP, pg. 76)

A21. ~~The County shall~~ Adopt by ordinance the "Wildland Fire Safety Requirements" contained in the Alameda County Fire Protection Master Plan. (Source: ECAP, pg. 76)

A22. ~~The County shall~~ Work with the California Department of Forestry and Fire Protection to designate "very high fire hazard severity zones" in conformance with AB 337 (1992) (Government Code Section 51178). The County shall ensure that all zones designated as such meet the standards and requirements contained in this legislation. (Source: ECAP, pg. 77)

A23. ~~The County shall~~ Make the necessary findings required by the Subdivision Map Act for development located within a State Responsibility Area (SRA) or a very high fire hazard severity zone. (Source: Government Code Section 66474.02)

4.0 FLOOD HAZARDS

4.1. Flood Related Hazards

A flood plain is any area that is susceptible to being inundated by water from any source. Mostly, this is the area adjacent to a river, creek, lake, stream, or other waterway that is subject to flooding when there is a significant run-off event. When development brings pavement, roofs, and other hard surfaces, rainfall percolates less into the ground. "Uncontrolled" development can cause increases in flooding, but Alameda County's current development regulations will typically require on-site detention of runoff from a 100-year storm."²⁶ Runoff to the nearby river or creek increases, and the development within the flood plain can be subject to flooding. Hazards often are the result of above average rainfall over a short duration, resulting in increased runoff and flooding along area creeks and areas with poor drainage. Flood prone areas are generally described as areas that have a one in a hundred (or 1%) chance of being inundated in any given year. Areas potentially subject to flooding from a 100-year event include various low-lying areas and areas adjacent to creek channels as mapped by the Federal Emergency Management Agency (FEMA). The County Floodplain Management Ordinance recognizes the following types of floodplains²⁷:

- The Special Flood Hazard Areas (SFHA's) shown on the FEMA Flood Insurance Rate Map (FIRM).
- Any outward adjustment of the SFHA's caused by errors in mapping.
- Any area outside of a SFHA or an adjusted SFHA that has actually been flooded.
- The County floodplain regulations are based upon the "design flood," which is always more severe (by a foot or more in depth) than the 100-year or base flood mapped by FEMA. Alameda County will apply the floodplain design regulations to any area theoretically wetted by the design flood.

²⁶ Text derived from comments received from John Rogers, Alameda County Public Works Agency, Land Development Division, on October 2, 2013,

²⁷ Ibid.

- The County can also apply setbacks to certain floodplain areas where it establishes building limit lines outside of the floodplain.

In conjunction with FEMA's effort, flood elevations and limits have been determined for the affected areas.

Flooding is a hazard that has adversely affected Alameda County in the past, and floods are likely to increase in frequency and intensity as a result of climate change. The Local Hazard Mitigation Plan states that there are four primary types of flooding that occur within Alameda County: coastal flooding, riverine flooding, localized flooding, and flash flooding. Alameda County's extreme precipitation events (2-day rainfall total) threshold is 0.9 inches. Under moderate and high possible greenhouse gas scenarios, the county is projected to experience between 2.8 and 14 extreme precipitation events per year. The county may experience an increase in the frequency and intensity of flood events as a result of these events. Western parts of San Lorenzo will directly experience sea level rise and associated flooding. The populations that will likely be most directly affected by extreme precipitation and flooding in the county are those that reside in the county's 100- and 500-year floodplains. Over 8,000 unincorporated county residents reside in the 100-year floodplain, and 7,500 reside in the 500-year floodplain. In addition, both residential properties and much of the county's critical infrastructure are at direct risk from flooding.

A map of flood hazards is provided in Figure S-6. Figure S-7 is a map of 100-, 200- and 500-year floodplains based upon best available data from the Department of Water Resources (DWR). Figure S-7 shows not only those areas within the FEMA designated 100- and 500-year floodplains, but also includes additional data from the DWR and United States Army Corp of Engineers (USACE).

Flooding occurring within the boundaries of the Planning Area is typically caused by heavy rainfall and runoff volumes that exceed the capacity of existing storm drainage and flood control systems. The following watercourses pose a potential flooding risk in unincorporated Alameda County:

- | | | |
|----------------------------------|-------------------------|-----------------------------------|
| ▪ Alameda Creek | ▪ Bockman Canal | ▪ Estudillo Canal |
| ▪ Altamont Creek | ▪ Castro Creek (Line J) | ▪ Palomares Creek |
| ▪ Arroyo De La Laguna | ▪ Castro Creek (Line I) | ▪ San Antonio Reservoir and Creek |
| ▪ Arroyo Del Valle | ▪ Cayetano Creek | ▪ San Lorenzo Creek |
| ▪ Arroyo Las Positas | ▪ Chabot Creek (Line F) | ▪ Sinbad Creek |
| ▪ Arroyo Las Positas (relocated) | ▪ Chabot Creek (Line G) | ▪ Sulphur Creek |
| ▪ Arroyo Mocho | ▪ Collier Canyon Creek | ▪ Tassajara Creek |
| ▪ Arroyo Seco | ▪ Crow Creek | ▪ Line N, San Lorenzo |
| | ▪ Cull Creek | |

Throughout the urbanized parts of the County, flood hazards have been greatly reduced through the efforts of the Alameda County Flood Control and Water Conservation District (ACFCWCD) and the Zone 7 Water Agency. Each of these entities designs, constructs, and maintains flood protection facilities to meet existing and projected community needs. Historically, systems have been adequate for most

situations, but may require additional evaluation in climate change scenarios. ~~Their systems are adequate for most situations.~~

Historical data on flooding, areas that are vulnerable to flooding after wildfires, and information pertaining to sites that have been repeatedly damaged by flooding is available in the Alameda County Local Multi-Hazard Mitigation Plan.

4.2. Federal, State and Local Entities Responsible for Flood Protection

Federal Emergency Management Agency (FEMA)

FEMA is the Federal agency that oversees floodplains and manages the national flood insurance program. FEMA prepares Flood Insurance Rate Maps (FIRM) for communities participating in the Federal flood insurance program. The FIRM maps indicate the regulatory floodplain to assist communities with land use and floodplain management decisions so that the requirements of the National Flood Insurance Program (NFIP) are met in the event of damaging floods. Alameda County participates in the Federal flood insurance program and must meet FEMA standards for flood protection facilities and floodplain management.

U.S. Army Corps of Engineers (USACE)

The USACE is the Federal agency that studies, constructs, and operates regional-scale flood protection systems in partnership with State and local agencies. Specific agreements between the USACE and its State and local partners used to define shared financial responsibilities and regulations. The Sacramento District of the USACE is preparing a Delta Islands and Levees feasibility Study. According to the USACE, “The Delta Islands and Levees Feasibility Study (Delta Study) is the Corps’ mechanism to participate in a cost-shared solution to address ecosystem restoration, flood risk management, and related water resources in the Delta and Suisun Marsh area.”²⁸ The study area includes a portion of the Mountain House area of Alameda County.

California Department of Water Resources, Division of Floodplain Management (DWR)

DWR is the State agency that studies, constructs, and operates regional-scale flood protection systems, in partnership with Federal and local agencies. DWR also provides technical, financial, and emergency response assistance to local agencies related to flooding.

²⁸ A fact sheet on the Delta Islands and Levees Feasibility Study may be obtained here: http://www.spk.usace.army.mil/Portals/12/documents/civil_works/Delta/DILFS/FactSheet_DeltaStudy_130131.pdf.

Central Valley Flood Protection Board (formerly Reclamation Board)

In 2007, Assembly Bill 5 (AB 5) was adopted, which renamed the Reclamation Board as the Central Valley Flood Protection Board (CVFPB). AB 5 reconfigured the membership of the Board, and required the CVFPB to be independent of DWR. Senate Bill 17 (SB 17) was also adopted in 2007 and contained similar provisions to AB 5, renaming and reorganizing the Reclamation Board as the CVFPB and directing DWR to prepare and the CVFPB to adopt a State Plan of Flood Control. The mission of the CVFPB is to control flooding along the Sacramento and San Joaquin Rivers in cooperation with various agencies and to maintain the integrity of the existing flood control system and designated floodways via authority over encroachment permits.

California Building Standards Commission (BSC)

The BSC's mission is to develop practical and sensible building standards and administrative regulations that implement or enforce those standards. All of the basic floodplain design standards for buildings and structures are now included in the various California building standards (i.e. Building Code, Residential Code, and Plumbing Code).

Unincorporated Alameda County

The Planning Department and the Alameda County Public Works Agency (ACPWA), Building Inspections Division oversee land use and development in unincorporated Alameda County.

For flood control and protection purposes, Alameda County is divided into ten zones that roughly correspond to major watershed boundaries²⁹. The Alameda County Flood Control & Water Conservation District (ACFCWCD), a dependent special district of the Alameda County Board of Supervisors, provides flood protection for Zones 2, 2A, 3A, 4, 5, 6, 9, 12, and 13 in Western Alameda County, including the urban unincorporated communities of Ashland, Castro Valley, Cherryland, Fairview, Hayward Acres, and San Lorenzo. ACFCWCD was created in 1949 when the state legislature passed [Act 205 of the California Uncodified Water Code](#)³⁰. Act 205 defines ACFCWCD's role in providing for the control and conservation of flood and storm waters. Under Act 205, ACFCWCD is authorized to protect all waterways, watersheds, harbors, and public highways, in addition to lives and property, from damage or destruction caused by flood and storm waters throughout its jurisdiction. Through ACPWA, ACFCWCD administers flood control programs and services including the planning and delivery of projects, and maintenance and operations of more than 500 miles of flood control facilities in western Alameda County³¹.

Zone 7 Water Agency ("Zone 7"), shortened from Alameda County Flood Control and Water Conservation District, Zone 7, is responsible for providing flood control and protection services in eastern Alameda County, including to the unincorporated community of Sunol. Zone 7's charge and regional flood

²⁹ <https://acffloodcontrol.org/get-involved/get-involved-neighborhood-zones/>.

³⁰ <https://acffloodcontrol.org/wp-content/uploads/act205.pdf>

³¹ <https://acffloodcontrol.org/who-we-are/>

management authority were also established by Act 205, and in 1957, residents of the Livermore-Amador Valley voted to place water management, including flood protection, under local control through the locally elected Zone 7 Board of Directors. A 2012 proposal (SB 1337) to make Zone 7 fully independent from Alameda County did not move forward, however, and Zone 7 remains a dependent special district of the Alameda County Board of Supervisors under Act 205. Zone 7 continues to describe its status as a dependent district with its own elected board for matters unique to Zone 7³². Zone 7's 2022 Flood Management Plan (FMP), Phase 1³³ (section 2.7), describes the activities Zone 7 undertakes to carry out its flood management charge, including managing a 37-mile flood protection system in the Livermore-Amador Valley area. While there are over 200 miles of streams and tributaries within Zone 7's jurisdiction, Zone 7 maintains only the flood control channel system where Zone 7 has fee title, easement, or agreement; for areas not owned by Zone 7, the channels are owned either privately or by other public agencies, with the owner entity bearing sole responsibility for maintenance (FMP Section 2.6).

