WILLIE A. HOPKINS, JR., Director

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January 11, 2016

Honorable Board of Supervisors
County of Alameda
1221 Oak Street, Suite 536
Oakland, California 94612-4305

Dear Board Members:

SUBJECT: APPROVE A RESOLUTION TO UPDATE THE ALAMEDA COUNTY PRE-DISASTER LOCAL HAZARD MITIGATION PLAN; PROJECT NO. 3056

RECOMMENDATION:

Approve a Resolution to update the County of Alameda's Pre-Disaster Local Hazard Mitigation Plan.

DISCUSSION/SUMMARY:

In October of 2000, the Federal government passed legislation, the Disaster Mitigation Act of 2000 (DMA 2000), requiring local governments to develop a Pre-Disaster Local Hazard Mitigation Plan (LHMP), should they want access to certain types of mitigation grant assistance. To implement the planning requirements of DMA 2000, the Federal Emergency Management Agency (FEMA) publishes a planning guide for an LHMP that describes the relevant elements needed to meet FEMA's mitigation planning requirements. The purpose of an LHMP is to identify methods to reduce the effects of disasters caused by natural and man-made hazards and the effects these can have on people, property, the economy, and the environment. When a local jurisdiction's HMP is approved by FEMA, the jurisdiction then becomes eligible for Federal pre-disaster and post-disaster mitigation grant programs. An individual jurisdiction can elect to develop a stand-alone mitigation LHMP or participate with other local governments as part of a coordinated multi-jurisdictional effort. Every five years, the LHMP must be reviewed, updated, and approved by FEMA.

In 2006 and 2011, the County of Alameda participated in the multi-jurisdictional plans developed by the Association of Bay Area Governments (ABAG). Your Board approved the original Alameda County Annex to ABAG's 2005-2010 Multi-Jurisdictional Mitigation Plan (MJMP) on January 23, 2007 by adopting Resolution R-2007-26. In addition, your Board approved the first update of the County's Annex to ABAG's 2010-2015 MJMP on January 24, 2012, by adopting Resolution R-2012-25. The current plan expires on March 16, 2016.

The County learned from ABAG in November of 2014 of changes in the approach to regional Local Hazard Mitigation planning efforts. Each jurisdiction is to prepare their own plans, with ABAG providing technical assistance and hazards data. On July 28, 2015, your Board authorized (Item No. 52) the award of a Standard Services Agreement for Mitigation Planning Services to AECOM Technology Services, Inc. (Principal: Eric Haase, Location: Oakland), to provide hazard mitigation consulting services to the County of Alameda General Services Agency (GSA)-Technical Services

Department. GSA staff have been working with the consultant and County departments to prepare the LHMP for submittal to FEMA.

Alameda County is vulnerable to a wide range of disasters. The 2016 LHMP update will provide the County with the necessary tools to identify risks to our population, property and the environment and prioritize future actions for reducing risks. Additionally, the plan will provide a framework for future requests for Federal assistance to institute risk-reducing actions. The updated 2016 LHMP also incorporates climate adaptation planning by addressing the hazard of climate change and how climate change affects other hazards. The updated plan also supports the County's participation in the National Flood Insurance Program's Community Rating System (CRS) program by addressing the program's Floodplain Management Planning activities. Per FEMA requirements, the plan also references the County's Safety Element of the General Plan.

The LHMP is required to include a list of specific capital improvements to County infrastructure that will address identified risks. Appendix A of the plan describes conceptual projects that the County intends to progress over the five-year period. Further action will be required by your Board to approve specific projects as funding and capital project priorities are identified.

Alameda County GSA has led the County's effort to produce the 2016 update with participation from Community Development Agency, Public Works Agency, Health Care Services Agency, Office of Emergency Services, Alameda Health System, Sheriff's Office, and the Fire Department. The County team has completed the hazard identification and analysis, vulnerability assessment and loss estimates, development of specific strategies to reduce the potential impacts of hazards on the County, and solicited input from Alameda County residents via a community outreach effort.

For official approval by FEMA, your Board must formally adopt the updated plan and resolution in a public meeting and resubmit the County's plan to FEMA. In the event that FEMA requires major changes to the plan, GSA will come back to your Board with plan amendments. Once final approval is acquired from FEMA, the County will become eligible for Federal mitigation grant funding.

Following your Board's consideration of the LHMP and FEMA approval, the Community Development Agency will amend the Safety Element of the County's General Plan for the Board's additional consideration.

FINANCING:

There is no financial impact associated with the adoption of this Board Resolution.

Respectfully submitted,

Willie A. Hopkins, Jr.
Director, General Services Agency

Attachments

cc: Susan S. Muranishi, County Administrator
Steve Manning, Auditor-Controller
Donna R. Ziegler, County Counsel

COUNTY OF ALAMEDA

RESOLUTION No. R-2016-30

Resolution Adopting the 2016 Update to the County of Alameda's Local Hazard Mitigation Plan for 2016-2021

WHEREAS, the Bay Area is subject to various earthquake-related hazards such as ground shaking, liquefaction, landsliding, fault surface rupture, and tsunamis; and

WHEREAS, the Bay Area is subject to various weather-related hazards including wildfires, floods, and landslides; and

WHEREAS, the County of Alameda recognizes that disasters do not recognize city, county, or special district boundaries; and

WHEREAS, the County of Alameda seeks to maintain and enhance a disaster-resilient County by reducing the potential loss of life, property damage, and environmental degradation from natural disasters, while accelerating economic recovery from those disasters; and

WHEREAS, the County of Alameda is committed to increasing the disaster resilience of infrastructure, health, housing, economy, government services, education, environment, and land use systems in the County; and

WHEREAS, the federal Disaster Mitigation Act of 2000 requires all cities, counties, and special districts to have adopted a Local Hazard Mitigation Plan to receive disaster mitigation funding from FEMA; and

WHEREAS, under Assembly Bill 2140 (Hancock, 2006) (Government Code sections 8685.9 and 65302.6), local jurisdictions are required to adopt the Local Hazard Mitigation Plan as a part of the Safety Elements of their General Plans in order to be eligible to receive full reimbursement of the state share of post-disaster public assistance from FEMA; and;

WHEREAS, the County adopted its Local Hazard Mitigation Plan in 2007, as updated in 2011, as an Annex to a region-wide multi-jurisdictional hazard mitigation plan prepared by the Association of Bay Area Governments (ABAG); and

WHEREAS, ABAG is not preparing a region-wide Local Hazard Mitigation Plan and the County has prepared a 2016-2021 Update to its Local Hazard Mitigation Plan as a standalone update to the County's 2011 Local Hazard Mitigation Plan; and

NOW, THEREFORE, BE IT RESOLVED that the County of Alameda adopts the 2016-2021 Update to the County of Alameda Local Hazard Mitigation Plan.

NOW, THEREFORE, BE IT FURTHER RESOLVED that upon FEMA's approval, the County of Alameda commits to continuing to take those actions and initiating further actions as identified in Appendix A of the County of Alameda's Local Hazard Mitigation Plan and intends to incorporate the Local Hazard Mitigation Plan into the County's General Plan as an Appendix to the Safety Element.

Adopted by the Board of Supervisors of the County of Alameda, State of California, on January 26 2016, by the following called vote:

AYES: Supervisors: Chan, Miley, Valle & President Haggerty - 4

NOES: None

EXCUSED: Supervisor Carson - 1

President of the Board of Supervisors
County of Alameda, State of California

ATTEST:
Clerk of the Board of Supervisors,
County of Alameda

By: _____
Deputy Clerk

Approved as to Form

DONNA R. ZIEGLER,
County Counsel

By: _____
Heather Littlejohn
Deputy County Counsel

County of Alameda
2016 Local Hazard Mitigation Plan

January 2016

AECOM

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List of Tables

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List of Acronyms and Abbreviations

2016 LHMP	County of Alameda 2016 Local Hazard Mitigation Plan
ABAG	Association of Bay Area Governments
ACFD	Alameda County Fire Department
ACFC&WCD	Alameda County Flood Control & Water Conservation District
ACS	American Community Survey
ACWD	Alameda County Water District
CADWR	California Department of Water Resources
CAL FIRE	California Department of Forestry and Fire Protection
Cal OES	California Governor's Office of Emergency Services
CCSF	City & County of San Francisco
CFR	Code of Federal Regulations
CGS	California Geological Survey
CRS	Community Rating System
COG	Continuity of Government
COOP	Continuity of Operations
County	County of Alameda
CV MAC	Castro Valley Municipal Advisory Council
DFIRM	Digital Flood Insurance Rate Map
DMA 2000	Disaster Mitigation Act of 2000
DSOD	Division of Safety of Dams
EBMUD	East Bay Municipal Utilities District
EMS	Emergency Medical Services
ENSO	El Niño-Southern Oscillation
FEMA	Federal Emergency Management Agency
FHSZ	Fire Hazard Severity Zones
FIRM	Flood Insurance Rate Maps
GIS	geographic information system
GSA	General Services Agency
HMA	Hazard Mitigation Assistance
LHMP	Local Hazard Mitigation Plan
MMI	Modified Mercalli Intensity
NCDC	National Climatic Data Center
NFIP	National Flood Insurance Program
NOAA	National Oceanic and Atmospheric Administration
NRC	National Research Council
PGA	peak ground acceleration
RL	Repetitive Loss
SFHA	Special Flood Hazard Areas
SHMP	State Hazard Mitigation Plan
SRL	Severe Repetitive Loss
Stafford Act	Robert T. Stafford Disaster Relief and Emergency Assistance Act of 1988
UCERF	Uniform California Earthquake Rupture Forecast
USGS	U.S. Geological Survey
VOAD	Voluntary Organizations Active in Disaster
WGCEP	Working Group on California Earthquake Probabilities
WUI	wildland urban interface

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1.1 OVERVIEW

This County of Alameda (County) 2016 Local Hazard Mitigation Plan (2016 LHMP) is written to (1) address the local mitigation planning requirements of the Disaster Mitigation Act of 2000 (DMA 2000) for Unincorporated Alameda County (represented by the County of Alameda) and other local participants (**Section 1.5, Local Participants**); and (2) address the 510 Floodplain Management Planning activities of the Community Rating System (CRS) for the Alameda County Flood Control & Water Conservation District (ACFC&WCD) on behalf of Unincorporated Alameda County.

This section provides an introduction to hazard mitigation planning as well as a brief description of DMA 2000 and CRS. This section also identifies the local participants and describes the various sections and appendices of the 2016 LHMP.

The 2016 LHMP supersedes the 2011 LHMP. The 2011 LHMP (and 2007 LHMP) was developed as an Annex to a region-wide multi-jurisdictional hazard mitigation plan prepared by the Association of Bay Area Governments (ABAG). This 2016 LHMP has been developed as a standalone plan. This plan focuses on the unincorporated portions of Alameda County; cities within Alameda County are developing their own LHMPs.

1.2 HAZARD MITIGATION PLANNING

As defined in Title 44 of the Code of Federal Regulations (CFR), Subpart M, Section 206.401, hazard mitigation is "any action taken to reduce or eliminate the long-term risk to human life and property from natural hazards." As such, hazard mitigation is any work to minimize the impacts of any type of hazard event before it occurs. Hazard mitigation aims to reduce losses from future disasters. It is a process in which hazards are identified and profiled, the people and facilities at risk are analyzed, and mitigation actions to reduce or eliminate hazard risk are developed. The implementation of the mitigation actions, which include short- and long-term strategies that may involve planning, policy changes, programs, projects, and other activities, is the end result of this process.

1.2.1 Disasters and Their Relationship to Hazard Mitigation Planning

A disaster is a natural or man-made emergency whose response needs exceed available resources. When local government resources are exceeded, the California Governor's Office of Emergency Services (Cal OES) is contacted and the Governor is requested to declare a State Disaster. When State resources are exceeded, Cal OES contacts the U.S. Department of Homeland Security's Federal Emergency Management Agency (FEMA), and the President is requested to declare a National Disaster. This Presidential Declaration triggers funding resources for the public, the state, and local governments to use for clean-up, repair, recovery, and mitigation.

There are two primary ways to deal with disasters:

1. Increase emergency response capability. Thus, more damage needs to occur for those capabilities to be exceeded. Large incidents become manageable emergencies.
2. Undertake projects to prevent or lessen the impacts of future incidents, reducing the need for larger and larger response capability. For example, homes can be moved from areas

suffering repeated floods; buildings and infrastructure can be built to reduce expected damage in earthquakes; and wood shakes on homes in woodland areas can be replaced with asphalt shingles or tile. These actions are called mitigation.

1.3 DISASTER MITIGATION ACT OF 2000

In recent years, hazard mitigation planning has been driven by a new federal law known as DMA 2000. On October 30, 2000, Congress passed DMA 2000 (Public Law 106-390), which amended the Robert T. Stafford Disaster Relief and Emergency Assistance Act of 1988 (Stafford Act) (Title 42 of the United States Code Section 5121 et seq.) by repealing the act's previous mitigation planning section (409) and replacing it with a new mitigation planning section (322). This new section emphasized the need for state, tribal, and local entities to closely coordinate mitigation planning and implementation efforts. This new section also provided the legal basis for FEMA's mitigation plan requirements for mitigation grant assistance.

To implement these planning requirements, FEMA published an Interim Final Rule in the Federal Register on February 26, 2002 (FEMA 2002) (44 CFR Part 201). The tribal planning requirements were updated in 44 CFR Part 201.7 in 2009. The local mitigation planning requirements are identified in their appropriate sections throughout the 2016 LHMP and also within the FEMA Plan Review Tool included in **Appendix A**.

1.4 COMMUNITY RATING SYSTEM – ACTIVITY 510 FLOODPLAIN MANAGEMENT PLANNING

CRS is a voluntary incentive program that recognizes and encourages community floodplain management activities that exceed the minimum National Flood Insurance Program (NFIP) requirements. Under CRS, flood insurance premium rates are discounted to reflect the reduced flood risk that results when community actions meet the three goals of CRS: reducing flood damage to insurable property, strengthening and supporting the insurance aspects of the NFIP, and encouraging a comprehensive approach to floodplain management. In October 1992, Unincorporated Alameda County joined CRS as a class 7 rating, entitling flood insurance policy holders to receive up to a 15 percent premium discount annually.

There are 18 programs or "activities" in CRS that are intended to reduce or eliminate exposure to floods, including Activity 510 Floodplain Management Planning. To implement these activities, FEMA published the 2013 NFIP CRS Coordinators Manual (FIA 15-2013), which spells out the credit and credit criteria for CRS activities. The floodplain management planning activities for Unincorporated Alameda County (administered by the ACFC&WCD) are identified in their appropriate sections throughout the 2016 LHMP and also in the 510 Floodplain Management Planning Checklist included in **Appendix A**.

1.5 LOCAL PARTICIPANTS

The participating jurisdiction and special districts, referred to in this plan as local participants, are listed below (participant profiles are found in **Section 2, Community Profile**).

- County of Alameda (representing Unincorporated Alameda County)
- Alameda County Fire Department (ACFD)
- Alameda County Flood Control & Water Conservation District (ACFC&WCD)

1.6 ADOPTION DOCUMENTATION

The local hazard mitigation planning requirements and floodplain management planning activities for the adoption of the 2016 LHMP are as follows (similar Regulation Checklist boxes illustrating the various hazard mitigation planning requirements and CRS steps are found throughout this plan; text/data supporting the required regulations is found in the sections following the Regulation Checklist boxes):

Regulation Checklist – 44 CFR 201.6 Local Mitigation Plans
Element E: Plan Adoption
E1. Does the Plan include documentation that the Plan has been formally adopted by the governing body of the jurisdiction requesting approval? (Requirement § 201.6(c)(5))
E2. For multi-jurisdictional plans, has each jurisdiction requesting approval of the plan documented formal plan adoption? (Requirement §201.6(c)(5))

Regulation Checklist – CRS 510 Floodplain Management Planning
CRS Step 9: Adopt the Plan
No additional information.

The County of Alameda and the participating special districts of ACFD, and ACFC&WCD are the local participants represented in this LHMP and meet the requirements of Section 409 of the Stafford Act and Section 322 of the DMA 2000.

Each local participant's governing body has adopted this 2016 LHMP by resolution. A scanned copy of each resolution is included in **Appendix B.**

1.7 DESCRIPTION OF THE LOCAL HAZARD MITIGATION PLAN

The remainder of the 2016 LHMP consists of the sections and appendices described below.

1.7.1 Section 2: Community Profile

Section 2 provides a description of Alameda County and each of the participating special districts.

1.7.2 Section 3: Planning Process

Section 3 describes the planning process. Specifically, this section describes major milestones achieved during the LHMP update process and identifies key stakeholders, including the members of the LHMP Planning Team (**Appendix C**). This section includes a description of the Planning Team meetings held as part of the plan update process. Additionally, this section documents public outreach activities (**Appendix D**) and discusses the review and incorporation of relevant plans, reports, and other appropriate information.

1.7.3 Section 4: Hazard Assessment

Section 4 describes the process through which the LHMP Planning Team reviewed and re-selected the hazards to be profiled in the 2016 LHMP. The hazard analysis includes the nature, history, location, extent, and probability of future events for each hazard. Location and historical hazard map figures are provided in **Appendix E**.

1.7.4 Section 5: Risk Assessment

Section 5 identifies the methodology for analyzing potentially vulnerable assets: population, housing unit stock, Repetitive Loss (RL) properties, and critical facilities and infrastructure such as emergency response, government, and education facilities. This information was compiled by assessing the potential impacts from each hazard using Geographic Information System (GIS) data. Results of the Risk Assessment illustrate the level of vulnerability the County of Alameda has to each hazard.

1.7.5 Section 6: Capability Assessment

Section 6 includes the capability assessment; the capability assessment evaluates the human and technical, financial, and legal and regulatory resources available for hazard mitigation. It also describes current, ongoing, and completed mitigation projects and programs. In addition, it includes an overview of local participation in the NFIP.

1.7.6 Section 7: Mitigation Strategy

Section 7 provides a blueprint for reducing the potential losses identified in the risk assessment/vulnerability analysis. This process included a review of each local participant's 2011 LHMP mitigation action plan; development of a list of potential mitigation actions for each local participant; and selection and prioritization of a new mitigation action plan for each local participant. During this process additional CRS activities were addressed, including the review of each potential mitigation action.

1.7.7 Section 8: Plan Maintenance

Section 8 describes the formal plan maintenance process to ensure that the 2016 LHMP remains an active and applicable document. The plan maintenance process consists of monitoring, evaluating, and updating the plan; monitoring mitigation projects and closeout procedures; implementing the plan through existing planning mechanisms; and achieving continued public involvement. Forms to assist in plan maintenance are found in **Appendix I**.

1.7.8 Section 9: References

Section 9 includes reference sources used to develop this document.

1.7.9 Appendices

The following appendices follow the main body of the plan:

- A FEMA Compliance Documents
- B Adoption Resolutions

- C LHMP Planning Team Documents
- D Public Outreach and Stakeholder Involvement
- E Map Figures
- F The County of Alameda – Risk Assessment Tables
- G Alameda County Fire Department – Risk Assessment Tables
- H Alameda County Flood Control & Water Conservation District – Risk Assessment Tables
- I Plan Maintenance

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2.1 OVERVIEW

This section provides a brief narrative about the County of Alameda and the other local participants.

2.2 COMMUNITY PROFILE

2.2.1 County of Alameda

In 1853, just three years after the addition of California as the 31st state of the union, the County of Alameda was established. Located on the east side of San Francisco Bay, it was carved out of territory from two previously established neighboring counties, Contra Costa and Santa Clara.

The name of the County, "Alameda" means "a place where poplar trees grow." It was derived from the Spanish/Mexican heritage of the region and was actually the name originally given to a local creek, the Arroyo de la Alameda (Poplar Grove Creek).

Though sparsely populated in the early years after incorporation, the County has since become the 4th most inhabited in California (per 2010 census numbers). With a population of 1,610,921 – a density of 2,043.6 persons per square mile (2014 estimate, U.S. Census Bureau) – the number of County residents has increased about 3.4% since 2011 when the last Annex to the ABAG multi-jurisdictional plan was completed. Its 14 cities and 6 unincorporated areas are located within 738 square miles of land alongside 84 square miles of water for a total area of 831 square miles. Throughout the County there are 592,355 housing units (2014, U.S. Census Bureau).

Alameda County provides health care, social services, public protection, and general government programs. County services are provided to the citizens by over 9,000 employees working in 21 different agencies and departments. The County government has an operating budget of $2.74 billion, it currently owns and occupies approximately 6.5 million square feet of office and institutional space, leases another 1.2 million, and also owns, operates, and maintains bridges, dams, and other infrastructure.

Alameda County's residents, since the time of incorporation, have enjoyed a diverse and beautiful landscape that includes rolling open spaces, urban marinas and coastal plains along the bay, and densely vegetated hillsides with lakes and streams. Along with this natural beauty, however, come the associated dangers that such features bring. These include wildfires, landslides, flooding, and earthquakes. This last natural hazard is the result of a network of faults that permeate the area. Running mostly north to south, the primary faults include Greenville, northern Calaveras, the southern tip of Diablo, and one of the most dangerous fault systems in the United States, the North-South Hayward. And, lurking to the west across the bay is the ever-present San Andreas fault. While not located within the boundaries of Alameda County, it, too, poses a serious threat.

These inherent dangers, both in and around the County, have produced a number of emergencies and major disasters including numerous floods, the Hayward Quake of 1868, The Great San Francisco Earthquake and Fire of 1906, the Oakland Hills Fire Storm of 1991, and the Loma Prieta Earthquake of 1989.

2.2.2 Participating Special Districts

As noted previously, two special districts are participating in this 2016 LHMP. Information about each district is provided below.

2.2.2.1 Alameda County Fire Department

The ACFD was formed on July 1, 1993 as a dependent special district with the Alameda County Board of Supervisors as its governing body. This consolidation brought together into a single jurisdiction the Castro Valley Fire Department, Eden Fire Department, and County Fire Patrol. In subsequent years, the following entities elected to receive emergency fire and medical services by ACFD through a contractual agreement with Alameda County: the City of San Leandro (1995), the City of Dublin (1997), Lawrence Berkeley National Laboratory (2002), Lawrence Livermore National Laboratory (2007), the Alameda County Regional Emergency Communications Center (2008), the City of Newark (2010), the City of Union City (2010), and the City of Emeryville (2012).

The ACFD is comprised of four organizational branches: operations branch, communications and special operations branch, administrative support services branch, and fire prevention branch. The ACFD service area covers approximately 508 square miles, has a daytime population of approximately 394,000 residents, plus an additional 500,000 daily commuter travelling through services roads, freeways and railways. ACFD's 30 fire stations respond to over 35,000 calls annually. In addition to their 30 fire station, ACFD has offices for Administration, Urban Search and Rescue, Fire Prevention and Training/Emergency Medical Services (EMS). Services are provided by a staff of 414 personnel and 75 Volunteer Reserve Firefighters of various skills and ranking. ACFD is the Operational Area Dispatch Center for ten East Bay Area fire service agencies in Alameda County, and the coordinator for Fire and Fire Rescue Region II in California, which serves 16 counties along the Northern California coast.

Due to the broad range of community hazards, including earthquakes, wildfires, terrorist attacks etc., ACFD has numerous special operations programs including; Heavy and Water Rescue, Hazardous Material, Urban Search and Rescue and Dozer Operations in order to save lives and protect critical infrastructure. Automatic/Mutual aid is a daily occurrence.

2.2.2.2 Alameda County Flood Control & Water Conservation District

The ACFC&WCD was created in 1949 when the state legislature passed Act 205 of the California Uncodified Water Code. Act 205 defines the District's role in providing for the control and conservation of flood and storm water. The District provides flood protection for Alameda County residents and businesses. It plans, designs, constructs, and maintains flood control projects such as natural creeks, channels, levees, pump stations, dams, and reservoirs.

Although the ACFC&WCD serves the citizens of Alameda County, it is a completely separate legal entity from the County of Alameda. Many people often mistake or confuse the District with the Alameda County Public Works Agency. The District relies on the staff of the Alameda County Public Works Agency to carry out its mission. While staff is shared between two entities, there is no legal link between the two. The ACFC&WCD is comprised of four departments, each of which serves a unique function: engineering, maintenance and operations, construction and development, and management services.

3.1 OVERVIEW

This section summarizes:

- LHMP review and revision, including the incorporation of existing plans and other relevant information and coordination with other agencies
- LHMP update process
- LHMP Planning Team
- Public outreach and stakeholder involvement

Supporting information is provided in **Appendices C** and **D**.

3.2 LHMP REVIEW AND REVISION

The local hazard mitigation planning and floodplain management planning requirements for the plan review and evaluation as well as coordination with communities and other agencies are as follows:

Regulation Checklist – 44 CFR 201.6 Local Mitigation Plans
Element A: Planning Process
A4. Does the Plan describe the review and incorporation of existing plans, studies, reports, and technical information? (Requirement § 201.6(b)(3))

Regulation Checklist – 44 CFR 201.6 Local Mitigation Plans
Element D: Plan Review, Evaluation, and Implementation
D1. Was the Plan revised to reflect changes in development? (Requirement § 201.6(d)(3))

Regulation Checklist – CRS 510 Floodplain Management Planning
CRS Step 3: Coordinate with Other Agencies
A. Review of existing studies and plans.

3.2.1 LHMP Review and Recommendations

This 2016 LHMP is the third iteration of the plan. The LHMP was originally developed as part of the 2005 ABAG Multi-Jurisdictional Hazard Mitigation Plan. The Alameda County specific Annex was adopted in 2007, and a second version was developed in 2010 and adopted in 2011. Prior to developing this 2016 version of the LHMP, the 2011 LHMP was reviewed to identify the areas that require updating. Key recommendations for the 2016 LHMP are noted in **Table 3-1**.

Table 3-1. 2011 LHMP Review and Recommendations

Section #	2011 LHMP Section Name	2016 Section Name and Update Recommendations
1	N/A	**Introduction:** Add a discussion about LHMPs in general, and the various grant programs available to jurisdictions with an approved LHMP.
2	Introduction	**Community Profile:** Introduction section from the 2011 LHMP contained the community profile information; this information will remain, but the section will be re-titled.
3	Regional Planning Process & Local Planning Process	**Planning Process:** Similar to the 2011 LHMP, this section will talk about both the regional planning process as well as the local planning process. Discussion of the public outreach activities will be added to this section.
4	Hazards Assessment	**Hazards Assessment:** The hazards assessment will be updated so that it is broken out by hazard; for each hazard, nature, history, location, extent and probability of future events will be addressed. Incorporate climate change throughout the hazards assessment.
5	Risk Assessment	**Risk Assessment:** This section will continue to address the vulnerabilities of county-owned and maintained critical facilities; population and housing unit stock information will be added. Additionally, for the 2016 LHMP, the vulnerabilities will be provided for each individual facility.
6	N/A	**Capability Assessment:** This will be a new section for the 2016 LHMP.
7	Mitigation Goals and Objectives	**Mitigation Strategy:** This section will continue to include mitigation goals objectives and priorities for the next 5 years.
8	Plan Update Process	**Plan Maintenance:** This section will discuss the process to update the 2016 LHMP for the 5-year update, and will also discuss mechanisms to evaluate whether a minor update to the LHMP should occur sooner.
9	N/A	**References:** This will be a new section for the 2016 LHMP.

*Sections were not previously numbered; numbers were assigned to more clearly define each section

During the planning process, the LHMP Planning Team reviewed and incorporated information from existing plans, studies, and reports. Key information sources integrated into this document are listed in **Table 3-2**; additional references are provided in **Section 9, References**.

Table 3-2. Review and Incorporation of Other Studies and Plans

Study/Plan	Key Information
2013 California State Hazard Mitigation Plan	Disaster declaration information
Alameda County General Plan – Safety Element (last amended on February 4, 2014)	Historical hazard and location information
Adapting to Rising Tides, Alameda County Shoreline Vulnerability Assessment (May 2015)	Climate change and sea level rise data
Alameda County Climate Action Plan – For Government Services and Operations Through 2020	Climate change information and County priorities

3.2.2 Land Use and Development Trends

The County General Plan (General Plan) guides land use and development for the County. The General Plan consists of several documents. There are three area plans that contain land use and circulation elements for their respective geographic areas, as well as eight County-wide elements: Community Climate Action Plan, Conservation, Housing, Noise, Open Space, Recreation, Safety and Scenic Route. Each year an annual report for the General Plan is developed which highlights changes and achievements related to the General Plan over the last few years (the most recent report reflects activity through 2014).