The map in Figure S-9 illustrates the jurisdictional boundaries of Alameda County's flood control agencies.

Within Alameda County, the Alameda County Flood Control and Water Conservation District (ACFCWCD), the Zone 7 Water Agency, and Public Works Agency provide regulatory guidance and oversee the flood control system within unincorporated Alameda County. In addition, the Planning Department and PWA, Building Inspections Division oversees land use and development.

4.3. Assembly Bill 162 (Wolk)

Pursuant to Assembly Bill (AB) 162 (2007), the California Department of Water Resources (DWR) and Central Valley Flood Protection Board (CVFPB) has prepared and adopted a Central Valley Flood Protection Plan (CVFPP). The northeast corner of Alameda County is included within the Systemwide Planning Area (SPA) of the CVFPP; therefore, the policies contained therein shall apply to those lands within the plan's boundaries. The SPA includes lands subject to flooding under the current facilities and operation of the Sacramento-San Joaquin River Flood Management System (California Water Code Sections 9611, 9614(d,e)). Figure S-8 is a map of the SPA as provided in the CVFPP. Plan documents may be accessed here: <https://water.ca.gov/Programs/Flood-Management/Flood-Planning-and-Studies/Central-Valley-Flood-Protection-Plan>.

AB 162 also establishes certain flood protection requirements for local land use decision-making based on the CVFPP. This law sets a higher standard for flood protection for the Sacramento-San Joaquin Valley area, which covers the entire Delta region. It sets an urban level of flood protection necessary to

³² <https://www.zone7waterca.gov/post/organization>

³³ [Zone 7 Water Agency Flood Management Plan Phase I, August 2022: https://www.zone7waterca.gov/post/flood-management-plan-1](https://www.zone7waterca.gov/post/flood-management-plan-1)

withstand a 1 in 200 chance of occurring in any given year (200-year flood) for areas developed or planned to have a population of at least 10,000. For areas with a population less than 10,000 residents, no new developments may be approved unless the area has made “adequate progress” in achieving 100-year flood protection.

Upon adoption of the CVFPP, Alameda County must incorporate CVFPP measures into its General Plan and Zoning Ordinance. On the effective date of those amendments, the County is prohibited from entering into a development agreement or approving a subdivision map within an identified flood hazard zone unless certain findings are made with substantial evidence. The County will include appropriate CVFPP measures within the comprehensive Zoning Ordinance update.

All of the land identified under the CVFPP lies within the boundaries of the East County Area Plan (ECAP) as amended by Measure D. Under ECAP, the lands have the following general plan designations, Large Parcel Agriculture, Water Management, Parklands, and Major Public Facilities. The Major Public Facilities designation is associated with the California Aqueduct and Clifton Court Forebay. The Parklands designation includes the Bethany Reservoir. The Water Management designation is associated with portions of the California Aqueduct. The remaining land has the Large Parcel Agriculture designation.

ECAP policies greatly limit development within these areas. Privately owned parcels must be a minimum of 100 acres in size. They are also subject to a maximum floor area ratio of 0.01, and residential and residential accessory structures shall not exceed 12,000 square feet in floor area.

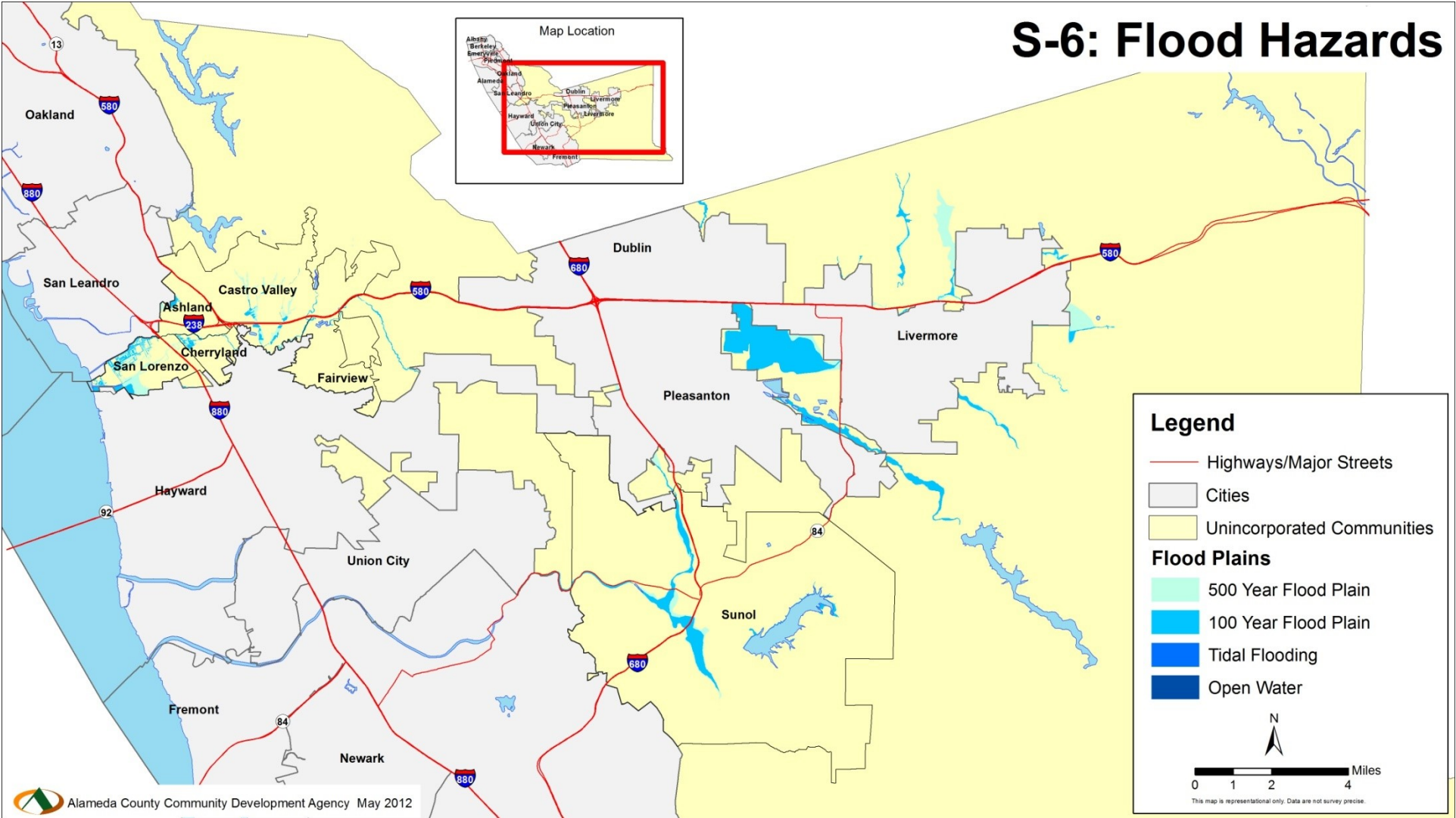
4.4. Senate Bill 5 (Machado)

This bill requires each city and county within the Sacramento-San Joaquin Valley, within 24 months of the adoption of the CVFPP by the CVFPB (not later than July 1, 2012) is to amend its general plan to include data and analysis contained in that flood protection plan; goals and policies for the protection of lives and property that will reduce the risk of flood damage; and related feasible implementation measures. Each city and county, within 36 months of the adoption of the flood protection plan, but not more than 12 months after the amendment of the general plan, is to amend its zoning ordinance so that it is consistent with the general plan, as amended.

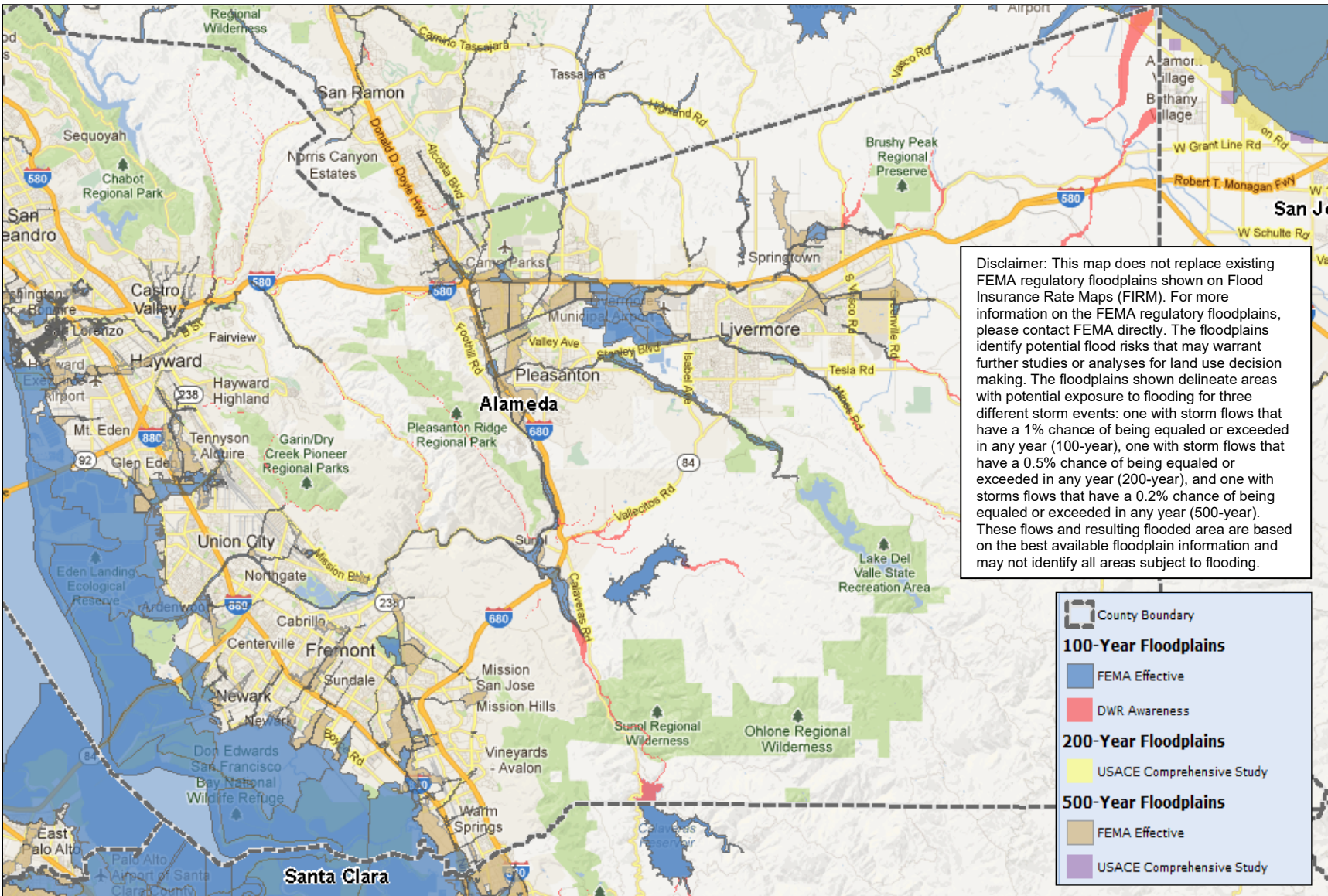
In addition, the bill mandates that DWR develop, for adoption and approval by the California Building Standards Commission, updated requirements to the California Building Standards Code for construction in areas protected by facilities of the CVFPP, where levels are anticipated to exceed 3 feet for the 200-year event.