Since development of the 2011 LHMP a variety of General Plan updates have occurred:

- Anticipated in 2016, adoption of the Ashland and Cherryland Community Health & Wellness Element
- December 2015, the Ashland and Cherryland Business District Specific Plan and Code was adopted
- February 2014, the County Community Climate Acton Plan was adopted (as an optional element of the County General Plan)
- February 2014, amendments to the countywide Safety Element were adopted
- January 2013, a comprehensive revision to the County-wide Safety Element was adopted
- 2012, several amendments to the Zoning Ordinance, as part of the implementation of the Housing Element, were adopted (the Housing Element was adopted in April 2011)
- March 2012, the Castro Valley Area General Plan was approved

Significant accomplishments that were made toward achieving major General Plan objectives include:

- The adoption of Residential Design Guidelines
- Promotion of future growth near transit that enhances neighborhoods and provides housing and commercial opportunities in pedestrian friendly environments; promotion of mixed use and transit oriented development
- Began implementation of AB 551 which promotes urban agriculture by designating Urban Agriculture Incentive Zones
- Revision of the County's Density Bonus Ordinance; developed materials to promote the

Density Bonus Program to developers

- Continued to support the development of affordable housing (such as the Ashland Family Apartments and the San Lorenzo Senior Housing projects)

Additionally, as mandated by Senate Bill 375, all regions in California must complete a Sustainable Communities Strategy as part of a Regional Transportation Plan. In the Bay Area this plan and planning process is called Plan Bay Area; the first plan was Plan Bay Area 2013. The plan is designed to be a work in progress and therefore is to be updated every four years. Development of the plan update began in 2015 and is anticipated to be adopted in 2017 (and is referred to as Plan Bay Area 2040).

A key concept in Plan Bay Area is Priority Development Areas (PDAs). PDAs are areas nominated by local jurisdictions as places that are appropriate for infill development that will provide housing amenities, and services to meet the daily needs of residents in a pedestrian-friendly environment served by transit. For Plan Bay Area 2013, Alameda County nominated four PDAs within the unincorporated area, and for Plan Bay Area 2040, Alameda County has nominated 43 PDAs (many of which fall within city boundaries). The concept of PDAs compliments current County General Plan policies, which recognize the importance of creating sustainable communities where residents of all income levels have access to jobs, services, and housing using transit, or by walking and bicycling.

Since development of the 2011 LHMP, a number of updates have been made to documents that guide development in Alameda County, however, the general development trend that existed when the 2011 LHMP was developed is still relevant today: increased infill development in urban cores which encourages transited-oriented and mixed use developed, combined with continued development of outlying areas.

3.3 LHMP UDPATE PROCESS

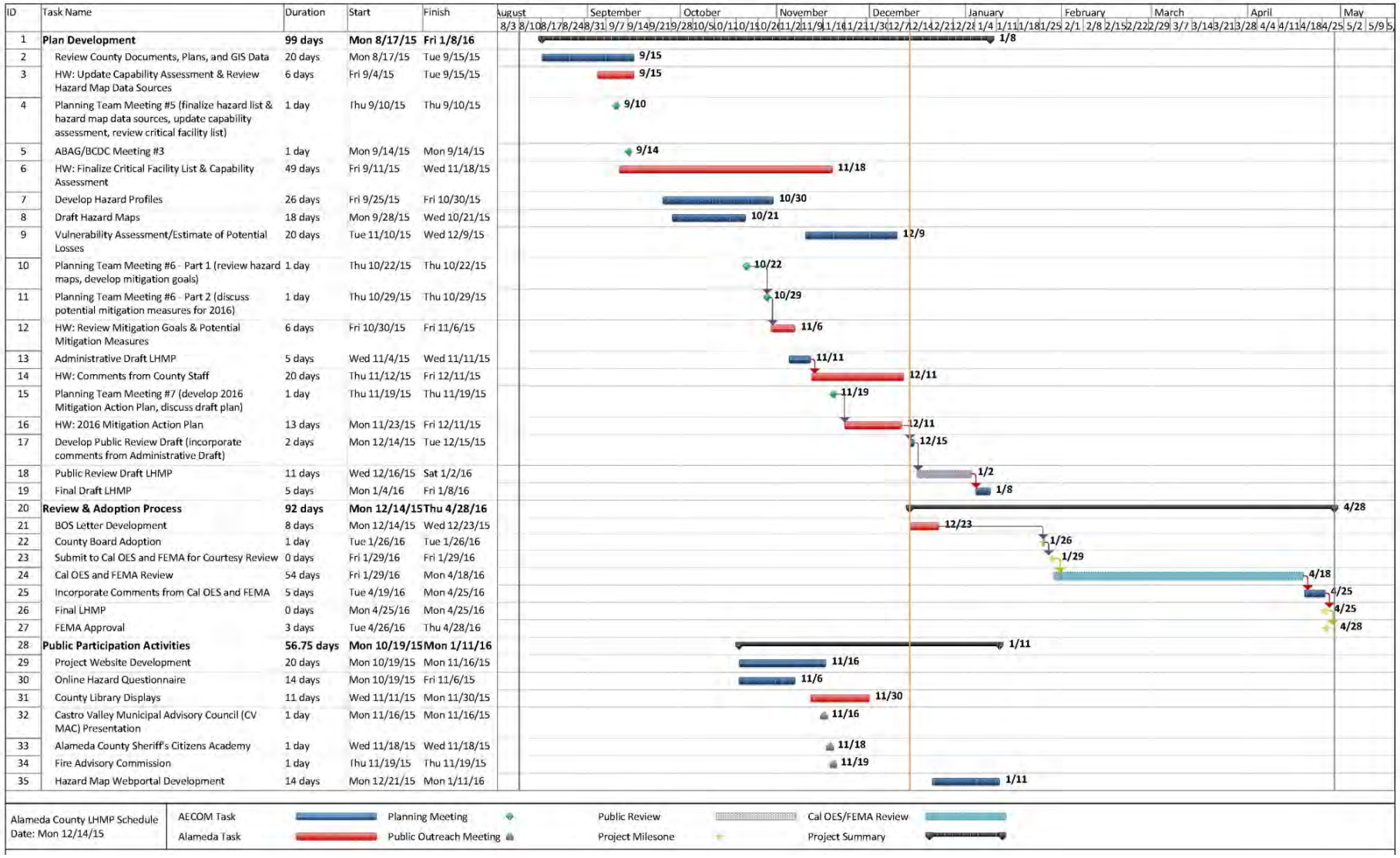
The local hazard mitigation planning requirement to document the planning process is as follows:

Regulation Checklist – 44 CFR 201.6 Local Mitigation Plans
Element A: Planning Process
A1. Does the Plan document the planning process, including how it was prepared and who was involved in the process for each jurisdiction? (Requirement § 201.6(c)(1))

In May 2015, Alameda County kicked off the 2016 LHMP update process for Alameda County. **Figure 3-1** shows the key planning tasks and the timeline associated with each task.

In addition to Alameda County's effort, a regional effort led by ABAG also occurred. While ABAG did not write the LHMP for this iteration of the plans, ABAG did lead various workshops to guide jurisdictions through the planning process. LHMP Planning Team members attended the following workshops to collaborate with region-wide efforts:

- Workshop 1: Resilience Planning Process Overview (3/26/15)
- Workshop 2: Risk Assessment Process (6/23/15)
- Workshop 3: Strategy Selection, Evaluation, and Implementation Process (9/14/15)



ID	Task Name	Duration	Start	Finish
1	**Plan Development**	**99 days**	**Mon 8/17/15**	**Fri 1/8/16**
2	Review County Documents, Plans, and GIS Data	20 days	Mon 8/17/15	Tue 9/15/15
3	HW: Update Capability Assessment & Review Hazard Map Data Sources	6 days	Fri 9/4/15	Tue 9/15/15
4	Planning Team Meeting #5 (finalize hazard list & hazard map data sources, update capability assessment, review critical facility list)	1 day	Thu 9/10/15	Thu 9/10/15
5	ABAG/BCDC Meeting #3	1 day	Mon 9/14/15	Mon 9/14/15
6	HW: Finalize Critical Facility List & Capability Assessment	49 days	Fri 9/11/15	Wed 11/18/15
7	Develop Hazard Profiles	26 days	Fri 9/25/15	Fri 10/30/15
8	Draft Hazard Maps	18 days	Mon 9/28/15	Wed 10/21/15
9	Vulnerability Assessment/Estimate of Potential Losses	20 days	Tue 11/10/15	Wed 12/9/15
10	Planning Team Meeting #6 - Part 1 (review hazard maps, develop mitigation goals)	1 day	Thu 10/22/15	Thu 10/22/15
11	Planning Team Meeting #6 - Part 2 (discuss potential mitigation measures for 2016)	1 day	Thu 10/29/15	Thu 10/29/15
12	HW: Review Mitigation Goals & Potential Mitigation Measures	6 days	Fri 10/30/15	Fri 11/6/15
13	Administrative Draft LHMP	5 days	Wed 11/4/15	Wed 11/11/15
14	HW: Comments from County Staff	20 days	Thu 11/12/15	Fri 12/11/15
15	Planning Team Meeting #7 (develop 2016 Mitigation Action Plan, discuss draft plan)	1 day	Thu 11/19/15	Thu 11/19/15
16	HW: 2016 Mitigation Action Plan	13 days	Mon 11/23/15	Fri 12/11/15
17	Develop Public Review Draft (incorporate comments from Administrative Draft)	2 days	Mon 12/14/15	Tue 12/15/15
18	Public Review Draft LHMP	11 days	Wed 12/16/15	Sat 1/2/16
19	Final Draft LHMP	5 days	Mon 1/4/16	Fri 1/8/16
20	**Review & Adoption Process**	**92 days**	**Mon 12/14/15**	**Thu 4/28/16**
21	BOS Letter Development	8 days	Mon 12/14/15	Wed 12/23/15
22	County Board Adoption	1 day	Tue 1/26/16	Tue 1/26/16
23	Submit to Cal OES and FEMA for Courtesy Review	0 days	Fri 1/29/16	Fri 1/29/16
24	Cal OES and FEMA Review	54 days	Fri 1/29/16	Mon 4/18/16
25	Incorporate Comments from Cal OES and FEMA	5 days	Tue 4/19/16	Mon 4/25/16
26	Final LHMP	0 days	Mon 4/25/16	Mon 4/25/16
27	FEMA Approval	3 days	Tue 4/26/16	Thu 4/28/16
28	**Public Participation Activities**	**56.75 days**	**Mon 10/19/15**	**Mon 1/11/16**
29	Project Website Development	20 days	Mon 10/19/15	Mon 11/16/15
30	Online Hazard Questionnaire	14 days	Mon 10/19/15	Fri 11/6/15
31	County Library Displays	11 days	Wed 11/11/15	Mon 11/30/15
32	Castro Valley Municipal Advisory Council (CV MAC) Presentation	1 day	Mon 11/16/15	Mon 11/16/15
33	Alameda County Sheriff's Citizens Academy	1 day	Wed 11/18/15	Wed 11/18/15
34	Fire Advisory Commission	1 day	Thu 11/19/15	Thu 11/19/15
35	Hazard Map Webportal Development	14 days	Mon 12/21/15	Mon 1/11/16

Figure 3-1. Plan Update Schedule

3.4 LHMP PLANNING TEAM

The local hazard mitigation planning and floodplain management requirement for documenting who was involved in the planning process, including Planning Team members, is as follows:

Regulation Checklist – 44 CFR 201.6 Local Mitigation Plans
Element A: Planning Process
A1. Does the Plan document the planning process, including how it was prepared and who was involved in the process for each jurisdiction? (Requirement § 201.6(c)(1))

Regulation Checklist – CRS 510 Floodplain Management Planning
CRS Step 1: Organize to Prepare the Plan
A. Involvement of Office Responsible for Community Planning
B. Planning committee of department staff

Regulation Checklist – CRS 510 Floodplain Management Planning
CRS Step 2: Involve the Public
A. Planning process conducted through a planning committee.

3.4.1 LHMP Planning Team

Similar to the past two versions of the plan, a LHMP Planning Team was formed to help guide development of the 2016 LHMP. The membership of the 2011 LHMP Planning Team was used as a starting point for the 2016 LHMP Planning Team. The 2016 LHMP Planning Team includes staff from relevant County departments and agencies, and representatives from the two Special Districts. The 2016 LHMP Planning Team is shown in **Table 3-3**.

The LHMP Planning Team met seven times during the plan update process to discuss the following:

- **May 26, 2015:** introduce the project; establish responsibilities; identify other stakeholders; evaluate mitigation progress during the past five years
- **June 11, 2015:** discuss and begin capability assessment; begin Community Engagement Strategy discussion
- **June 25, 2015:** develop initial Community Engagement Strategy
- **July 9, 2015:** review of team progress
- **September 10, 2015:** overview of hazard mitigation planning in general; review hazard map sources; discussion of the capability assessment; discussion of the critical facility list
- **October 22, 2015:** hazard maps, vulnerability analysis process; 2016 LHMP potential mitigation actions; 2016 LHMP mitigation strategy process (a follow-up meeting was held on October 29th for the LHMP Planning Team members that could make it to further discuss the mitigation strategy process)

- **November 19, 2015:** finalize the mitigation action plans and discuss the draft plan

Detailed meeting agendas and minutes are provided in **Appendix C**.

Table 3-3. LHMP Planning Team

Agency	Name	Title
Alameda County Fire Department	Hilda Quiroz	Emergency Preparedness Manager
Alameda County Medical Center	Sandra Williams	EOC Manager
Alameda County Sheriff's Office - Homeland Security & Emergency Services	Theresa (Terri) Langdon	Senior Emergency Services Coordinator
Community Development Agency - Planning Department	Angela Robinson-Piñon	Senior Planner
Community Development Agency - Planning Department	Elizabeth McElligott	Assistant Deputy Director
General Services Agency - Building Maintenance Department	John Kitching	Deputy Director
General Services Agency - Building Maintenance Department	Matt Muniz	Facilities Manager
General Services Agency - Sustainability Department	Carolyn Bloede	Sustainability Program Manager
General Services Agency - Sustainability Department	Ryan Bell	Sustainability Project Manager
General Services Agency - Technical Services Department	Michael Cadrecha	Architect, Mitigation Project Manager
General Services Agency - Technical Services Department	Rona Rothenberg	Architect, Design and Construction Program Manager
Public Health - Division of Communicable Disease Control & Prevention	Donata Nilsen	Public Information Officer
Public Health - Division of Communicable Disease Control & Prevention	Ron Seitz	Disaster Preparedness Coordinator
Public Health - Division of Communicable Disease Control & Prevention	Zerlyn Ladua	Bioterrorism/Public Health Emergency Preparedness Director
Public Health - Emergency Medical Services, Health Care Services Agency	Cynthia Frankel	Prehospital, EMS-C, and HPP EMSA Coordinator
Public Works Agency	Bill Lepere	Deputy Director
Public Works Agency - Building Inspection Division	Allen Lang	Chief Building Official
Public Works Agency - Environmental Section	Kwablah Attiogbe	Supervising Environmental Compliance Specialist

Table 3-3. LHMP Planning Team

Agency	Name	Title
Public Works Agency - Flood Control Design	Moses Tsang	Supervising Civil Engineer
Public Works Agency – Flood Control Watershed Planning Section	Andy Otsuka	Associate Engineer

The LHMP Planning Team members were considered initial points of contact for the agencies and special districts they represented. LHMP Planning Team members had the responsibility of attending meetings, participating in meeting discussions, providing agency/special district information, reviewing draft materials and serving as liaisons for their agency/special district. As liaisons, LHMP Planning Team members were the face of the project for their agency/special district, but throughout the planning process LHMP Planning Team members worked with their colleagues within their agency/special district.

3.5 PUBLIC OUTREACH AND STAKEHOLDER INVOLVEMENT

The local hazard mitigation planning and floodplain management planning requirements for public outreach and stakeholder involvement are as follows:

Regulation Checklist – 44 CFR 201.6 Local Mitigation Plans
Element A: Planning Process
A2. Does the Plan document an opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, agencies that have the authority to regulate development as well as other interests to be involved in the planning process? (Requirement § 201.6(b)(2))
A3. Does the Plan document how the public was involved in the planning process during the drafting stage? (Requirement § 201.6(b)(1))

Regulation Checklist – CRS 510 Floodplain Management Planning
CRS Step 2: Involve the Public
B. Public meetings held at the beginning of the planning process.
D. Other public information activities to encourage input.

3.5.1 Multi-Media Releases

A media release was distributed that announced the project. It described the purpose of the project, and provided points of contact for anyone who wanted to participate in the planning process or wanted more information about the project. The media release was distributed by the County Public Information Officer. Information regarding the 2016 LHMP project could also be found on the following social media outlets: Alameda County's Facebook page and Alameda County's Twitter account. Screenshots of the media releases are included in **Appendix D**.

3.5.2 LHMP Website

A website was developed to provide continuous public access to information on the 2016 LHMP project: http://www.AlamedaCountyLHMP.com. The website includes an overview of the project, dates and locations of community presentations on the LHMP, draft pieces of the plan for review, and points of contact for the consultant and the County project lead should any member of the public like to ask a question or get more involved in the planning process. Screenshots of the LHMP website are included in **Appendix D**.

3.5.3 Online Questionnaire

A questionnaire was developed for the public to provide feedback on their concerns about natural and human-caused hazards. The questionnaire was made available on the project website under the tab "Get Involved." Additionally, hard copies of the questionnaire were available at the library displays (**Section 3.5.6, Library Displays**) and passed out at the community presentations (**Section 3.5.5, Community Presentations**). A copy of the questionnaire is included in **Appendix D** as well as an analysis of the responses received.

3.5.4 Web Portal

Toward the end of the project, a web portal was developed that allows the user to view and manipulate the various hazard maps developed for the 2016 LHMP. Hazard maps can be viewed individually or multiple hazard layers can be viewed at a time to better understand the relationships between hazards. The search and zoom functions allow users to personalize their viewing. The web portal will remain accessible after completion of the plan for continued public use. An example of the web portal is included in **Appendix D**.

3.5.5 Community Presentations

As part of the public outreach process, the LHMP Project Management Team (which includes the 2016 LHMP Project Manager for Alameda County, the General Services Agency [GSA] Architect, Design and Construction Program Manager, the GSA Acting Director and the consulting staff) made presentations on the 2016 LHMP at four regularly scheduled community meetings. The County decided it was a great opportunity to take advantage of the existing and captive audience engaged in community activities and presented at the following meetings:

- Alameda County Voluntary Organizations Active in Disaster (VOAD) – Thursday, October 29, 2016
- Castro Valley Municipal Advisory Council (CV MAC) – Monday, November 16, 2015
- Alameda County Sheriff's Citizens Academy – Wednesday, November 18, 2015
- Fire Advisory Commission – Thursday, November 19, 2015

At the various meetings project staff also handed out hard copies of the questionnaire and the business-size cards which advertised the project website to meeting attendees to encourage further involvement.

3.5.6 Library Displays

From November 11, 2015 to November 30, 2015 the LHMP was advertised at five libraries throughout the County. The library displays included draft hazard maps for view; paper copies of the hazard questionnaire for the public to fill out and leave in a comment box; comment cards for the public to leave comments and/or ask questions on; and business-size cards advertising the project website for the public to take. Library displays were placed at the following libraries:

- Albany Library
- Castro Valley Library
- Dublin Library
- Fremont Library
- San Lorenzo Library (this display was installed on November 19th and removed on November 30th)

4.1 OVERVIEW

A hazards analysis includes identifying, screening, and profiling each hazard. The hazards analysis encompasses natural, human-caused, and technological hazards. Natural hazards result from unexpected or uncontrollable natural events of significant size and destructive power. Human-caused hazards result from human activity and include technological hazards. Technological hazards are generally accidental or result from events with unintended consequences (for example, an accidental hazardous materials release).

This hazards analysis consists of the following two steps:

- Hazard identification and screening
- Hazard profiles

4.2 HAZARD IDENTIFICATION AND SCREENING

As the initial step in this hazards analysis, the LHMP Planning Team reviewed the list of hazards identified in the 2011 LHMP and considered the following factors:

- Is the hazard included in the 2011 LHMP?
- Is the hazard included in the Alameda County General Plan - Safety Element (2014)?
- Is the hazard included in the 2013 California State Hazard Mitigation Plan (SHMP)?
- Has the hazard occurred in Alameda County and been declared a Presidential or State emergency or disaster in the past 15 years?

Based on the above analysis, the Planning Team determined that all hazards identified in the 2011 LHMP should be included in the 2016 LHMP. In addition, it was decided that climate change should be profiled in the 2016 LHMP. Climate change will not be a standalone hazard, but will be discussed throughout this hazard assessment.

As such, the following 11 hazards are profiled in the 2016 LHMP:

- Dam Failure Inundation
- Drought
- Earthquake
- Flood (including Sea Level Rise)
- Landslide
- Liquefaction
- Post-Fire Debris Flow
- Tsunami
- Wildfire

Climate Change
Climate change is not addressed as a standalone hazard because it is not considered separate, but is instead expected to contribute to and intensify numerous other hazards that are already addressed in this document, particularly including drought, flood, landslide, and wildfire. However, even dam failure, liquefaction, and tsunamis may be exacerbated by new weather patterns spurred by climate change, for example, through increased localized precipitation events and ongoing sea level rise.

Climate change refers to the long-term and irrevocable shift in weather related patterns, either regionally or more globally. According to most climatologists, the planet is starting to experience shifts in climate patterns which used to be relatively stable and predictable, and which are anticipated to lead to an increased frequency of extreme weather events, ranging from local to global levels. The Earth and its natural ecosystem are very closely tied to the climate and any permanent climate change will lead to an imbalance in the existing ecosystem, impacting the way people live, food availability, human health, wildlife and natural systems, as well as the availability of water.

Over the next century, continuously increasing atmospheric greenhouse gas concentrations are expected to cause a variety of changes to local climate conditions, leading to sea level rise and storm surge in coastal areas, reduced mountain snow pack, increased riverine flooding throughout the county, and more frequent, higher temperatures (leading to extreme heat events and wildfires), decreasing air quality, and extended periods of drought.

The effects of climate change are expected to negatively impact water and electricity demand and supplies in Alameda County. In addition to this, rising sea levels will continue to threaten cities along the County's coast and rivers, decreasing air quality and extreme heat days will degrade public health, and wildfire risk will increase (particularly in the grassland hills and mountainous areas of the County).

The effects of climate change are further discussed in the appropriate hazard profiles (i.e. Sea Level Rise is addressed under the Flood hazard profile).

4.3 HAZARD PROFILES

The local hazard mitigation planning and floodplain management planning requirements for hazard profiles are as follows:

Regulation Checklist – 44 CFR 201.6 Local Mitigation Plans
Element B: Hazard Identification and Risk Assessment
B1. Does the Plan include a description of the type, location, and extent of all natural hazards that can affect each jurisdiction(s)? (Requirement § 201.6(c)(2)(ii))
B2. Does the Plan include information on previous occurrences of hazard events and on the probability of future hazard events for each jurisdiction? (Requirement § 201.6(c)(2)(i))

Regulation Checklist – CRS 510 Floodplain Management Planning
CRS Step 4: Assess the Hazard
A. Plan includes the assessment of the flood hazard with: (1) A map of known flood hazards. (2) A description of known flood hazards. (3) A discussion of past floods.
B. Plan includes an assessment of less frequent floods.
C. Plan includes an assessment of areas likely to flood.
D. The plan describes other natural hazards.

The hazards selected were profiled based on existing available information. The hazard profiling consists of describing the nature of the hazard, disaster history, location of hazard, extent, and probability of future events, as well as the influence of climate change on the hazard. The sources of information are listed in **Section 9, References** of this document.

The hazards profiled for this LHMP are discussed in alphabetical order; the order does not signify level of risk.

4.3.1 Dam Failure Inundation

Nature: A dam failure is the unintentional and uncontrolled release or surge of impounded water from the dam reservoir, generally caused by a compromise of the dam structure. Dam failure can result from the gradual weakening of the structure, shortfalls within the initial design of the dam, structural damage due to human activity, or can occur as a secondary result of another hazard event.

Gradual weakening of the structure may occur through the normal aging process of the dam, improper operation, and inadequate maintenance and repair of the structure. A notable source of failure is piping, otherwise known as internal erosion caused by seepage, which generally occurs around hydraulic structures, through animal burrows, around roots, and between cracks in the dam structure and foundation.

A dam may fail due to its initial design as a result of not having been built under current construction techniques and seismic standards. Initial design limitations can also include inadequate spillway capacity, which can lead to overtopping following prolonged rainfall. Hazardous events such as earthquakes, floods, landslides, or a combination thereof can cause rapid structural damage that can result in dam failure.

The high-velocity, debris-laden wall of water released from dam failure has the potential to impact life and property by causing human causalities, economic loss, lifeline disruption (such as disruption to oil, gas, electricity, telecommunications, drinking water, waste water and transportation services), and environmental damage. Dam failure can occur rapidly and without advance warning for downstream communities, and is particularly severe when caused by natural events.

Dam failure inundation may result from the total collapse of a damn, a partial collapse of the dam, or unintended releases due to overtopping from prolonged rainfall or damaged spillways. In addition, normal dam operations can sometimes have unintended consequences that result in or contribute to a hazardous situation.

History: The San Francisco Public Utilities Commission-owned Calaveras Dam, located in Alameda County, failed during construction in 1918. A landslide damaged the upstream shell of the dam and destroyed the dam's outlet tower. In 2015, the inflatable dam on Alameda Creek (Rubber Dam 3) failed due to vandalism, releasing a significant supply of the community's water into the San Francisco Bay. However, Alameda County, as well as the Bay Area as a whole, has not experienced dam failure of a functioning dam that has resulted in inundation.

Location: Table 4-1 includes the name, owner, year built, capacity, and type for the dams that constitute potential failure hazards for Alameda County.

Map Figure-1 shows the name and location of the dams throughout the County, as well as extent, represented as the established dam failure inundation areas. It is not anticipated that every dam would fail at the same time; this map is designed to simply provide an approximate assessment of total risk for the County.

Table 4-1. Dams within Alameda County

Dam	Owner	Year Built	Capacity (ac/ft)	Type
Almond*	EBMUD	1954	20	Earth
Berryman Reservoir	EBMUD	1905	45	Earth
Bethany Forebay*	CADWR	1961	5,250	Earth
Calaveras*	CCSF	1925	100,000	Hydraulic fill
Central*	EBMUD	1910	485	Earth
Chabot*	EBMUD	1892	10,281	Hydraulic fill
Cull Creek*	ACFC&WCD	1963	310	Earth
Decoto Reservoir*	ACWD	1966	46	Earth
Del Valle*	CADWR	1968	77,100	Earth
Dunsmuir Reservoir*	EBMUD	1968	197	Reinforced Tank
Dyer*	CADWR	2011	525	Earth
Estates	EBMUD	1903	56	Earth
James H. Turner*	CCSF	1964	50,500	Earth
Lake Temescal *	East Bay Regional Park District	1869	200	Earth
Mayhew Reservoir	ACWD	Unknown	Unknown	Unknown
Middlefield Reservoir*	ACWD	1958	22	Earth
New Upper San Leandro Dam*	EBMUD	1977	42,000	Earth
Patterson (1065-000) *	ACWD	1962	46	Earth
Patterson (1-062) *	CADWR	1962	104	Earth
Piedmont*	EBMUD	1905	500	Earth
Quarry Pits*	ACWD	1977	3,360	Earth
Rubber Dam 1	ACWD	Unknown	Unknown	Unknown
Rubber Dam 3*	ACWD	1990	154	Inflatable
San Lorenzo Creek*	ACFC&WCD	1964	380	Earth
San Pablo Clearwell	EBMUD	1922	17	Earth
Seneca*	EBMUD	1950	92	Earth
Shinn*	ACWD	1987	390	Earth
South*	EBMUD	1956	156	Earth
Summit*	EBMUD	1891	117	Earth

Table 4-1. Dams within Alameda County

Dam	Owner	Year Built	Capacity (ac/ft)	Type
Ward Creek*	ACFC&WCD	1963	130	Earth

Source: DSOD 2015; Alameda County General Plan: Safety Element 2013

*State-size Dam, defined as being more than 25 feet in height and holding back more than 15 acre-feet of water, or being more than six feet in height and holding back more than 50 acre-feet of water

ACFC&WCD = Alameda County Flood Control & Water Conservation District
ACWD = Alameda County Water District
CADWR = California Department of Water Resources
CCSF = City & County of San Francisco
EBMUD = East Bay Municipal Utilities District

Extent: FEMA characterizes a dam as a high hazard if it stores more than 1,000 acre-feet of water, is taller than 150 feet, and has the potential to cause downstream property damage. The hazard ratings for dams are set by FEMA and confirmed with site visits by engineers. Most dams in the county are characterized by increased hazard potential because of downstream development and increased risk as a result of structural deterioration or inadequate spillway capacity.