Senate Bill 5 also prohibits cities and counties from entering into a development agreement for any property that is located within a flood hazard zone unless the city or county finds, based upon substantial evidence in the record, that the facilities of the State Plan of Flood Control or other flood management facilities protect the property to the urban level of flood protection in urban and urbanizing areas or the standard of flood protection of the FEMA National Flood Insurance Program (NFIP) in non-urbanized areas. These requirements are codified in Government Code Sections 65865.5, 65962, and 66474.5.

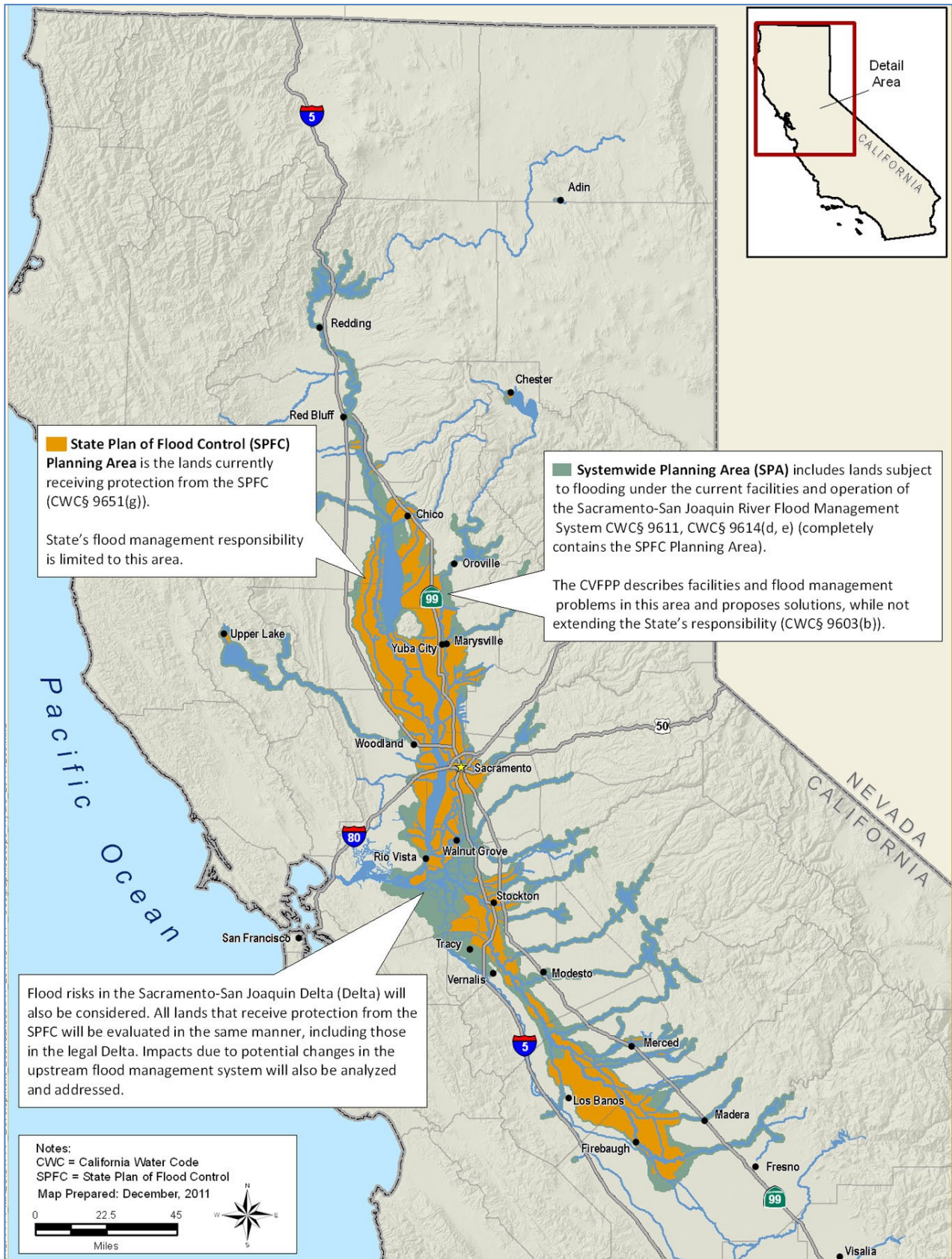
S-6: Flood Hazards



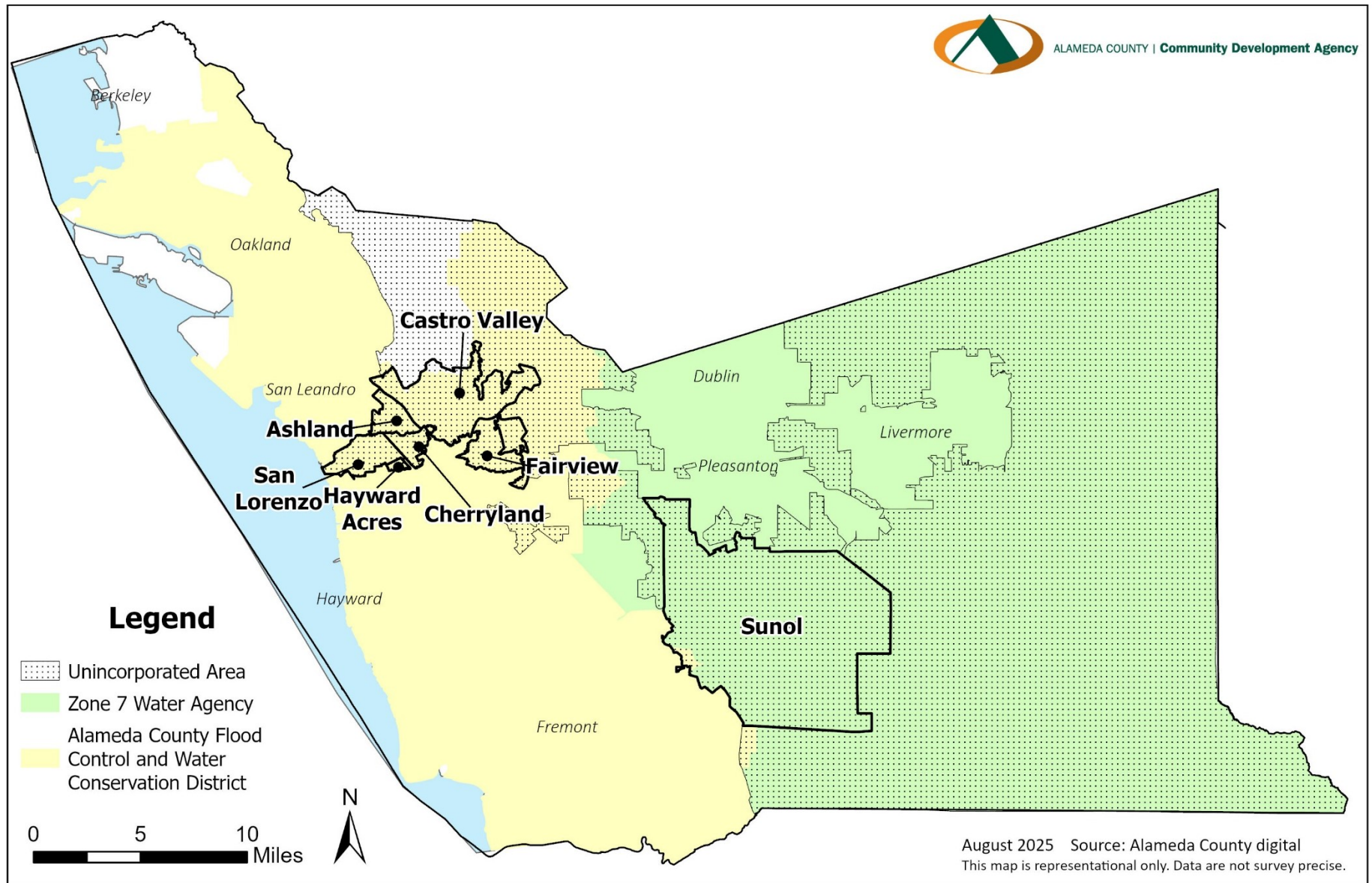
S-7: Best Available Floodplain Maps



S-9 S-8: Central Valley Flood Protection Plan Map



S-9: Flood Control Agency Jurisdictional Boundaries



4.5. Dam Inundation

In accordance with State law, the County has also evaluated possible flood risks arising from the failure of dams or reservoirs. Within the state of California, oversight of dams falls to the Department of Water Resources, Division of Safety of Dams (DOSD). Existing dams under DOSD jurisdiction are inspected annually to ensure adequate maintenance and to direct the dam owner to correct any known deficiencies. Regular inspections and routine maintenance of the dams substantially reduces the risk of catastrophic failure. Figure S-9 S-10 highlights those areas that are within the Planning Area that might be affected by flooding in the event of a dam or reservoir failure. The depth of inundation would vary from zero in upland areas to many feet on low-lying areas and in creek channels. There are no State or local restrictions for development within dam failure inundation areas; however, the Emergency Services Act (Government Code Section 8589.5) requires that dam inundation maps be prepared to identify flood risk and that local jurisdictions prepare evacuation procedures in the event of a catastrophic dam failure.

The following table, Table S-5, lists all of the dams within or adjacent to the planning area.