The Division of Safety of Dams (DSOD) regulates state-size dams and inspects them annually to ensure that they are in good operating condition. Per government requirements, dam owners are to submit copies of their dam inundation maps to Cal OES (who distributes the maps to local communities). The dam inundation maps establish inundation limits resulting from a dam breach during the design storm and contain flood-wave arrival time estimates and flood inundation areas. While DSOD does not review or oversee the preparation of these maps, inundation maps are available for most large dams. The extent of inundation areas, for the available dam inundation maps, is shown in **Table 4-2**.

Table 4-2. Dam Inundation Areas

Dam	Inundation Area (Square Miles)
Almond	0.22
Berryman Reservoir	1.37
Bethany Forebay	2.55
Calaveras	41.25
Central	0.89
Chabot	8.55
Cull Creek	0.04
Decoto Reservoir	0.29
Del Valle	97.98
Dunsmuir Reservoir	0.97

Table 4-2. Dam Inundation Areas

Dam	Inundation Area (Square Miles)
Estates	0.23
Lake Temescal	1.77
Mayhew Reservoir	0.22
Middlefield Reservoir	0.26
New Upper San Leandro Dam	10.18
Patterson (1-062)	3.08
Piedmont	0.45
San Pablo Clrwell	0.05
San Lorenzo Creek	0.26
Seneca	0.20
South	0.24
Summit	0.05
Ward Creek	1.09

Source: Cal OES, 2015.

Probability of Future Events: The quantitative probability of dam failure inundation is unknown, partly because when a dam is known to have failure potential, the water level is reduced to allow for partial collapse without loss of water as required by DSOD and by safety protocols established by dam owners. However, a dam failure inundation event will most likely be the result of an extreme storm or secondary hazard.

Influence of Climate Change: Climate change may increase the likelihood and occurrences of prolonged rainfall and extreme storms/high-precipitation events, which can cause unintended releases of reservoir waters due to overtopping. Occurrences of extreme single-day precipitation events have been increasing in the United States over the last 40 years. See additional discussion in **Section 4.3.4, Flood**.

4.3.2 Drought

Nature: Drought is a prolonged period of dryness in which precipitation is less than expected or needed in a given geographic location or climate over an extended period of time. For much of human history, drought and its devastations have been seen as an unpredictable, unavoidable calamity. However, that viewpoint is giving way to the recognition that climatic fluctuations occur everywhere, and that periods of low precipitation are a normal, recurrent feature of climate.

There is no universally accepted quantitative definition of drought from a scientific or engineering point of view. However, in common terms drought is defined as natural deficit of water supply in a region due to below-average precipitation over a seasonal period or several years, causing a serious hydrological imbalance that results in biological losses and/or economic losses. Drought differs from normal aridity, which is a permanent feature of the climate in areas of low rainfall. Drought is the result of a natural decline in the expected precipitation over an extended period, typically one or more seasons in length. Other climatic characteristics (e.g., high temperature, high wind, low relative humidity) impact the severity of drought conditions.

Four scientific/engineering definitions of drought are listed below:

- Meteorological drought is defined solely by the degree of dryness, expressed as a departure of actual precipitation from an expected average or normal amount based on monthly, seasonal, or annual time scales.
- Hydrological drought relates to the effects of precipitation shortfalls on stream flows and reservoir, lake, and groundwater levels.
- Agricultural drought is defined principally in terms of soil moisture deficiencies relative to the water demands of plant life, usually crops.
- Socioeconomic drought associates the supply and demand of economic goods or services with elements of meteorological, hydrologic, and agricultural drought. Socioeconomic drought occurs when the demand for water exceeds the supply as a result of weather-related supply shortfall.

A drought's severity depends on numerous factors, including duration, intensity, and geographic extent as well as regional water supply demands by humans and vegetation. Due to its multi-dimensional nature, drought is difficult to define in exact terms and thus poses difficulties in terms of comprehensive risk assessments.

Drought differs from other natural hazards in three ways. First, both the onset and the end of a drought are difficult to determine due to the slow accumulation and lingering effects of an event after its apparent end. Second, the lack of an exact and universally accepted definition of drought adds to confusion about its existence and severity. Third, in contrast with other natural hazards, the impact of drought is less obvious and may be spread over a large geographic area. These characteristics have hindered the preparation of drought contingency or mitigation plans by many governments.

The effects of drought increase with duration as more moisture-related activities are impacted. Non-irrigated croplands are most susceptible to precipitation shortages. Rangeland and irrigated agricultural crops may not respond to moisture shortage as rapidly, but yields during periods of drought can be substantially affected. During periods of severe drought, lower moisture in plant

and forest fuels create an increased potential for devastating wildfires. In addition, lakes, reservoirs, and rivers can be subject to water shortages that impact recreational opportunities, irrigated crops, availability of water supplies for activities such as fire suppression and human consumption, and natural habitats of animals. Insect infestation can also be a particularly damaging impact from severe drought conditions.

History: Drought is a cyclic part of the climate of California, occurring in both summer and winter, with an average recurrence interval between 3 and 10 years. Recent droughts in California history are listed in **Table 4-3**.

Short-term, annual events are more frequent, whereas the less-frequent long-term events have ranged from 2 to 4 years in length. Climate change is likely to increase the number and severity of future droughts; the magnitude of this change is currently unknown. Alameda County, specifically, has received one Presidential Disaster Declaration as a result of drought, in 1967–1977. In addition, California experienced drought conditions between 2007 and 2009, and a statewide drought was declared for 2008.

Table 4-3. Recent Droughts in California

Year(s)	Areas Affected	Disaster Proclamation
1917-1921	Statewide except central Sierra Nevada and north coast	No
1922-1926	Statewide except central Sierra Nevada	No
1928-1937	Statewide	No
1943-1951	Statewide	No
1959-1962	Statewide	No
1976-1977	Statewide, except for southwestern deserts	Presidential declaration; Statewide disaster proclamation
1987-1992	Statewide	No
2007-2009	Statewide, particularly the central coast	Statewide disaster proclamations (2008 and 2009)
2012-2015	Statewide	Statewide disaster proclamation (2014)

Source: Paulson et al 1991; Cal OES, 2015.

The State of California is in the midst of the fourth year of a drought at the time of the writing of this LHMP. According to University of California, Berkeley, Professor B. Lynn Ingram, California is “on track for having the worst drought in 500 years.”

Location: The occurrence of drought is regional in nature and scope, which holds true for Alameda County. As illustrated on **Figure 4-1**, when drought occurs it typically affects the entire county.

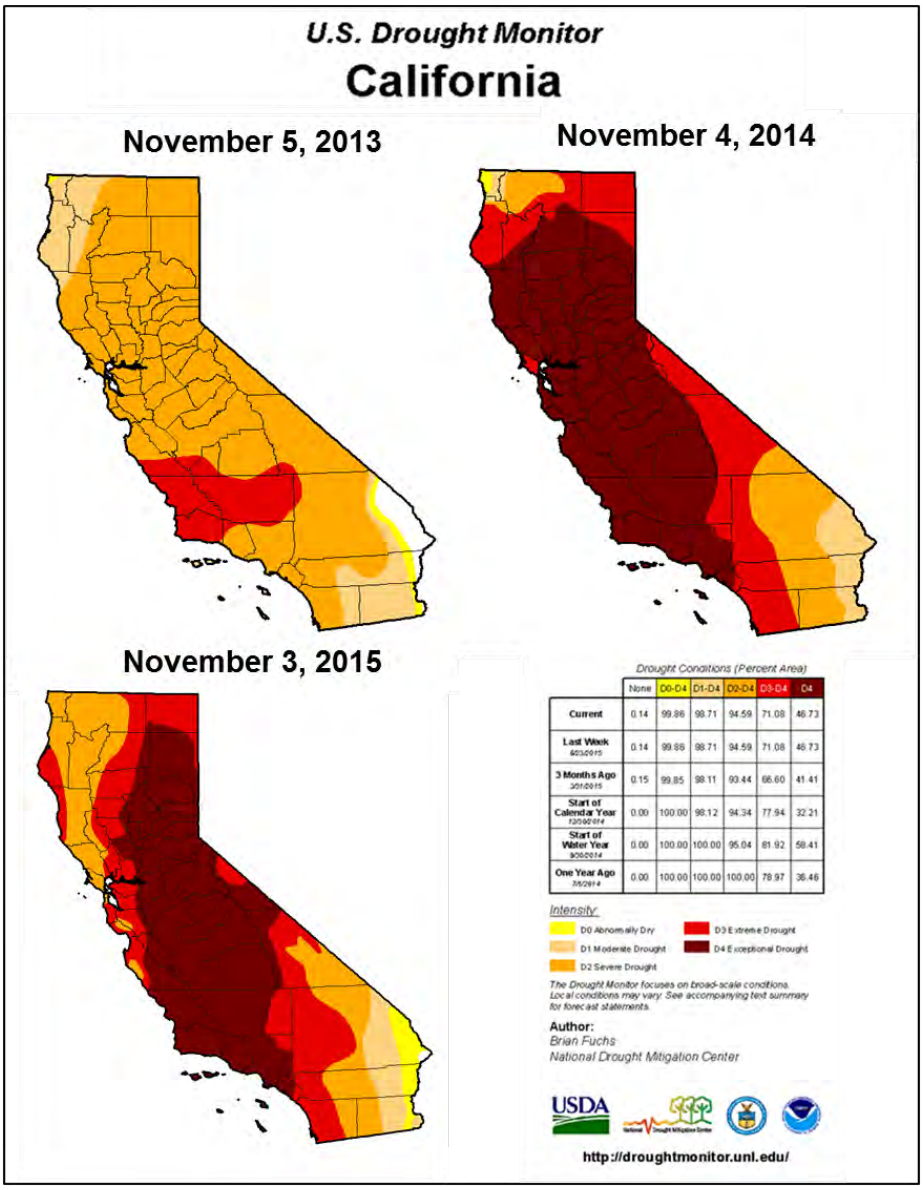


Figure 4-1. California Drought Conditions 2013-2015

Extent: The National Drought Mitigation Center produces drought monitor maps for the United States. It classifies droughts into five categories: D0 is the least severe, with abnormally dry conditions; and D4 is the most severe, with exceptional drought conditions. As of November 3, 2015, Alameda County and roughly half of the State of California remained classified in the highest ranking of D4, exceptional drought conditions.

Probability of Future Events: The ability to reliably predict drought conditions at seasonal or annual timescales is very limited. According to the California Department of Water Resources, the status of El Niño-Southern Oscillation (ENSO) conditions is currently the only factor that can offer some predictability to the onset of drought. Strong La Niña (warm) conditions of ENSO tend to favor a drier outlook for California. Therefore, based on previous La Niña conditions, drought conditions may exist in Alameda County every 3 to 10 years.

Influence of Climate Change: Climate change is projected to increase the number and severity of California's cyclical droughts. The odds of California suffering extreme droughts, like the current one that began in 2012, have roughly doubled over the past century and a recent study released in August 2015 said that climate change most likely intensified the current drought in California by 15 to 20 percent. The cumulative impact of climate change impacts will result in hotter and drier conditions, and will thus likely alter the timing and efficiency of the Bay Area water supply: rising temperatures dry the soil faster and cause more rapid evaporation from streams and reservoirs, leaving less water available for natural systems and human uses, such as agriculture. An increase in temperature and a reduction in snow pack are the two most direct effects of climate change that will result in a drier state with fewer natural water resources than have been available in recent human history.

In the Bay Area temperatures are projected to increase between 3 degrees (low emission scenario) and 6 degrees (high emission scenario) Fahrenheit by the end of the century. High temperatures further intensify drought conditions (higher evaporation rates and less atmospheric moisture), increasing the need for water from streams and reservoirs.

The reduction in snowpack does not have direct impacts in the Bay Area, as the region does not accumulate meaningful levels of snow. However, the snow pack in the Sierras is the source of two-thirds of the regions water and thus adversely impacts the Bay Area by its severe reduction from drought conditions and higher temperatures. By the end of the century the spring snow pack in the Sierra could be reduced by as much as 70 to 90 percent of the historic average.

4.3.3 Earthquake

Nature: The natural disaster with the greatest potential impact on Alameda County is an earthquake. An earthquake is a sudden motion or trembling caused by a release of strain accumulated within or along the edge of the earth's tectonic plates. The effects of an earthquake can be felt far beyond the site of its occurrence. Earthquakes usually occur without warning and can cause massive damage and extensive casualties in a few seconds. Common effects of earthquakes are ground motion and shaking, surface fault ruptures, and ground failure.

Ground motion is the vibration or shaking of the ground during an earthquake. When a fault ruptures, seismic waves radiate, causing the ground to vibrate. The severity of the vibration increases with the amount of energy released and decreases with distance from the causative fault or epicenter. Soft soils common to the Bay Area can amplify ground motions.