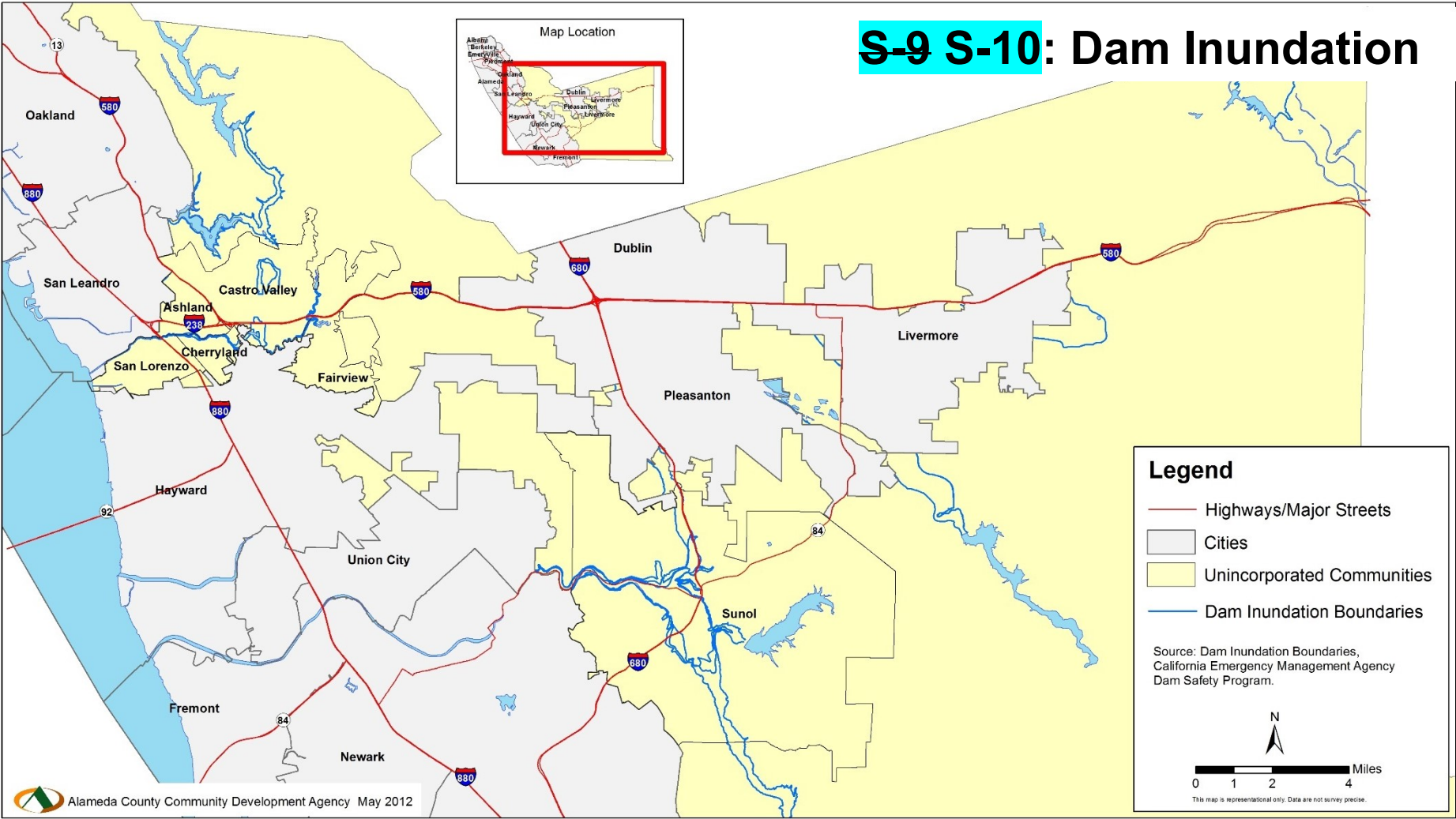
Table S-5: Dams within or Adjacent to the Planning Area³⁴

Name	Owner	Type	Capacity (acre/feet)
Almond	EBMUD	Earth	20
Bethany Forebay	CA Department of Water Resources (CADWR)	Earth	5,250
<u>Calaveras</u>	<u>City/County of SF</u>	<u>Hydraulic Fill</u>	<u>100,000</u>
Chabot	EBMUD	Hydraulic Fill	10,281
Cull Creek	ACFCWCD	Earth	310
Del Valle	CADWR	Earth	77,100
James H. Turner	City/County of SF	Earth	50,500
New Upper San Leandro	EBMUD	Earth	42,000
Patterson (1-062)	CADWR	Earth	98
San Lorenzo Creek	ACFCWCD	Earth	380
South	EBMUD	Earth	156
Ward Creek	ACFCWCD	Earth	130

In 2011, San Francisco Public Utilities Commission began construction on a replacement for the Calaveras Dam downstream from its current location. This project may result in a change to the dam inundation areas as indicated on the map below. The County will continue to monitor the project and, if necessary, will revise its dam inundation map.

³⁴ CA Department of Water Resources, Division of Safety of Dams, [Complete Listing of Dams within the Jurisdiction of the State of California in Alphabetically order by name of the Dam.](#)

S-9 S-10: Dam Inundation



4.6. Development Standards for Areas at Risk of Flooding

The following is a summary of development guidelines and regulations pertaining to flood hazards.

Federal Emergency Management Agency (FEMA), National Flood Insurance Program (NFIP)

The County in conjunction with other local jurisdictions participates in the FEMA sponsored National Flood Insurance Program (NFIP). The NFIP provides flood insurance to businesses and individuals in known flood hazard areas. As a participant, the County must comply with FEMA's standards for the regulation of development in special flood hazard areas and conduct floodplain management activities not only to reduce or prevent the loss of life or property, but also preserve and protect the floodplain.

The California Environmental Quality Act (CEQA)

The Act includes several provisions that address flood prevention and loss caused by floods. Through the environmental review process authorized under the Act a project must declare if it would:

- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff (e.g., due to increased impervious surfaces) in a manner which would result in flooding on- or off-site (i.e. within a watershed);
- Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems due to changes in runoff flow rates or volumes;
- Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map;
- Place within a 100-year flood hazard area structures which would impede or redirect flood flows; and
- Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam

Projects that would result in one or more of these environmental effects would be required to consider an alternative to the particular project or to provide appropriate mitigations that either reduce or eliminate these hazards.

The Alameda County General Ordinance Code

The Alameda County Ordinance Code addresses flood hazard mitigation in the following documents:

- Flood Control and Water Conservation District Use Regulations (Chapter 6.36)
- The Watercourse Protection Ordinance (Chapter 13.12)
- Section 15.08.230 of the Building Ordinance
- Section 15.03.300 of the Building Ordinance
- Grading Erosion and Sediment Control Ordinance (Chapter 15.36)

- Floodplain Management (Chapter 15.40)
- Design Requirements (Chapter 16.16)

New development within a floodplain is generally required to be at least one foot above the 100-year flood levels, or may be restricted completely within any designated floodway (i.e. the central portion of certain 100 year flows).

These documents are periodically reviewed and updated to ensure consistency with State law and/or NFIP requirements.

4.7. Goals, Policies and Implementing Actions

Goal 3. To reduce hazards related to flooding and inundation.

Policies

- P1. “Within flood hazard areas, all new construction of buildings, structures, and portions of buildings and structures, including substantial improvement and restoration of substantial damage to buildings and structures, shall be designed and constructed to resist the effects of flood hazards and flood loads.”
- P2. The County shall control surface runoff from new development ~~shall be controlled~~ by on-site measures including, but not limited to structural controls and restrictions regarding changes in topography, removal of vegetation, creation of impervious surfaces, and periods of construction such that the need for off-site flood and drainage control improvements is minimized and such that runoff from development will not result in downstream flood hazards. (~~Source: Seismic Safety and Safety Element, pg. 8~~)
- P3. The County shall locate structures ~~shall generally be located~~ away from shoreline areas subject to tsunami inundation, except where they can be feasibly designed to withstand the effects of inundation. (Source: Seismic Safety and Safety Element, pg. 8)
- P4. The County shall only allow development ~~shall only be allowed~~ on lands within the 100-year flood zone if it will not:
- Create danger to life and property due to increased flood heights or velocities caused by excavation, fill, roads and intended use.
 - Impede access of emergency vehicles during a flood.

- Create a safety hazard due to the expected heights, velocity, duration, rate of rise and sediment transport of the flood waters at the site.
 - Exacerbate costs of providing governmental services during and after flooding, including increased maintenance and repair of public utilities and facilities.
 - Interfere with the existing water flow capacity of the floodway.
 - Substantially increase erosion and/or sedimentation.
 - Contribute to the deterioration of any watercourse or the quality of water in any body of water. (Source: Eden Area Plan, pg. 8-19)
- P5. Both public and private service facilities and utilities in existing 100-year flood zones, shall be flood-proofed to a point at, or above, the base flood elevation. (Source: Eden Area Plan, pg. 8-19)
- P6. The County shall prevent the construction of flood barriers within the 100-year flood zone that will divert flood water or increase flooding in other areas. (Source: Eden Area Plan, pg. 8-19)
- P7. To the extent feasible, the County shall continue to improve its rating under the National Flood Insurance Program so that flood insurance premiums for residents in flood prone areas may be reduced. (Source: Eden Area Plan, pg. 8-20, with minor revision)
- P8. Property owners should be informed of the National Flood Insurance Program, which is intended to reduce the financial risk from flooding.
- P9. Development shall comply with applicable NPDES requirements. (Source: Eden Area Plan, pg. 8-20)
- P10. The County shall work with the Alameda County Flood Control and Water Conservation District ~~and~~ Zone 7 Water Agency, and other large public property owners to provide for development of adequate storm drainage and flood control systems to serve existing and future development. (Source: ECAP, pg. 67, with minor revision)
- P11. The County shall promote flood control measures that advance the goals of recreation, resource conservation (including water quality and soil conservation), groundwater recharge, preservation of natural riparian vegetation and habitat, and the preservation of scenic values of the county's arroyos and creeks. (Source: ECAP, pg. 67)

- P12. The County shall require new development to pay their fair share of storm drainage and flood control improvements. (Source: ECAP, pg. 67)
- P13. The County shall regulate new development on a case-by-case basis to ensure that project storm drainage facilities shall be designed so that peak rate flow of storm water from new development will not exceed the rate of runoff from the site in its undeveloped state. (Source: ECAP, pg. 67, with minor revision)
- P14. The County shall ensure that development proposals within designated dam inundation areas are referred to the Office of Emergency Services and to appropriate local ~~police~~ law enforcement departments for evaluation and updating of emergency response and evacuation plans. (Source: ECAP, pg. 67)
- P15. All development proposals shall comply with all County ordinances and State Codes that include flood-related design requirements.
- P16. The County shall not approve any new development³⁵ on lands within the Sacramento - San Joaquin Valley (SSJV) as defined by the California Department of Water Resources unless the findings contained within Government Code Section 65865.5, 65962, or 66474.5 have been made.
- P17. The County shall require new residential development to include at least two emergency evacuation routes.
- P18. The County shall require development to provide additional access roads where feasible to provide for safe access of emergency equipment and civilian evacuation concurrently. The width, surface, grade, radius, turnarounds, turnouts, bridge construction, and lengths of emergency response apparatus access roads shall meet the requirements of the State and existing County requirements.
- P19. The County shall advise, and where appropriate, require all new developments to help eliminate impediments to evacuation within existing community plan areas, where limited ingress/egress conditions could impede evacuation events.
- P20. The County shall implement warning systems and evacuation plans for developed areas located within known hazard areas. Periodically analyze the capacity, safety, and viability of the County's

³⁵ Development includes all of the following: development agreements, discretionary permit, discretionary entitlement, ministerial permit for a project, or a tentative map/parcel map for a subdivision.

evacuation routes under a range of emergency scenarios during updates to the County's Emergency Operations Plan.