In addition to ground motion, several secondary natural hazards can occur from earthquakes, such as the following (both liquefaction and landslide are also discussed separately in following profiles):

- **Surface Faulting** is the differential movement of two sides of a fault at the earth's surface. Displacement along faults - both in terms of length and width - varies but can be significant (e.g., up to 20 feet), as can the length of the surface rupture (e.g., up to 200 miles). Surface faulting can cause severe damage to linear structures, including railways, highways, pipelines, tunnels, and dams.
- **Liquefaction** occurs when seismic waves pass through saturated granular soil, distorting its granular structure, and causing some of the empty spaces between granules to collapse. Pore-water pressure may also increase sufficiently to cause the soil to behave like a fluid for a brief period and cause deformations. Liquefaction causes lateral spreads (horizontal movements of commonly 10 to 15 feet, but up to 100 feet), flow failures (massive flows of soil, typically hundreds of feet, but up to 12 miles), and loss of bearing strength (soil deformations causing structures to settle or tip). Liquefaction can cause severe damage to property.
- **Landslides/Debris Flows** occur as a result of horizontal seismic inertia forces induced in the slopes by the ground shaking. The most common earthquake-induced landslides include shallow, disrupted landslides such as rock falls, rockslides, and soil slides. Debris flows are created when surface soil on steep slopes becomes totally saturated with water. Once the soil liquefies, it loses the ability to hold together and can flow downhill at very high speeds, taking vegetation and/or structures with it. Slide risks increase after an earthquake during a wet winter.

The severity of an earthquake can be expressed in terms of intensity and magnitude. Intensity measures the strength of shaking produced by the earthquake at a certain location. Intensity is determined from effects on people, structures and facilities (roads, bridges, pipelines, etc.), and the natural environment. Magnitude is the measure of the earthquake "strength," the energy released at the source of the earthquake.

The two most common measures of earthquake intensity used in the United States are the Modified Mercalli Intensity (MMI) Scale, which measures felt intensity, and peak ground acceleration (PGA), which measures instrumental intensity by quantifying how hard the earth

shakes in a given location. Magnitude is measured by the amplitude of the earthquake waves recorded on a seismograph using a logarithmic scale. The following table presents intensities that are typically observed at locations near the epicenter of earthquakes of different magnitudes, with interpretations of perceived shaking and potential damage to the built environment (**Table 4-4**).

Table 4-4. Magnitude/Intensity/Ground-Shaking Comparisons

Magnitude	Instrumental Intensity	PGA (% g)	Perceived Shaking	Potential Damage
0 – 4.3	I	<0.17	Not Felt	None
	II-III	0.17 – 1.4	Weak (Typically does not cause significant damage)	
4.3 – 4.8	IV	1.4 – 3.9	Light (Typically does not cause significant damage)	
	V	3.9 – 9.2	Moderate (Typically does not cause significant damage)	Very light
4.8 – 6.2	VI	9.2 – 18	Strong (Some things thrown from shelves, pictures shifted, water thrown from pools)	Light
	VII	18 – 34	Very Strong (Many things thrown from walls and shelves. Furniture is shifted)	Moderate
6.2 – 7.3	VIII	34 – 65	Violent (Nearly everything thrown down from shelves, cabinets, and walls. Furniture overturned)	Moderate to Heavy
	IX	65 – 124	Very Violent (Only very well anchored contents remain in place)	Heavy
	X	124 +	Extreme (Events of MMI X and greater have not yet been recorded)	Very Heavy
7.3 – 8.9	XI			
	XII			

Source: ABAG: *Modified Mercalli Intensity Scale*

History: Alameda County sits in one of the most historically seismically active regions in the United States. 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. The 1838, 1906, and 1989 earthquakes originated on the San Andreas fault, west of the county near San Francisco or to the south.

The three most prominent earthquakes (1868 Hayward, 1906 San Francisco, and Loma Prieta) are discussed below. **Map Figures-2** and **3** illustrates historic earthquakes in the Alameda County region.

- **1868 Hayward Earthquake, M 6.8, October 21, 1868:** This was one of the most destructive earthquakes in California's history. At the surface, ground rupture was traced for 20 miles and in the town of Hayward nearly every building was either destroyed or significantly damaged by the earthquake. The region was sparsely populated at the time.
- **1906 San Francisco Earthquake, M 7.9, April 18, 1906:** The 1906 earthquake struck along the north segment of the San Andreas Fault. The epicenter occurred about two miles off the San Francisco coast and shaking was felt from Oregon to Los Angeles and as far east as Nevada. The earthquake led to fires, which—combined with the damage from the earthquake—became one of the costliest natural events in the history of the United States. The combined events caused an estimated 3,000 deaths and $524 million in property losses.
- **Loma Prieta, M 6.9, October 17, 1989:** This earthquake struck along the northern segment of the San Andreas Fault near the Santa Cruz Mountains. This event greatly affected Alameda County, mainly due to the failure of the Cypress Street Viaduct on the Nimitz Freeway (Interstate 880) in the City of Oakland. A double-deck portion of the freeway collapsed, crushing the cars on the lower deck. Across the entire region it killed 63 persons, injured 3,757, displaced over 12,000, and caused approximately $6 billion of damage.

Location: Alameda County is exposed to seismic hazards from a number of known and potentially unmapped, undiscovered faults. The faults in Alameda County, as well as most of the major faults in the Bay Area, are strike-slip faults, where the rupture plane is oriented generally vertically and the ground on one side of the fault slips horizontally relative to the other side. The Bay Area also has several thrust or reverse faults, where ground moves upward and over adjacent ground. The most active strike-slip fault in Alameda County is the Hayward Fault, which has three fault segments (Rodgers Creek, North Hayward, and South Hayward). The most active fault in the Bay Area is the San Andreas Fault, which has ten fault segments. Additionally, both the Northern Calaveras and the Greenville Faults run straight through Alameda County.

The major regional faults that will have a significant impact on Alameda County are described below:

- **San Andreas (north):** The San Andreas fault system is the most active and well researched fault system in California. In its entirety, it runs 800 miles down the California coastline, staying entirely inland to the south of San Francisco. The northern segment of the fault runs from Hollister, through the Santa Cruz Mountains, epicenter of the 1989 Loma Prieta earthquake, then up the San Francisco Peninsula, then offshore at Daly City near Mussel Rock.
- **Hayward/Rodgers Creek:** The Hayward Fault Zone is a geologic fault zone capable of generating significantly destructive earthquakes. This fault is about 74 mi long, situated mainly along the western base of the hills on the east side of San Francisco Bay. It runs through densely populated areas, and is parallel to the San Andreas Fault.

North of San Pablo Bay, and somewhat offset from the Hayward Fault is the Rodgers Creek Fault. This structure may be an extension of the Hayward Fault Zone. The connection between the Rodgers Creek Fault Zone and the Hayward Fault Zone is unclear, as they are not aligned under San Pablo Bay. Nonetheless, the current view is that the Hayward Fault and Rodgers Creek Fault are probably connected by a series of en echelon fault strands beneath San Pablo Bay. It is considered possible that a major seismic event on either fault may involve movement on the other, either concurrently or within an interval of up to several months

- **Calaveras (north and central):** The Calaveras Fault is a major branch of the San Andreas Fault located in northern California in the San Francisco Bay Area. The Calaveras fault extends 76 mi, splaying from the San Andreas fault near Hollister and terminating at Danville at its northern end. It runs east of the San Andreas, diverging from it in the vicinity of Hollister, California, and is responsible for the formation of the Calaveras Valley there.
- **Concord/Green Valley:** The Concord Fault is a geologic fault in the San Francisco Bay Area. It is so called because it is located under the city of Concord. It is connected to, and considered to be part of, the same fault zone as the Green Valley fault, which lies just a few miles to the north across the Suisun Bay. The fault is situated at the east of West Napa Fault and extends from Mount Diablo to the Carquinez Strait, making it approximately 11 miles in length.
- **Greenville Fault:** The Greenville Fault is located in the eastern San Francisco Bay Area of California, in Alameda County and Contra Costa County. It is part of the somewhat parallel system of faults that are secondary to the San Andreas Fault.
- **San Gregorio (north):** The San Gregorio Fault is an active fault located off the coast of Northern California. The southern end of the fault is in southern Monterey Bay, and the northern end is about 12.5 miles northwest of San Francisco, near Bolinas Bay, where the San Gregorio intersects the San Andreas Fault. Most of the San Gregorio fault trace is located offshore beneath the waters of Monterey Bay, Half Moon Bay, and the Pacific Ocean, though it cuts across land near Point Año Nuevo and Pillar Point. The San Gregorio Fault is part of a system of coastal faults, which run roughly parallel to the San Andreas. The northern San Gregorio fault system that runs about 68 miles long.
- **Mt. Diablo Thrust:** The Mount Diablo Thrust Fault, also known as the Mount Diablo Blind Thrust, is a thrust fault in the vicinity of Mount Diablo in Contra Costa County, California. The fault lies between the Calaveras Fault, the Greenville Fault, and the Concord Fault, all right-lateral strike-slip faults, and appear to transfer movement from the Calaveras and Greenville Faults to the Concord Fault, while continuing to uplift Mount Diablo.

An earthquake on the Hayward Fault is the most likely and has the potential to cause the most damage for Alameda County. However, the entire western portion of the County is highly susceptible to an earthquake and earthquake damage; **Map Figures-4** and **5** illustrate the earthquake-shaking potential for Alameda County and the region, as well as the major faults in the region.

Extent: The strength of an earthquake's ground movement can be measured by PGA. PGA measures the rate in change of motion relative to the established rate of acceleration due to gravity (g = 980 centimeters per second, per second). PGA is used to project the risk of damage from future earthquakes by showing earthquake ground motions that have a specified probability (e.g., 10 percent, 5 percent, or 2 percent) of being exceeded in 50 years. The ground motion values are used for reference in construction design for earthquake resistance and can also be used to assess relative hazard between sites when making economic and safety decisions.

In 2013, the U.S. Geological Survey (USGS) developed an updated map of earthquake shaking potential for California. **Map Figures-4** and **5** indicate the level of shaking potential in Alameda County which includes 74.5 square miles of strong ground shaking, 288.5 square miles of very strong shaking potential, and 15.9 square miles of violent shaking.

Probability of Future Events: Over past years a group called the Working Group on California Earthquake Probabilities (WGCEP), a multi-disciplinary collaboration of scientists and engineers, has developed earthquake forecasts for California. In 2007, the WGCEP was commissioned to develop the Uniform California Earthquake Rupture Forecast (UCERF), the first comprehensive framework for comparing earthquake likelihoods throughout all of California. UCERF provided important new information for improving seismic safety engineering, revising building codes, setting insurance rates, and helping communities prepare for inevitable future earthquakes.

A new model was released in 2015 (UCERF3), which improves upon previous models by incorporating the latest data on the state's complex system of active geological faults, as well as new methods for translating these data into earthquake likelihoods. Compared to the previous assessment issued in 2008, UCERF2, the estimated rate of earthquakes around magnitude 6.7, the size of the destructive 1994 Northridge earthquake, has gone down by about 30 percent. The expected frequency of such events statewide has dropped from an average of one per 4.8 years to about one per 6.3 years.

For the San Francisco Region, the likelihood of having an M 6.7 or greater earthquake over the next 30 years (starting from 2014) is 72 percent. Below are 30-year probabilities for the three major northern California faults:

- San Andreas fault (northern): M 6.7 or greater, 6.4 percent chance
- Hayward fault: M 6.7 or greater, 14.3 percent change
- Calaveras fault: M 6.7 or greater, 7.4 percent chance

4.3.4 Flood

Nature: Flooding is the accumulation of water where usually none occurs or the overflow of excess water from a stream, river, lake, reservoir, or coastal body of water onto adjacent floodplains. Floodplains are lowlands adjacent to water bodies that are subject to recurring floods. Floodplains may change over time as a result of natural processes, changes in the characteristics of a watershed, or human activity. Coastal floodplains may also change over time as waves and currents alter the coastline.

Floods are natural events that are considered hazards only when people and property are affected. Nationwide, floods result in more deaths and more economic damage than any other natural hazard. Physical damage from floods includes the following:

- Inundation of structures, causing water damage to structural elements and contents.
- Impact damage to structures, roads, bridges, culverts, and other features from high-velocity flow and from debris carried by floodwaters. Such debris may also accumulate on bridge piers and in culverts, increasing loads on these features or causing overtopping or backwater effects.
- Release of sewage and hazardous or toxic materials as wastewater treatment plants are inundated, storage tanks are damaged, and pipelines are severed.

Secondary hazards from floods can include:

- Erosion or scouring of stream banks, roadway embankments, foundations, footings for bridge piers, and other features.
- Destruction of crops, erosion of topsoil, and deposition of debris and sediment on croplands.

Floods also cause economic losses through closure of businesses and government facilities. They disrupt communications, disrupt the provision of utilities, such as water and sewer service, result in excessive expenditures for emergency response, and generally disrupt the normal function of a community.

At least four flood types can occur: coastal flooding, riverine flooding, stormwater runoff, and flash flooding.

- **Coastal Flooding:** Coastal flooding in Alameda County is generally caused by wave run-up. Pacific Ocean storms in the months of November through February in conjunction with high tides and strong winds can cause significant wave run-up. The size and intensity of storm-generated waves depend on the magnitude of the storm, its sustained wind speeds, and the duration of the storm. During storm conditions, the elevated water levels generated by storm surge allow waves to penetrate much closer to the shoreline, exposing coastal structures to direct wave attack, wave run-up, and wave-induced scour and erosion.
- **Riverine Flooding:** The most common type of flooding - riverine flooding, also known as overbank flooding - refers to fresh water sources. Riverine floodplains range from narrow, confined channels in the steep valleys of mountainous and hilly regions to wide, flat areas in plains and coastal regions. The amount of water in the floodplain is a function of the size and topography of the contributing watershed, the regional and local

climate, and the land use characteristics of the floodplain. In steep valleys, flooding is usually rapid and deep but of short duration; in flat areas, flooding is typically slow, relatively shallow, but can last for long periods of time.

- **Stormwater Runoff:** Flooding due to stormwater runoff or street flooding often occurs when storm drains cannot convey the amount of water that would need to flow through them. This hazard can be due to high rates of rainfall, inadequate drainage design, storm surges, and/or debris blocking the storm drain conveyances.
- **Flash Flooding:** A flash flood, also a fresh water source, is the fastest-moving type of flood; this hazard can fill a normally calm area with a rushing current in a relatively short time. Flash floods occur when water falls too quickly on saturated soil or dry soil that has poor absorption ability. This water cannot be absorbed into the soil and therefore flows elsewhere.