P21. The County shall develop, implement, and maintain an effective evacuation program for areas of risk in the event of a natural or human-caused disaster.

P22. The County shall coordinate with State and Federal landowners regarding joint use and access agreements for roadways located on state and federal lands that can be used for evacuation purposes.

P23. The County shall support the creation of resilience hubs and other place-based resilience resources to provide community members with essential services before, during, and after flood-related hazard events, partnering with community groups and residents of frontline communities to establish location, programming and activation of resource hubs and other place-based resilience resources.

P24. The County shall seek opportunities to empower property owners in flood-prone areas with information about flood risk, and with tools to identify mitigation, adaptation, and resilience strategies that property owners can take to better protect their homes and businesses from the impacts of future flooding.

P25. The County shall continue efforts that began in 2025, through the office of the District 1 Supervisor, to collaborate with relevant public agencies to discuss and address flood mitigation and response in the community of Sunol.

P26. When updating the Local Hazard Mitigation Plan (LHMP) in 2026 and in subsequent update cycles, the County shall actively seek input from the community of Sunol, the flood control agency in which it is located, and other relevant agencies including the Alameda County Office of Emergency Services, to ensure, at minimum, that the LHMP: (1) accurately reflects past flood events and future flood risk in Sunol; (2) documents the existing authorities, policies, programs, and resources available for flood mitigation and response in Sunol; and (3) within the scope of the County's authority and in partnership with the relevant flood control agency, presents goals to reduce/avoid long-term flood vulnerabilities in Sunol, a range of specific mitigation actions to reduce the effects of floods in Sunol, and an action plan that describes how the County will work with relevant agencies to prioritize, implement, and administer these actions.

P27. The County shall urge the Zone 7 Water Agency to engage Sunol residents in the development of and subsequent updates to Zone 7's comprehensive Flood Management Plan, and support Zone 7 in its engagement efforts with a goal of ensuring that Sunol's interests are embedded in Zone 7's efforts to optimize flood management and flood protection within its jurisdiction.

P28. When mining operations and reclamation activities cease at the Chain of Lakes quarries, the County shall support the transfer of the site to the Zone 7 Water Agency, enabling Zone 7 to begin implementation of its long-term plan to acquire and utilize the Chain of Lakes for seasonal water storage and conveyance, and flood water detention and conveyance.

Actions

- A1. Enforce applicable provisions of the Building Code (Source: Seismic Safety and Safety Element, pg. 8)
- A2. Require environmental assessment of project impacts. (Source: Seismic Safety and Safety Element, pg. 8)
- A3. Utilize site development and planned development district review. (Source: Seismic Safety and Safety Element, pg. 8)
- A4. Require studies where development is proposed in areas designated by FEMA as a having a potential flood risk and that any resulting development conform to the study findings.
- A5. Ensure that all construction and development activities obtain all applicable federal, state, regional, and County permits and approvals related to grading and erosion control, stormwater management and discharge control, and watercourse protection. (Source: Castro Valley Plan, pg. 10-18)
- A6. Require new development to comply with the requirements and criteria for stormwater quantity controls established in the Alameda County Hydrology and Hydraulics Criteria Summary (HHCS) to control surface runoff from new development. (Source: Castro Valley Plan, pg. 10-19)
- A7. Dedicate adequate resources to ensure effective and timely monitoring and maintenance of public drainage facilities, including storm drains, to maintain adequate capacity for peak flows in the area. (Source: Castro Valley Plan, pg. 10-19)
- A8. Use the Alameda County Flood Plain Management Ordinance (Chapter 15.40) and Section 15.08.230 of the Alameda County Building Code when assessing flood risk prior to project completion, as well as ongoing risk after flood control and improvement projects are implemented.
- A9. Work with ACFCWCD and other agencies and jurisdictions to conduct feasibility studies and implement flood control improvement projects, including, but not limited to: creek restoration, regional detention facilities in existing or proposed open space areas and/or parks, dredging;

existing area dams that are silted-up, dredging existing facilities for increased capacity and recreation. (Source: Castro Valley Plan, pg. 10-20)

A10. Establish design standards, guidelines, and setback requirements for development on properties that abut creeks and waterways, and require the replanting and restoration of riparian vegetation as part of any discretionary permit. Implement and enforce creek setback requirements for development for properties that abut creeks in coordination with the ACFCWCD and Zone 7 Water Agency. (Source: Castro Valley Plan, pg. 10-20, with minor revision)

A11. Continue to participate in activities that prevent or reduce flood impacts to existing and future development as described under the Community Rating System program developed by FEMA's National Flood Insurance Program. (Source: Eden Area Plan, pg. 8-20)

A12. Monitor potential changes in information regarding tsunami hazards for the unincorporated area. (Source: Eden Area Plan, pg. 8-20)

A13. Review and revise Chapters 13.08 (Stormwater Management and Discharge Control), 13.12 (Watercourse Ordinance), 15.36 (Grading Erosion and Sediment Control), Title 16 (Subdivision Ordinance), and Section 15.08.230 of the Building Code as needed to minimize flood risks within the County and to comply with State and Federal flood control requirements.

A14. Amend the Zoning Ordinance as needed to comply with the Central Valley Flood Protection Plan.

5.0 **EXTREME HEAT**

5.1. **Extreme Heat Related Hazards**

Increased temperatures as a result of climate change will present heat-related challenges not previously common in Alameda County. This is especially concerning for residents that may not have access to air conditioning or access to nearby cooling centers. Vulnerable buildings and infrastructure that are not constructed for higher temperatures and community functions such as agriculture are particularly susceptible to the impacts of extreme heat.

Extreme heat exacerbated by climate change is one of the primary health concerns in the county, and the entire population of the unincorporated county will be exposed to this climate change effect. An extreme heat day as defined by Cal-Adapt is when the daily maximum temperature exceeds 92.7 °F (the threshold for Alameda County). Under moderate greenhouse gas scenarios, the county is projected to experience 18.7 extreme heat days and 2.0 heat waves annually by the end of the century, and 32.7 extreme heat days and 4.6 heat waves annually under high greenhouse gas scenarios by the end of the century. As a worst-case scenario, the county has the potential to experience a maximum of 105.0 extreme heat days and 22.0 heat waves per year. Increased temperatures and extreme heat events are likely to affect the unincorporated county's built environment primarily through changes in energy use, as well as disproportionate impacts on individuals residing in units that do not have air conditioning, which is relatively common in the historically temperate western portions of the county.

5.2. **Goals, Policies and Implementing Actions**

Goal 4. <u>To minimize risks to lives and property due to extreme heat.</u>
--

Policies

- P1. Upgrade existing heat-sensitive infrastructure and design new infrastructure to withstand the future intensity and frequency of extreme heat events.

- P2. Develop and implement a Cool Community Strategy to reduce the impacts of the heat island effect* through various measures including increasing urban tree canopy and use of cool roofs and cool pavements as well as increasing green space in the unincorporated areas of the county, prioritizing implementation in the areas most impacted by extreme heat currently. [*Heat island effect: a term describing a measurable increase in ambient air temperature in urbanized areas, caused by combination of heat-absorptive surfaces (such as dark pavement and roofing).

heat-generating activities (such as engines and generators) and the absence of vegetation (which provides evaporative cooling) (CalEPA)].

- P3. Provide community education in commonly-spoken languages to help protect vulnerable populations from the increasing intensity of extreme heat events.
- P4. Work with Pacific Gas & Electric and Ava Community Energy to promote and help educate residents about time-of-day energy rates and the cost benefits of reducing electricity use during peak demand periods, ensuring that information is available in commonly-spoken languages.
- P5. Support the creation of resilience hubs and other place-based resilience resources to provide community members with essential services before, during, and after extreme heat related hazard events.
- P6. Engage heat-vulnerable communities when setting extreme heat thresholds for Cooling Center operations.
- P7. Increase resilience of existing Cooling Centers by increasing guidance, providing low-tech information sources, and seeking funding for additional resources, such as improved ventilation and backup power capabilities.

CHAPTER 2: MAN MADE HAZARDS

1.0 PURPOSE AND INTENT

This chapter describes man made hazards present within unincorporated Alameda County and goals, policies and actions intended to minimize loss due to hazardous materials and aviation.

2.0 HAZARDOUS MATERIALS

2.1. Introduction

Residential, commercial and industrial activities are all potential sources of hazardous waste. Hazardous materials include those substances that may be described as toxic, infectious, ignitable, corrosive or reactive. In the urban unincorporated areas, common sources of hazardous waste are gasoline service stations, dry cleaners, automotive repair businesses, machine shops, printers and photo processors. Other sources include plant nurseries, building supply yards, hospitals and medical office buildings, paint stores, and welding shops. In most cases, these uses are confined to major traffic corridors. In the non-urbanized portion of the County hazardous waste is generated through agricultural and mining related activities.

2.2. Regulatory Oversight for the Creation, Containment and Disposal of Hazardous Waste

The production, storage, transport and disposal of hazardous waste is regulated by federal, state and local laws designed to protect human health and the environment. The various agencies that enforce these laws include, but are not limited to, the U.S. Environmental Protection Agency, the California Environmental Protection Agency, the California Department of Transportation (Caltrans), and the Alameda County Health Care Services Agency - Department of Environmental Health. In those cases where there is evidence of contamination of ground and surface water, the State and Regional Water Resources Control Boards have oversight. The Bay Area Air Quality Management District would respond to the release of airborne contaminants to ensure compliance with applicable rules and regulations.

The California Environmental Quality Act (CEQA)

CEQA provides a mechanism for investigating potential impacts arising from the transport use or disposal of hazardous materials. CEQA requires identification of projects that would:

- Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials.
- Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment.
- Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school.
- Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment.

Once these risks are known, the project applicant must either propose project alternatives or take appropriate actions (mitigation measures) to reduce the impact to acceptable levels.

Hazardous Materials Program³⁶

The Hazardous Materials / Waste Program for waste generation was established by the County Board of Supervisors in 1985 and recognized by the State of California Department of Toxic Substances Control (DTSC) through a Memorandum of Understanding. In quick succession the County's hazardous materials management plan program, underground storage tank program, tiered permitting program, and risk management program also started.

The Alameda County Health Care Services Agency - Department of Environmental Health (ACDEH) Certified Unified Program Agency (CUPA) is the administrative agency that coordinates and enforces numerous local, state, and federal hazardous materials management and environmental protection programs in the county. The CUPA administers the following programs:

Hazardous Materials Business Plan Program: Chapter 6.95 of the Health and Safety Code establishes minimum statewide standards for Hazardous Materials Business Plans (HMBP's). HMBP's contain basic information on the location, type, quantity, and health risks of hazardous materials and/or waste. Each business shall prepare a HMBP if that business uses, handles, or stores a hazardous material and/or waste or an extremely hazardous material in quantities greater than or equal to the following:

- 55 gallons for a liquid
- 500 pounds of a solid
- 200 cubic feet for any compressed gas
- Threshold planning quantities of an extremely hazardous substance

³⁶ This information was obtained from the Department of Environmental Health website <http://www.acgov.org/aceh/hazard/index.htm>

Hazardous Waste Generator Program: The Hazardous Waste Generator Program regulates businesses that generate any amount of a hazardous waste. Proper handling, recycling, treating, storing and disposing of hazardous waste are key elements to this program.

Underground Storage Tank Program: The Underground Storage Tank (UST) Program regulates the construction, operation, repair and removals of UST systems used to store hazardous materials and/or waste.

California Accidental Release Program: The California Accidental Release Program (Cal ARP) requires any business that handles more than threshold quantities of an extremely hazardous substance to develop a Risk Management Plan (RMP). The RMP is implemented by the business to prevent or mitigate releases of regulated substances that could have off-site consequences through hazard identification, planning, source reduction, maintenance, training, and engineering controls.

Tiered Permitting: The Tiered Permitting Program regulates the onsite treatment of hazardous waste.

Aboveground Storage Tanks: Facilities with a single tank or cumulative aboveground storage capacities of 1,320 gallons or greater of petroleum-based liquid product (gasoline, diesel, lubricants, etc.) must develop a Spill Prevention Control and Countermeasure plan (SPCC). An SPCC plan must be prepared in accordance with the oil pollution prevention guidelines in the Federal Code of Regulations (40 CFR, 112). This plan must include procedures, methods, and equipment at the facility to prevent discharges of petroleum from reaching navigable waters. A Registered Professional Engineer must certify an SPCC plan, and a complete copy of the plan must be maintained on site.

The ACDEH CUPA program has jurisdiction in the following communities: Alameda, Albany, Castro Valley, Dublin, Emeryville, Piedmont, Newark, San Lorenzo, Sunol, and the unincorporated areas of Fremont, Hayward, Livermore, Pleasanton, San Leandro and parts of Byron, Mountain House and Tracy.

Household Hazardous Waste³⁷

The Alameda County Household Hazardous Waste Program is operated as a partnership between the Alameda County Department of Environmental Health and StopWaste.org. Household hazardous wastes include leftover paint, solvents, antifreeze, used oil and batteries, cleansers, pesticides and pool chemicals. Alameda County has implemented provisions of its Household Hazardous Waste Plan that called for the development of three permanent facilities for household waste collection and recycling in Oakland, Hayward, and Livermore. These facilities collect, identify, sort, store, pack, and recycle or

³⁷ For more information about this program please go to the following website
<http://www.stopwaste.org/home/index.asp?page=293>

dispose of all hazardous wastes (except radioactive waste and explosives) delivered by residents of Alameda County and small businesses.

Emergency Response

The Alameda County Fire Department would respond to any discharge of hazardous waste.

2.3. Goals, Policies and Implementing Actions

Goal 5. Minimize residents' exposure to the harmful effects of hazardous materials and waste.

Policies

- P1. Uses involving the manufacture, use or storage of highly flammable (or toxic) materials and highly water reactive materials should be located at an adequate distance from other uses and should be regulated to minimize the risk of on-site and off-site personal injury and property damage. The transport of highly flammable materials by rail, truck, or pipeline should be regulated and monitored to minimize risk to adjoining uses. (Source: Seismic Safety and Safety Element, pg. 8-9)
- P2. The County shall strive to reduce hazardous waste using the following hierarchy of waste management strategies:
- Reduce the sources of hazardous waste.
 - Recycle and reuse hazardous waste.
 - Treat or incinerate residual hazardous waste.
 - Place reduced or untreatable waste in secure land disposal units. (Source: Eden Area Plan, pg. 8-23)
- P3. The County shall minimize risks of exposure to or contamination by hazardous materials by educating the public, establishing performance standards for uses that involve hazardous materials, and evaluating soil and groundwater contamination as part of development project review.
- P4. New or expanding businesses shall be required to demonstrate compliance with the hierarchy of waste management strategies listed in Policy 1 (P1) of this Goal as a condition of receiving land use and business permits. (Source: Eden Area Plan, pg. 8-24)
- P5. All existing hazardous waste generators shall be required to implement the hazardous waste management hierarchy listed in Policy 2 (P2) of this Goal to the maximum extent feasible, both technically and economically. (Source: Eden Area Plan, pg. 8-24)

- P6. Adequate separation shall be provided between areas where hazardous materials are present and sensitive uses such as schools, residences and public facilities. (Source: Eden Area Plan, pg. 8-24)
- P7. The County shall assist the Alameda County Waste Management Authority with the implementation of the *Alameda County Integrated Waste Management Plan* and the *Alameda County Hazardous Waste Management Plan*. (Source: Eden Area Plan, pg. 8-24)
- P8. Developers shall be required to conduct the necessary level of environmental investigation to ensure that soil, groundwater and buildings affected by hazardous material releases from prior land uses and lead or asbestos in building materials will not have a negative impact on the natural environment or health and safety of future property owners or users. This shall occur as a pre-condition for receiving building permits or planning approvals for development on historically commercial or industrial parcels. (Source: Eden Area Plan, pg. 8-24)
- P9. The safe transport of hazardous materials through the unincorporated areas shall be promoted by implementing the following measures:
- Maintain formally-designated hazardous material carrier routes to direct hazardous materials away from populated and other sensitive areas.
 - Prohibit the parking of empty or full vehicles transporting hazardous materials on County streets.
 - Require new pipelines and other channels carrying hazardous materials avoid residential areas and other immobile populations to the extent possible.
 - Encourage businesses to ship hazardous materials by rail. (Source: Eden Area Plan, pg. 8-24)
- P10. Emergency response plans shall be submitted as part of all use applications for any large generators of hazardous waste. (Source: Eden Area Plan, pg. 8-25)
- P11. To the extent feasible, the County shall continue to support the removal of hazardous wastes from the solid waste stream in unincorporated Alameda County in accordance with Countywide plans. (Source: Eden Area Plan, pg. 8-25)

Actions

- A1. Enforce applicable provisions of the Zoning and Building Ordinances.
- A2. Utilize zoning to segregate potentially hazardous uses. Hazardous materials should be located so that they are not affected by disasters such as fire, floods, and earthquakes. (Source: Seismic Safety and Safety Element, pg. 9)

- A3. Enforce the Alameda County Solid Waste Management Plan. (Source: Seismic Safety and Safety Element, pg. 9)
- A4. Cooperate with the Alameda County Waste Management Authority and Alameda County Department of Environmental Health to implement the hierarchy of waste management strategies listed in Policy 2 of this Goal. (Source: Eden Area Plan, pg. 8-25)
- A5. Continue to implement local siting criteria in order to implement relevant and applicable provisions consistent with the hazardous materials and waste management plans for Alameda County. (Source: Eden Area Plan, pg. 8-25)
- A6. Coordinate with the Alameda County Department of Environmental Health, Hazardous Materials Division and other appropriate regulatory agencies during the review process of all proposals for the use of hazardous materials or those involving properties that may have toxic contamination such as petroleum hydrocarbons, asbestos, and lead. (Source: Castro Valley Plan, pg. 10-34)
- A7. Require applicants of projects in areas of known hazardous materials occurrences such as petroleum hydrocarbon contamination, USTs, location of asbestos rocks and other such contamination to perform comprehensive soil and groundwater contamination assessments in accordance with regulatory agency testing standards, and if contamination exceeds regulatory action levels, require the project applicant to undertake remediation procedures prior to grading and development under the supervision of appropriate agencies such as Alameda County Department of Environmental Health, Department of Toxic Substances Control, or Regional Water Quality Control Board. (Source: Castro Valley Plan, pg. 10-34)
- A8. Amend the County zoning regulations and project review processes to ensure that uses involving the use, storage, or transport of highly flammable, toxic, and/or highly water-reactive materials are located at an adequate distance from other uses and where they will not be adversely affected by disasters such as major fires, floods, or earthquakes. Regulate these uses to minimize the risk of on-site or off-site personal injury and property damage. (Source: Castro Valley Plan, pg. 10-34)
- A9. Educate businesses and residents (for example through information on the County's website, etc.) about the proper use, storage, and disposal of hazardous materials, but also ways to reduce or eliminate the use of hazardous materials, including the use of non-toxic or less-toxic alternatives. (Source: Castro Valley Plan, pg. 10-33)

3.0 AVIATION HAZARDS

Within Alameda County there are three airports: Oakland International, Hayward Executive, and the Livermore Municipal Airports. The unincorporated areas are affected by flights not only arriving and departing from these airports, but also from the nearby San Francisco International Airport and the San Jose International Airport. As a result, the airspace over Alameda County is quite crowded, making the potential for crash an ever-present concern.

3.1. Aviation Regulations Related to Land Use and Development

In California, there are various levels of government oversight for land use planning near airports.

- **Federal:** Federal Aviation Administration (FAA) FAA approves airport noise studies, is the lead in the federal environmental processes, and manages the nation's airspace. The FAA publishes standards for the airside of the airport and provides planning guidelines for use by airport sponsors.
- **State:** The Caltrans Division of Aeronautics provides for the integration of aviation into transportation system planning on a regional, statewide, and national basis. Staff administers noise regulation and land use planning laws that foster compatible land use around airports heliports and encourages environmental mitigation measures to prevent incompatible land use encroachment. In addition, the California Environmental Quality Act (CEQA) requires that a project be screened for the creation of potential hazards within two miles of a public airport.
- **Airport Land Use Commissions (ALUCs):** Airport Land Use Commissions (ALUCs) are established pursuant to the State ALUC law (Public Utilities Code Article 3.5, State Aeronautics Act, Section 21661.5, Section 21670 et seq., and Government Code Section 65302.3 et seq.) to protect the public health, safety, and welfare by promoting the orderly expansion of airports and adoption of land use measures by local public agencies to minimize exposure to excessive noise and safety hazards near airports, heliports and helipads. ALUCs establish policies for land uses around airports, heliports and helipads, ensuring that those uses are compatible with airport operations. This is accomplished through the development of Airport Land Use Compatibility Plans (ALUCPs) which address these four impact areas: Noise, Safety, Airspace Protection, and Overflight. ALUCs also ensure that county and city plans (general, specific and other) and proposed land use policy actions are consistent with the ALUCP. This is done on an advisory basis.
- **Local Governments:** Cities and/or counties have a responsibility to ensure the orderly development of the airports within their local jurisdiction and make sure all applicable planning documents and building regulations are consistent with the ALUCP. They also have the final decision on local land use issues and have the ability to overrule ALUC determinations, with conditions.