  The defining characteristic of a flash flood is the timescale in which it develops; a flash flood generally develops in less than six hours. Flash flood waters also move at very great speeds and have the power to move boulders, tear out trees, and destroy both buildings and transportation infrastructure. During a flash flood, walls of water can reach heights of 10 to 20 feet. This combination of power and suddenness makes flash floods particularly dangerous.

History: Flooding is among the most common disasters in Alameda County. Query results from the National Climatic Data Center (NCDC) show that Alameda County has experienced 29 flood events since 1950. Recent events include the 1998 El Niño events, which led to about $700 thousand worth of property damage. The 2005–2006 winter storms received a presidential disaster declaration and resulted in about $17.6 million worth of property damage. All 29 of the recorded flood events occurred during the months of October, November, December, January, or February; 69 percent of them occurred in January and February.

Seven major flood events occurred in Alameda County over the past 20 years:

- 2008 January Storms: State Proclamation
- 2006 Storms (March-April): Federal Declaration
- 2005/2006 Winter Storms (January-February): Federal Declaration
- 2003 State Road Damage: State Proclamation
- 1998 El Niño Floods (February-April): State Proclamation, Federal Declaration
- 1996/1997 Winter Storms (December-April): Federal Declaration
- 1995 Winter Storms (January-April): State Proclamation, Federal Declaration

Location: Map Figure-6 shows the locations of areas likely to flood in Alameda County. Areas along the southern coast of Alameda County are most susceptible to flooding, as well as areas in the Livermore and Pleasanton Valleys.

Areas with unmapped flood hazards include numerous small channels and streams. Agricultural drainage ditches and urban drains cover much of the flatter parts and urban areas of Alameda County. Flooding in these areas is due to high-intensity rainfall occurring over a very short period. The flooding is usually shallow and mainly affects roadways and other low-lying areas.

In particular, the City of Castro Valley, the City of San Leandro, the City of Hayward and various communities along stretches of the San Lorenzo Creek, and Peralta Creek have historically experienced localized flooding conditions primarily due to inadequate storm drainage infrastructure and topography (hence, the "Zone X-Shaded" FEMA designations on the Flood Insurance Rate Maps [FIRMs] / Digital Flood Insurance Rate Map [DFIRMs]). These residential communities (largely built out) are not currently mapped by FEMA in the "Zone AE" high hazard Special Flood Hazard Area (SFHA). Most recently the affected portions of these communities have been mapped by FEMA under the DFRIRMs as a Zone X-Shaded (500-year floodplain).

Repetitive flood hazard areas are discussed in **Section 5.5, Repetitive Loss Properties**.

Extent: The magnitude of flooding that is used as the standard for floodplain management in the United States is a flood with a probability of occurrence of 1 percent in any given year. This flood is also known as the 100-year flood or the base flood. The most readily available source of information regarding the 100-year flood, as well as the 500-year flood, is on the FIRMs prepared by FEMA. These maps are used to support the NFIP.

FEMA has prepared a countywide DFIRM for the unincorporated areas of Alameda County, effective August 3, 2009. **Map Figure-6** shows the SFHAs identified in the Alameda County DFIRM. The Alameda County DFIRM identifies the following SFHAs: 5.14 square miles in the 100-year flood hazard area; and 1.89 square miles in the 500-year flood hazard area.

Probability of Future Events: On average, floods causing major damage within Alameda County occur every 3 years.

Influence of Climate Change: Climate change is projected to exacerbate all types of flooding noted above, in particular through storms and extreme precipitation events and through continuous sea level rise along the coast. The associated hazards of sea level rise and storm surge impacts are addressed in detail below. Occurrences of floods causing major damage within Alameda County, especially through major storms may increase due to Climate change.

4.3.4.1 Sea Level Rise

Globally, sea levels are rising due to thermal expansion caused by the ocean warming and the ongoing melting of land based ice, such as glaciers and polar ice caps. Regionally and locally, the rate of sea level rise is affected by other processes, including changes in land elevation (subsidence or uplift), coastal erosion, wind and ocean currents, ocean temperature and salinity, atmospheric pressure, and large-scale climate regimes.

In the Bay Area, sea levels have risen more than 8 inches in the past 100 years and currently continues to rise about 2 millimeters a year as measured by the National Oceanic and Atmospheric Administration (NOAA). The science of sea level rise is continually advancing and future research may enhance the scientific understanding of how the climate is changing and how this affects sea level rise locally. However, according to the most recent State guidance based on the 2012 National Research Council (NRC) Report Sea-Level Rise for the Coasts of California, Oregon, and Washington: Past, Present, and Future, sea level rise is projected to accelerate during this century. Depending on the rate of global warming, the report foresees a likely rise of 6 ± 2 inches by 2030, 11 ± 4 inches by 2050 and 36 ± 10 inches by the end of the century (It should be noted that the extreme limits of the ranges of sea level rise that are *unlikely but*

possible are 2 to 12 inches by 2030, 5 to 24 inches by 2050 and 17 to 66 inches by 2100 using both low and very high emission scenarios).

Sea level rise inundation maps (**Map Figures-7** and **8**) help to visually assess under what conditions assets may be impacted by sea level rise and storm events and how far reaching the consequences may be if they are impacted.

In addition to sea level rise, consideration must be given to storm surge and waves along the Alameda County shorelines. Understanding the additive impact of large waves and high tides to produce inundation and flooding is crucial for planning in the coastal environment. **Table 4-5** provides an overview of factors affecting existing water levels in the San Francisco Bay and the Alameda County shoreline. The typical range shown for the components that can build up extreme water levels represents how the magnitude of these components can vary, and are not referenced to an elevation datum.

Table 4-5. Factors That Influence Local Water Level Conditions in Addition to Sea Level Rise

Factors Affecting Water Level	Typical Range [1,2,3]	Period of Influence	Frequency
Tides	5 to 7 ft	Hours	Twice daily
Storm Surge	0.5 to 4 ft	Days	Several times a year
Storm Waves	0.5 to 4 ft	Hours	Several times a year
El Niños (within the ENSO cycle)	<1.5 ft	Months to Years	2 to 7 years

Source: Adapting to Rising Tides – Alameda County Shoreline Vulnerability Assessment. 2015.

[1] DHI. 2010. Regional Coastal Hazard Modeling Study for North and Central San Francisco Bay. Prepared for Federal Emergency Management Agency.

[2] DHI. 2012. Regional Coastal Hazard Modeling Study for South San Francisco Bay. Prepared for Federal Emergency Management Agency.

[3] BakerAECOM. 2013. Central San Francisco Bay Coastal Flood Hazard Study for Alameda County. Prepared for Federal Emergency Management Agency.

Alameda County is susceptible to sea level rise, storm surge, and wave hazards from the San Francisco Bay. The shoreline is comprised of a variety of shoreline features, including natural tidal marshes and mudflats, a network of non-engineered berms, engineered flood protection structures (e.g., levees) and engineered shoreline protection features (e.g., bulkheads, revetments, and rip-rap) all serving as the first line of defense to protect the densely built inland areas from coastal hazards. Some areas along the shoreline, including the Bay Bridge/I-80 touchdown area, the Bay Farm Bridge touchdown area on Bay Farm Island, and the salt ponds, already experience inundation due to coastal hazards, such as the annual extreme tides, or King Tides. Areas of the shoreline that have been filled, such as Bay Farm Island and Oakland International Airport, are especially at risk, as rising sea levels may influence groundwater levels, resulting in increased subsidence and liquefaction hazards.

The following coastal flood hazards may increase due to sea level rise and other atmospheric-oceanic processes:

- **Daily tidal inundation:** As sea level rises, the amount of land and infrastructure subjected to daily inundation by high tides – also known as increases in mean higher high water – will increase. This would result in increased permanent future inundation of low-lying areas.
- **Annual high tide inundation (King Tides):** King Tides are abnormally high, predictable astronomical tides that occur approximately twice per year. King Tides are the highest tides that occur each year during the winter and summer when the Earth, moon and sun are aligned. In the winter (December, January, and February), King Tides may be amplified by winter weather, making these events more dramatic. King Tides result in temporary inundation, particularly associated with nuisance flooding, such as inundation of low-lying roads, boardwalks, and waterfront promenades.
- **Extreme high tide inundation (storm surge):** When Pacific Ocean storms coincide with high tides, storm surge due to meteorological effects can elevate Pacific Ocean and San Francisco Bay water levels and produce extreme high tides, resulting in temporary inundation. Such storm surge events have occurred in January 27, 1983, December 3, 1983, February 6, 1998, January 8, 2005, and December 31, 2006. Extreme high tides can cause severe inundation of low-lying roads, boardwalks, and promenades; can exacerbate coastal and riverine flooding and cause upstream flooding; and can interfere with stormwater outfalls.
- **El Niño winter storms:** During El Niño winters, atmospheric and oceanographic conditions in the Pacific Ocean produce severe winter storms that impact the San Francisco shorelines. Pacific Ocean storms follow a more southerly route and bring intense rainfall and storm conditions to the Bay Area. Tides are often elevated 0.5 to 1.0-feet above normal along the coast, and wind setup can elevate water levels even further. El Niño winter conditions prevailed in 1977–1978, 1982– 1983, 1997–1998, and 2009–2010. A very pronounced El Niño is raising water levels in 2015-2016 and expected to bring above average rain storms to the Bay Area. Typical impacts include severe inundation of low-lying roads, boardwalks and waterfront promenades; storm drain backup; wave damage to coastal structures; and erosion of natural shorelines.
- **Ocean swell and wind-wave events (storm waves):** Pacific Ocean storms and strong thermal gradients can produce strong winds that blow across the ocean and the Bay. When the wind blows over long reaches of open water, large waves can be generated that impact the shoreline and cause damage. Typical impacts include wave damage along the shoreline, particularly to coastal structures such as levees, docks and piers, wharves, and revetments; backshore inundation due to wave overtopping of structures; and erosion of natural shorelines.

In Alameda County, the potential for new or prolonged flooding as sea level rises will not be confined to the shoreline. Sea level rise will increase the likelihood of major flood events because higher water levels in tidal creeks and flood control channels will reduce capacity to discharge rainfall runoff. While some creeks and coastal infrastructure already flood when rainstorms coincide with high tides, rising sea levels will increasingly cause flooding during smaller, more frequent rainfall events.

4.3.5 Landslide

Nature: Landslide is a general term for the dislodging and fall of a mass of soil or rocks along a sloped surface, or for the dislodged mass itself. The term is used for varying phenomena, including mudflows, mudslides, debris flows, rock falls, rock slides, debris avalanches, debris slides, and slump-earth flows. Landslides may result from a wide range of combinations of natural rock, soil, or artificial fill. The susceptibility of hillside and mountainous areas to landslides depends on variations in geology, topography, vegetation, and weather. Landslides may also occur because of indiscriminate development of sloping ground or the creation of cut-and-fill slopes in areas of unstable or inadequately stable geologic conditions.

Additionally, landslides often occur together with other natural hazards, thereby exacerbating conditions, as described below:

- Shaking due to earthquakes can trigger events ranging from rock falls and topples to massive slides.
- Intense or prolonged precipitation that causes flooding can also saturate slopes and cause failures leading to landslides.
- Wildfires can remove vegetation from hillsides, significantly increasing runoff and landslide potential.
- Landslides into a reservoir can indirectly compromise dam safety; a landslide can even affect the dam itself.

Another type of landslide occurs in areas cut by perennial streams. As floodwaters erode channel banks, rivers have undercut clay-rich sedimentary rocks along their south bank, thereby destabilizing the ground and causing the ground above it to slide.

Landslide movement can occur suddenly or slowly, depending on the nature of the incident and geologic conditions. Fast-moving landslides are an especially dangerous hazard to human life because in almost all cases, they catch victims completely unaware.

Landslides can cause several types of secondary effects, including blocking access to roads, disrupting or damaging communication infrastructure, depositing debris or pollutants into water supply, harming natural habitats, and permanently destabilizing land.

History: Landslides in the Bay Area typically occur as a result of either earthquake or, most prominently, during heavy and sustained rainfall events. USGS records show that localized damage in the Bay Area due to earthquake-induced landslides has been recorded since 1838 for at least 20 earthquakes. The 1906 earthquake generated more than 10,000 landslides throughout the region, killing 11 people and causing substantial damage to buildings and infrastructure. The most significant landslides caused by the 1989 earthquake were located in the Santa Cruz Mountains. However, landslides from this event were reported throughout the Bay Area.

Urbanized, and especially hilly, areas of Alameda County have sustained damage from landslides caused by storms going back to 1927. During the sustained winter storm of 1969-1970, heavy rains caused 22 homes in the Oakland Hills to slide into the canyon of Peralta Creek. In 1982, a major storm caused widespread and catastrophic landslide damage throughout the Bay Area, resulting in many deaths and over $60 million in direct costs. The El Niño rainstorm of 1998 triggered landslides throughout the Bay Area that, according to a USGS study,

damaged 87 sites in Alameda County, resulting in a total direct cost of about $20 million (about 50 percent of which was allocated to restoring roads and highways). Most of the losses occurred along the densely populated west flank of the Oakland Hills. About half of the damage sites were within the cities of Oakland and Berkeley. Since then, smaller events have occurred in the Oakland Hills. In January 2008, a large section of the roadway Skyline Boulevard in the Oakland Hillsgave way, sending mud and water down to the homes below. No homes or lives were lost, but a portion of the road was closed for about six months for repairs. Most recently, in 2012, high groundwater triggered a complex slide near CA-13 in Oakland that caused rocks slope protection to spill into the roadway and damage nearby homes and the sewer system, resulting in nearly $7 million in direct costs.

Location: Map Figure-9 illustrates the landslide zones throughout Alameda County. As expected, the areas that are most susceptible to landslides are the more mountainous areas of the County found predominately in the eastern portion of the County. Fortunately, the zones where landslides are more prevalent are also some of the least densely populated areas of the County.

Extent: There are 157.5 square miles of Alameda County located in the few landslides zone and 169.3 square miles in the mostly landslides zone.

Probability of Future Events: Landslides will almost always occur in coordination with another event, generally an earthquake or a storm. Based on the history of landslide occurrences and the potential for landslides as a result of the conditions in the County, future events are likely to occur about once every 10 years.