Alameda County Airport Land Use Commission

The Alameda County Airport Land Use Commission (ALUC) is an advisory body that assists local agencies in their efforts to comply with the provisions of the four compatibility impact areas (noise, safety, airspace, and overflight) when planning for land uses near airports. Safety Zone Compatibility Criteria have been established for seven distinct zones within the Airport Influence Areas (AIAs) for each of the three airports in the county. Please refer to the following webpage for specific information <http://www.acgov.org/cda/planning/generalplans/airportlandplans.htm>.

Heliports and Helipads

The ALUCP applies to any site and environs of any existing or proposed public-use, private-use, or special-use heliport or helipad (as defined by Caltrans) in the County. Table S – 6 summarizes information regarding heliports located in unincorporated Alameda County.

Table S-6: Heliports in Unincorporated Alameda County³⁸

Heliport Name	Location	Public/ Private	Number of Daily Operations	Number of Night Operations (10:00 PM to 7:00 AM)
ACFD, Station 14	11345 Sunol Blvd. Sunol, CA 94586	Public	N/A	N/A
Eden Medical Center	20103 Lake Chabot Road Castro Valley, CA 94546	Private	Variable*	Variable*
Fairview Site	27218 Fairview Avenue Fairview, CA 94542	Private	N/A	N/A
Little Valley Site	Sunol, CA	Private	N/A	N/A

Notes: *Variable use at hospitals is based upon need. N/A = Not available

FAA Advisory Circular (AC) 150-5390-2B “Heliport Design” provides recommendations for heliport design and describes the federal requirements associated with heliport development. Alameda County encourages those with heliport proposals to implement the guidance set forth in the AC to the greatest extent practicable. The AC is available online from the FAA website at www.faa.gov. For more information about heliport permitting, please contact Caltrans’ Division of Aeronautics (www.dot.ca.gov/hq/planing/aeronaut/index.html). Also see section 2.7.4 of the ALUCPs for ALUC review criteria for new heliports, or heliport master/development plans.

Emergency Response

The Alameda County Fire Department has staff capable of responding to aviation accidents, both on land and the sea. The City of Oakland also has a special fire-fighting unit at the Oakland International Airport equipped with special apparatus for aviation accidents. The US Coast Guard will respond to an aircraft

³⁸ Oakland Airport ALUCP, December 2010, page 2-5.

incident over the water. The County, Port of Oakland, and the US Coast Guard have periodic drills to ensure readiness in the event of a water crash landing.

3.2. Goals, Policies and Implementing Actions

Goal 6. Minimize potential impacts from aircraft accidents at facilities that contain hazardous materials and waste
--

Policies

- P1. Require proposed land use projects within Airport Influence Areas (AIAs) that utilize hazardous materials (flammable, explosive, corrosive or toxic) be referred to the ALUC for a compatibility determination.

Actions

- A1. Consult the Alameda County's ALUCPs for proposed land uses prior to approval of Discretionary or Ministerial Projects.
- A2. Refer all updates to County General Plans, Specific Plans, and Zoning Ordinances to the Alameda County ALUC for a compatibility determination.
- A3. Special measures to minimize risk in the event of an aircraft accident to be determined by the permitting agencies in Safety Zones 3-5 in each airport's AIA.
- A4. Storage fuel and other hazardous materials within the airport environs are restricted as follows:
 - Within Safety Zones 1 and 2, storage of any such substance is prohibited.
 - Within Safety Zone 3, storage of fuel or other hazardous materials is permitted only if the substances are stored in underground tanks, and the quantity stored is no more than 2,000 gallons.

CHAPTER 3: EMERGENCY PREPAREDNESS

1.0 PURPOSE AND INTENT

The Safety Element provides a policy framework for the implementation of short-range emergency preparedness plans to maintain long-term safety goals. This chapter describes the protection and response providers for the unincorporated areas of the County.

1.1. Disaster Planning and Preparedness

Local Hazard Mitigation Plan (LHMP)³⁹

The federal Disaster Mitigation Act of 2000 (DMA 2000) requires that cities, counties, and special districts have a Local Hazard Mitigation Plan to be eligible to receive Federal Emergency Management Agency (FEMA) hazard mitigation funds. To assist local governments in meeting this requirement, the Association of Bay Area Governments is the lead agency on the multi-jurisdictional Local Hazard Mitigation Plan (LHMP) for the San Francisco Bay Area. Cities and counties can adopt and use all or part of this multi-jurisdictional plan in lieu of preparing all or part of a Local Hazard Mitigation Plan themselves. The County LHMP addresses potential damages in the unincorporated portions of the County, as well as to County facilities. Cities, schools, special districts, and eligible non-profit organizations within the County must prepare and submit separate Hazard Mitigation Plans to FEMA for approval.

The County, in conjunction with its many emergency services partners, has prepared its local annex to the LHMP that sets strategies for coping with the natural and man-made hazards faced by residents. The plan is a compilation of information from County departments correlated with known and projected hazards that face northern California. The plan complies with, and has been approved by, FEMA and the Governor's Office of Emergency Services (OES). The plan has been formally adopted by the County Board of Supervisors (BOS) for use in the development of specific hazard mitigation proposals.

Under Assembly Bill 2140 (Hancock, 2006) local jurisdictions are required to adopt the LHMP as an implementation appendix to their Safety Elements in order to receive full reimbursement of post-disaster public assistance from FEMA. The LHMP will be updated on a schedule as determined by FEMA.

Mitigation strategies included in the LHMP will serve as the implementation plan for the Safety Element.

A copy of the current LHMP will reside in Appendix A **and is available at**

<https://www.acgov.org/cda/planning/generalplans/index.htm>.

³⁹ For more information about this program please go to the ABAG website located at <http://quake.abag.ca.gov/>

Community Education

The Alameda County Fire Department offers the Personal Emergency Preparedness (PEP) and Community Emergency Response Team (CERT) trainings to provide community members with the tools and resources to become better prepared and self-sufficient during a large-scale emergency or disaster. The department also provides the Map Your Neighborhood (MYN) project, an all-hazards response tool to educate members of the community to become more prepared during the pre-planning and response phase of a large-scale emergency. Please refer to the ACFD website for more information about these programs: <https://fire.acgov.org/emergency-preparedness/>.

National Incident Management System (NIMS) & Standard Emergency Management System (SEMS)

As outlined in the Alameda County 2012–2025 Emergency Operations Plan, the Alameda County Emergency Management Program complies with Federal guidance to use NIMS and State guidance to use SEMS. NIMS provides a comprehensive approach to emergency management for all hazards. NIMS integrates existing best practices into a consistent, nationwide approach to domestic emergency management applicable to all jurisdictional levels (public and private) and across functional disciplines. SEMS is used to manage multi-agency and multi-jurisdictional responses to emergencies in California. In addition, Alameda County responds to disasters using the Incident Command System (ICS), which is a primary component of both SEMS and NIMS. This standardized incident management concept allows responders to adopt an integrated organizational structure equal to the complexity and demands of any single incident or multiple incidents without being hindered by jurisdictional boundaries.

Alameda County will follow the Standard Emergency Management System (SEMS) when responding to any disaster. SEMS is a management system that provides an organizational framework and guidance for operations at each level of California's emergency management system. The objective of SEMS is to improve the coordination of state and local emergency response. SEMS is not a physical agency; it is a procedure for integrating emergency response functions. As its name implies, the SEMS provides guidelines for standardization of procedures and approaches to emergency response; facilitation of the flow of information and resources between organizational levels (field, local government, operation area, regional and state); coordination between responding agencies; and rapid mobilization, deployment, use and tracking of resources. All local governments must use SEMS in multi-jurisdictional or multi-agency emergency responses to be eligible for state reimbursement of response-related personnel costs.

Operational Area Emergency Response County Emergency Operations Plan

Unincorporated Alameda County is susceptible to wildfire and flooding resulting from heavy rains or dam failures. These emergency situations could trigger an evacuation for residents and visitors, including those of the 25 potential vulnerable communities. Approximately 275 miles (23%) of the unincorporated county roadway network could be impacted by a wildfire, flooding, or both hazards. In both the morning and evening peak commute hours, large segments of I-580, I-680, Byron Bethany Road, Crow Canyon

Road, Pleasanton Sunol Road, Vallecitos Road (SR-84), and North Vasco Road currently have traffic volumes estimated to be near or over capacity.

The 2012–2025 Alameda County Emergency Operations Plan (EOP) is a crucial emergency response plan for Alameda County. The EOP aims to establish the foundational policies and procedures that define how Alameda County will effectively prepare for, respond to, recover from, and mitigate against natural or human-caused disasters. The EOP provides an overview of the County’s approach to emergency operations. It identifies emergency response policies, describes the response and recovery organization, and assigns specific roles and responsibilities to County departments, agencies, and community partners. The EOP has the flexibility to be used for all emergencies and will facilitate response and recovery activities in an efficient and effective way.

The County’s EOP consists of a basic plan and a few functional hazard, threat, or incident-specific annexes. These annexes, such as Alameda County Catastrophic Earthquake Transportation and Evacuation Plan and Alameda County Operational Area Care and Sheltering Plan, based on their inclusion in the EOP, have direct applicability and are consistent with its concepts.

The EOP addresses the entire spectrum of contingencies, ranging from relatively minor incidents to large-scale disasters. All departments and agencies must be prepared to promptly and effectively respond to any foreseeable emergency. The plan applies to all elements of the Alameda County Emergency Management Organization during all phases of emergency management. The EOP also covers emergency management activities that cover five phases: prevention, preparedness, response, recovery, and mitigation.

The EOP also includes a hazard assessment on the natural hazards and human-caused disasters for which the County is at risk. These hazards include agriculture infestation, aircraft incident, civil disturbance, dam failure, drought, earthquake, energy emergency, infectious diseases, flood/storm, hazardous materials, landslide/mudslide, liquefaction, terrorism, tornadoes and high winds, train derailment, tsunami and seiche, and wildland fire.

The EOP describes how the Alameda County Emergency Management Program is administered, including its foundational guidelines, the process and authority for proclaiming emergencies, and additional elements to sustain the program before, during, and after a disaster. SEMS and NIMS compliance, which is mentioned previously, is discussed in the EOP. The EOP also describes the concept of operations on how the emergency response organization accomplishes its mission, including a discussion on the Alameda County Emergency Operations Center (EOC) and its activation. In addition, the EOP talks about information collection, analysis and dissemination processes to the public, responders, and additional stakeholders, as well as recovery operations.

A crucial emergency response plan for the unincorporated areas of the County is the Operational Area Emergency Response Plan (OAERP), which is prepared by the Alameda County Office of Homeland Security and Emergency Services in consultation with various public and private entities. The intent of the plan is to strengthen short and long term emergency responses and recovery capability, and to identify emergency procedures and emergency management routes in the County.

In Alameda County, the Operational Area was established by the January 1995 “Agreement for Participation in Alameda County Operational Area Emergency Management Organization” (Agreement). According to the Alameda County Office of Homeland Security and Emergency Services (the Sheriff’s Department), all the cities in the county and the county are participants in this Agreement. The Agreement establishes an organizational structure for disaster response for the County of Alameda, cities, special districts, and other public benefit non-profit corporations (e.g. the American Red Cross) that participate in the Agreement. The Agreement forms a partnership for a systematic approach for exchanging disaster intelligence, mutual aid requests, and resource requests in emergencies. It also provides emergency preparedness on a day-to-day basis through cooperative training and exercise activities. It establishes a primary contact point during an emergency in Alameda County for sharing disaster intelligence among local agencies and between the Operational Area Emergency Management Organization and state and federal agencies requesting information.

The Operational Area Emergency Management Organization assists the participating parties in sharing resources before, during, and after an emergency to prepare for, respond to, and recover from disasters that strike Alameda County. The Agreement specifies that the Alameda County Emergency Operations Plan is the primary method and criteria used to conduct Operational Area Emergency Center activities. The Emergency Operations Plan also includes a description of the various functional responsibilities for County departments.

Related Plans

The County must prepare and periodically update several policy, planning and logistical documents pertaining to emergency response. An inventory of these plans is provided in Appendix B.

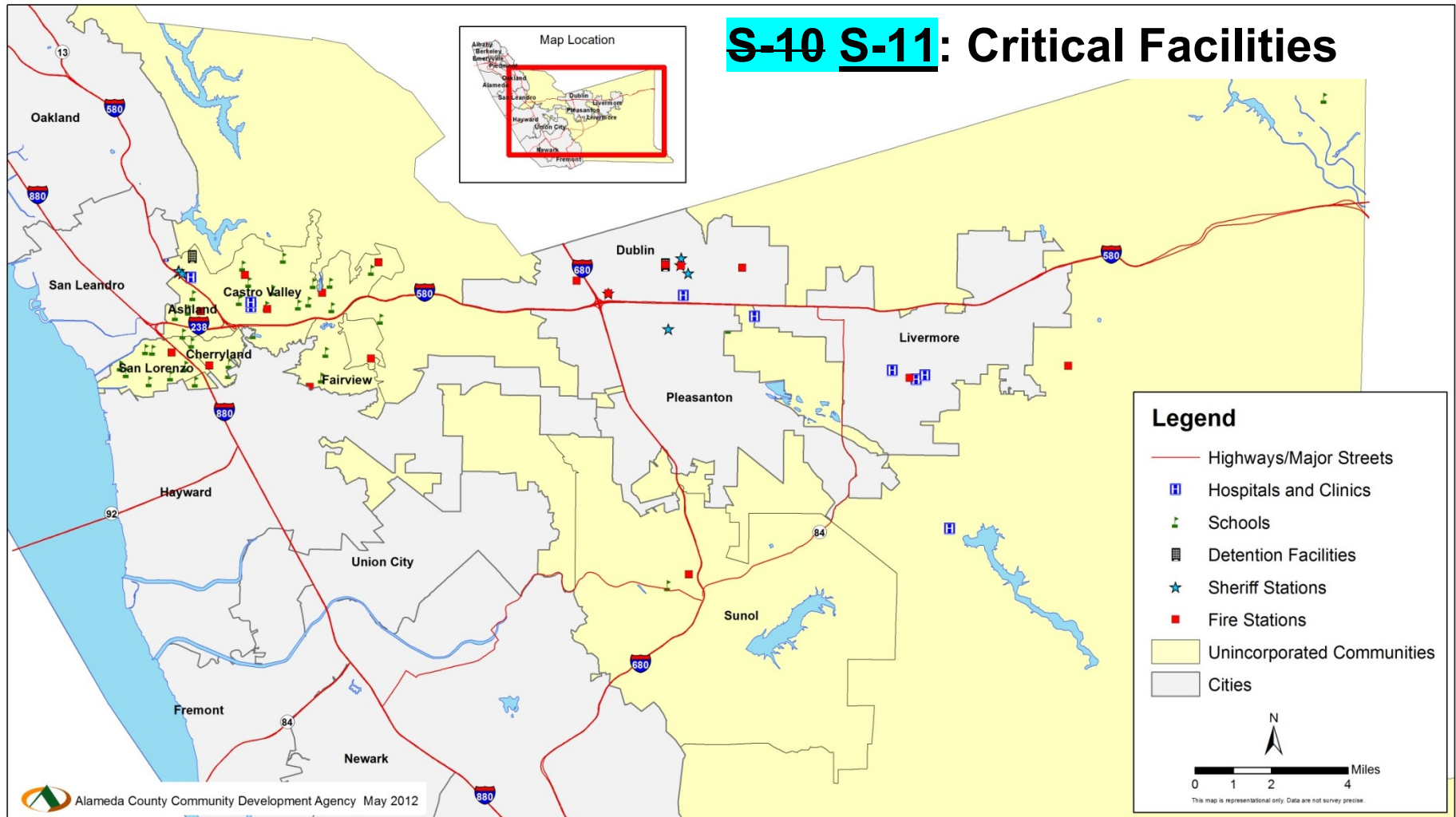
Emergency Critical Facilities and Shelter Sites

A map indicating the locations of emergency critical facilities and shelter sites is provided in Figure S-11 on the following page.

A listing of emergency services providers and resources for unincorporated Alameda County is provided in Appendix C.

S-10 S-11: Critical Facilities

S-10 S-11: Critical Facilities



Evacuation Locations

As required by SB 1409, a list of evacuation locations for unincorporated Alameda County is provided in Appendix A of the Alameda County Emergency Operations Plan Annex: Mass Care & Shelter Plan. The Alameda County Emergency Operations Plan Annex: Mass Care and Shelter Plan is incorporated by reference into this Element as Appendix G.

Police Law Enforcement Services

The Alameda County Sheriff's Office is a full-service law enforcement agency accredited through the Commission on Accreditation for Law Enforcement Agencies (CALEA) and the American Correctional Association (ACA). The Sheriff's Office has 1,500 authorized positions, including 1,000 sworn personnel distributed among five divisions, each headed by a Commander. The County's Emergency Operations Center (EOC) was dedicated in 1996 and is coordinated and maintained by the Sheriff's Office of Homeland Security and Emergency Services (SOHSE). The SOHSE is a proactive effort to enhance the Department's response to potential threats related to local homeland security issues, such as terrorism or bioterrorism. The SOHSE maintains a 24-hour response capability that includes the mobilization of the following volunteer units: Air Squadron, Communications Team, Mounted Posse, Search and Rescue Unit, and two Underwater Recovery Units.

1.2. Goals, Policies and Implementing Actions

Goal 7. Prepare and keep current County emergency procedures in the event of potential natural or man-made disaster.

Policies

- P1. The County shall coordinate its efforts with other local jurisdictions for hazard and disaster response planning and to minimize risks associated with man-made and environmental hazards. (Source: Eden Area Plan, pg. 8-26)
- P2. Adequate emergency water flow, emergency vehicle access and evacuation routes shall be incorporated into any new development prior to project approval. (Source: Eden Area Plan, pg. 8-26)
- P3. As part of the General Plan Annual Report, the County-Community Development Agency shall provide the Board of Supervisors and relevant advisory bodies and Board committees with annual updates on the status of implementation of the Safety Element. The Public Works Agency will be invited to participate in these presentations

- P4. The County shall prioritize development of redundant emergency notification systems in known hazard areas without adequate communication methods.
- P5. The County shall evaluate the effectiveness of utilizing emergency sirens as communications tools in hazard-prone areas and present findings to relevant Board Committees.
- P6. Pay particular attention to the evacuation needs of residents with limited mobility, residents with visual or hearing impairments, residents who must evacuate with medical equipment, residents without access to vehicles and non- or limited-English speaking residents. The County shall ensure that all evacuation programs meet the needs of residents, including language, community literacy levels, and consideration of low-income communities, people with disabilities, LGBTQ people, incarcerated persons, and other marginalized populations.
- P7. The County shall prepare, translate, revise, and test all emergency communications materials for community literacy levels well in advance of a disaster, and not just as needed during an emergency event.
- P8. The County shall provide emergency communication materials in all non-English languages spoken by more than 5 percent of the countywide population by January 1, 2025 pursuant to AB 1638 of 2023.
- P9. The County shall periodically assess future emergency service needs.
- P10. The County shall encourage all emergency service agencies within the jurisdiction to cooperatively train in various emergency or disaster trainings.
- P11. The Alameda County Emergency Operations Plan Annex: Mass Care & Shelter Plan, adopted by the Board of Supervisors in January 2025, shall serve to identify evacuation locations for a range of emergency scenarios as required by SB 1409, and is incorporated by reference into this Element as Appendix G.

Actions

- A1. Complete regularly scheduled reviews and updates of its emergency preparedness plans. (Source: Eden Area Plan, pg. 8-26)
- A2. Conduct periodic mock exercises using emergency response systems to test the effectiveness of County procedures included in the emergency management plan. (Source: Eden Area Plan, pg. 8-27)

- A3. Develop public education programs, offered in commonly-spoken languages, on first-aid training and disaster preparedness that encourage residents and businesses to stockpile emergency food, water and medical supplies, and provide information on emergency access routes. Other topics should be included as necessary. (Source: Eden Area Plan, pg. 8-27)
- A4. Work with Caltrans, and the local and Countywide fire and police departments to identify appropriate emergency access routes through the unincorporated areas. (Source: Eden Area Plan, pg. 8-27)
- A5. Coordinate with the school districts, hospitals, and other major public and private agencies and organizations, including agencies that serve seniors, persons with disabilities, non-English speakers and others who may need special support during an emergency, to develop and implement an effective disaster plans. (Source: Castro Valley Plan, pg. 9-13)
- A6. Adopt and amend as needed the Alameda County Local Hazard Mitigation Plan as required under the federal Disaster Mitigation Act of 2000.
- A7. The Alameda County Local Hazard Mitigation Plan (LHMP) adopted by the Board of Supervisors shall serve as the implementation program for the coordination of hazard planning and disaster response efforts within the County and is incorporated by reference to this Element as the Implementation Appendix, Appendix A.
- A8. The County will ensure that the LHMP is updated regularly to keep pace with the needs of its residents.
- A9. Conduct outreach in multiple languages to ensure that all residents are aware of the County's evacuation and emergency notification systems (e.g. AC Alert, Genasys Connect).
- A10. Consider adopting a Hazardous Tree Ordinance to address trees that are a risk to life or property.