Influence of Climate Change: Climate change is not expected to change the seismic risk, but climate change could change the behavior of winter storms. The regional models project fairly similar precipitation totals in the Bay Area, but the variability season to season may increase. If winters are compressed, with more rain falling in fewer months, or if individual years are more extreme the chance of rainfall-induced landslide will increase. Additionally, if fires burn greater portions of landslide- vulnerable hillsides, removing vegetation and increasing storm runoff, the landslide probability will increase. Currently, there is not enough evidence to suggest with certainty that future landslide probabilities will increase across the region, however local studies that take local conditions into consideration may reveal the potential for greater landslide risks in the future.

4.3.6 Liquefaction

Nature: Liquefaction is a secondary hazard that occurs from earthquakes. Liquefaction occurs when seismic waves pass through saturated granular soil, distorting its granular structure, and causing some of the pore spaces between granules to collapse. Pore-water pressure may also increase sufficiently to cause the soil to behave like a fluid for a brief period and cause deformations.

Liquefaction causes lateral spreads (horizontal movements of commonly 10 to 15 feet, but up to 100 feet), flow failures (massive flows of soil, typically hundreds of feet, but up to 12 miles), loss of shear strength (soil deformations causing structures to settle or tip), sand boils, and ground subsidence. Liquefaction can cause severe damage to property, including damaging pipes, compromising building foundations, and bucking roads and airport runways.

History: The USGS has mapped liquefaction occurrences for parts of the Bay Area for earthquakes occurring in the following years: 1838, 1852, 1865, 1868, 1906, 1957, and 1989. Past history has shown that the Oakland coast, Alameda, Oakland International Airport, and Alameda Creek near Fremont are the areas most affected by liquefaction.

Location: Areas with alluvial soil on the Bay front around the Alameda County Control Channel/Alameda Creek and areas of Livermore and Pleasanton are most susceptible to liquefaction. As illustrated in **Map Figure-10**, the majority of the County falls within the very low and low liquefaction susceptibility areas. Those in the very high susceptibility areas are predominately found along the coast from Albany south to San Lorenzo.

Extent: There are 20.9 square miles of Alameda County located in the moderate liquefaction susceptibility zone, 5.4 square miles located in the high liquefaction susceptibility zone, and 3.1 square miles in the very high liquefaction susceptibility zone.

Probability of Future Events: Because Alameda County includes areas where ground conditions are prone to liquefaction, the County will likely experience liquefaction during the next major earthquake. As noted in **Section 4.3.3, Earthquake**, scientists have determined that a 72 percent chance exists that a major earthquake will occur in the San Francisco Region over the next 30 years (2014-2043).

Influence of Climate Change: There is no direct influence of climate change considered, however sea level rise may increase the potential for higher ground water levels and more pore water pressure in low-lying coastal areas and thus could amplify the likelihood of liquefaction in the event of an earthquake.

4.3.7 Tsunami

Nature: A tsunami is a series of traveling ocean waves of extremely long length, generated by disturbances associated primarily with earthquakes occurring below or near the ocean floor. Subduction zone earthquakes at plate boundaries often cause tsunamis. However, tsunamis can also be generated by submarine landslides, submarine volcanic eruptions, the collapse of volcanic edifices, and—in very rare instances—large meteorite impacts in the ocean.

In the deep ocean, a tsunami may have a length from wave crest to wave crest of 100 miles or more but a wave height of only a few feet or less. Thus, the wave period can be up to several hours, and wavelengths can exceed several hundred miles. Therefore, tsunamis are unlike typical wind-generated swells on the ocean, which might have a period of about 10 seconds and a wavelength of up to 300 feet. Tsunamis cannot be felt aboard ships and they cannot be seen from the air in the open ocean. In deep water, the waves may reach speeds exceeding 700 miles per hour.

Tsunamis can originate hundreds or even thousands of miles away from coastal areas. Local geography may intensify the effect of a tsunami. Areas at greatest risk are less than 50 feet above sea level and within 1 mile of the shoreline. Tsunamis arrive as a series of successive crests (high water levels) and troughs (low water levels). These successive crests and troughs can occur anywhere from 5 to 90 minutes apart, but usually occur 10 to 45 minutes apart.

Tsunamis not only affect beaches that are open to the ocean, but also bay mouths, tidal flats, and the shores of large coastal rivers. Tsunami waves can also diffract around land masses. Because tsunamis are not symmetrical, the waves may be much stronger in one direction than another, depending on the nature of the source and the surrounding geography. However, tsunamis do propagate outward from their source, so coasts in the shadow of affected land masses are usually fairly safe.

History: Tsunamis have not been a major problem in Alameda County and most of the Bay Area.

From 1812 to 2000, 22 tsunamis have been recorded by the National Oceanic and Atmospheric Administration in the Bay Area. The majority, 15 of 22, of these tsunamis originated in Alaska and were caused by an earthquake, earthquake and landslide, or volcano and earthquake; the remainder had a source location of Northern California, Japan, or Chile. In 1859, a tsunami generated by an earthquake in Northern California generated 4.6-meter wave heights near Half Moon Bay. The Great 1868 earthquake on the Hayward Fault is reported to have created a local tsunami in the San Francisco Bay. In 1960, Pacifica experienced high water resulting from an M 9.5 earthquake off the coast of Chile. The tsunami generated by the 1964 Alaskan earthquake caused wave heights of three to seven meters off the Coast of Northern California, Oregon, and Washington. Eleven people were killed in Crescent City as a result of this tsunami. Along the coast of San Francisco, Marin, and Sonoma Counties, maximum wave heights of 1.1 meters were recorded, and no significant damage was experienced.

In February 2010, an M 8.8 earthquake struck off the coast of Chile and in March 2011, an M 8.9 earthquake struck off the coast of Japan. While neither of these events resulted in damage to Alameda County, the tsunami that resulted from the 2011 Japan earthquake hit the Northern California west coast, causing extensive damage to harbors and piers. Waves surging along the coast reached as high as 7 feet tall; the cities of Crescent City and Santa Cruz were hit the

hardest. In both the 2010 and 2011 events, Alameda County received tsunami advisories, the lowest-level alert issued by the National Weather Service. The City of Alameda, the Berkeley Marina, as well as other coastal areas of Alameda County saw waves resulting from the tsunami, but ultimately no damage was sustained. **Table 4-6** illustrates the historical tsunami run-ups that have affected Alameda County.

Table 4-6. Historical Tsunami Run-Ups in Alameda County

Date	Source/Source Location	Tsunami Location	Remarks
11/13/1851	Earthquake – California: Northern	San Francisco Bay	"unusual movement of water" was felt
10/21/1868	Earthquake – California: Northern	San Francisco Bay	14.76-foot run-up
3/31/1898	Earthquake – Oakland	Oakland	1.0-foot run-up
4/1/1946	Earthquake – Alaska (Unimak Island)	Alameda	.66-foot run-up
3/9/1957	Earthquake – Alaska (Andreanof Islands)	Alameda	.59–foot run-up
5/22/1960	Earthquake – Southern Chile	Alameda	1.0-foot run-up
		Berkeley	Unknown
3/28/1964	Earthquake – Alaska (Prince William Sound)	Alameda – Alviso Sough	.59–foot run-up
		Alameda – Naval Air Station	2.62-foot run-up
		Oakland	4.0-foot run-up
5/16/1968	Earthquake – Japan (off east coast of Honshu Island)	Alameda	.33–foot run-up
4/25/1992	Earthquake – Cape Mendocino	Alameda	.13-foot run-up
10/4/1994	Earthquake – Russia (S. Kuril Islands)	Alameda	.13-foot run-up
5/3/2006	Earthquake – Tonga	Alameda	.13-foot run-up
2/27/2010	Earthquake – Central Chile	Alameda	.39-foot run-up
3/11/2011	Earthquake – Japan (Honshu Island)	Alameda	1.67-foot run-up
		Berkeley Marina, CA	1.67-foot run-up
10/28/2012	Earthquake – British Columbia	Alameda	.36-foot run-up
9/16/2015	Earthquake – Central Chile	Alameda	.20-foot run-up

Source: National Geophysical Data Center / World Data Service: Global Historical Tsunami Database. 2015.

Run-up = the large amount of water that a tsunami pushes onto the shore above the regular sea level, that is the maximum vertical height onshore above sea level reached by a tsunami

Location: As illustrated in **Map Figure-11**, the majority of the Alameda County coastline is within the tsunami inundation area, with the coasts of the Cities of Alameda and Oakland being the most susceptible.

Extent: The extent of a tsunami is a factor of:

- Distance of shoreline from the tsunami generating event

- Magnitude of the earthquake causing the event; duration and period of waves
- Run-up elevations
- Tidal level at time of occurrence
- Location along shore and direction of shore in respect to propagated waves
- Topography of the seabed

As illustrated by Alameda County's tsunami history, the majority of tsunami events lead to a wave run-up of one 1 foot or less, however, wave run-ups can also reach over four feet in height.

Probability of Future Events: Large tsunamis have not been common along the coastal areas of Alameda County. Few significant incidents have been recorded over a limited historical record to develop accurate recurrence predictions. Based on previous occurrences in the region and the history of earthquakes in the Pacific Rim, another tsunami event is likely to occur, although the extent and probability is unknown.

Influence of Climate Change: There is no direct influence of climate change considered, however sea level rise will raise the mean water level and thus increase overall water elevation of a tsunami.

4.3.8 Wildfire

Nature: A wildfire is an uncontrolled fire that spreads through vegetative fuels, exploding and possibly consuming structures. Wildfires can be caused by human activities, such as arson or campfires, or by natural events, such as lightning. Wildfires often occur in forests or other areas with ample vegetation. Wildfires often begin unnoticed, spread quickly, and are usually signaled by dense smoke that may be visible from miles around. Wildfires can be categorized into four types:

- **Wildland fires** occur mainly in areas under federal control, such as national forests and parks, and are fueled primarily by natural vegetation.
- **Interface or intermix fires** occur in areas where both vegetation and structures provide fuel. These are also referred to as urban-wildland interface fires.
- **Firestorms** occur during extreme weather (typically high temperatures, low humidity, and high winds) with such intensity that fire suppression is virtually impossible. These events typically burn until the conditions change or the fuel is exhausted.
- **Prescribed fires and prescribed natural fires** are intentionally set or natural fires that are allowed to burn for beneficial purposes.

The following three factors contribute significantly to wildfire behavior; as described more fully below, these factors can be used to identify wildfire hazard areas:

- **Topography:** As slope increases, the rate of wildfire spread increases. South-facing slopes are also subject to greater solar radiation, making them drier and thereby intensifying wildfire behavior. However, ridgetops may mark the end of wildfire spread because fire spreads more slowly or may even be unable to spread downhill.
- **Fuel:** The type and condition of vegetation plays a significant role in the occurrence and spread of wildfires. Certain types of plants are more susceptible to burning or burn with greater intensity. Dense or overgrown vegetation increases the amount of combustible material available to fuel the fire (referred to as the “fuel load”); the ratio of living to dead plant matter is also important. The risk of fire is increased significantly during periods of prolonged drought as the moisture content of both living and dead plant matter decreases. The fuel’s continuity is also an important factor, both horizontally and vertically.
- **Weather:** The most variable factor affecting wildfire behavior is weather. Variables such as temperature, humidity, wind, and lightning can affect chances for ignition and spread of fire. Extreme weather, such as high temperatures and low humidity, can lead to extreme wildfire activity. By contrast, cooling and higher humidity often signals reduced wildfire occurrence and easier containment. Years of precipitation followed by warmer years tend to encourage more widespread fires and longer burn periods. Also, since the mid-1980s, earlier snowmelt and associated warming due to global climate change has been associated with longer and more severe wildfire seasons in the western United States.

In areas where structures and other human development interfaces with wildland or vegetative fuels, referred to as the wildland urban interface (WUI), wildfires can cause significant property damage and present extreme threats to public health and safety. If not promptly controlled, even

small wildfires may grow into an emergency or disaster and threaten lives and resources while destroying improved properties. It is also important to note that in addition to affecting people, wildfire may severely affect livestock and pets. Such events may require the emergency watering/feeding, shelter, evacuation, and even burying of animals.

The indirect effects of wildfires can be catastrophic. In addition to stripping the land of vegetation and destroying forest resources, large, intense fires can harm the soil, waterways, and the land itself. Soil exposed to intense heat may lose its capacity to absorb moisture and support plant life. Exposed soils erode quickly and enhance siltation of rivers and streams, thereby enhancing flood potential, harming aquatic life, and degrading water quality. Lands stripped of vegetation are also subject to increased debris flow hazards. Wildfires can also greatly affect the air quality of the surrounding area.

Residential and commercial encroachment into the WUI has increased the potential for disastrous fires in the County‘s lower hillside areas. In an effort to assist in alleviating fire dangers near the urban development interface, the construction of a fuel modification zone (firebreak, fuel break, or greenbelt) is applied. The continued application of this method has impacts on wildlife, on unique vegetation, and in some cases, to the watershed cover, as deep-rooted chaparral species are replaced by shallow-rooted grasses.

History: Wildfires are common in the Bay Area. Large historic wildfires occurred in 1961, 1962, 1964, 1965, 1970, 1981, 1985, 1988, and 1991. **Map Figure-12** illustrates the historic wildfires that occurred in Alameda County from 1950 to 2015. Additionally, the California Department of Forestry and Fire Protection (CAL FIRE) maintains information on a list of archived fires going back to 2003. The list includes 16 wildfires that occurred in Alameda County and is shown in **Table 4-7**. The largest urban-wildland fire in the Bay Area, and one of the worst wildland fires to ever strike the United States, occurred in 1991, in the Oakland Hills of Alameda County. The fire resulted in $1.7 billion in losses and received a Federal Disaster Declaration. The fire spread across 1,520 acres, destroyed 3,354 family dwellings and 456 apartments, injured 150 people, and took the lives of 25 others.

Table 4-7. Alameda County Wildfires 2003-2015

Name	Date	Acres Affected*
Midway Fire	July 11, 2006	6,400
Corral Fire	August 13, 2009	12,500
Diablo Fire	June 18, 2010	475
Grant Fire	June 14, 2011	175
Flynn Fire	July 14, 2011	917
Patterson Fire	August 23, 2011	147
Welch Fire	June 15, 2013	60
Vasco Fire	June 8, 2013	240
Grant Fire	July 4, 2013	50
Fallon Fire	July 6, 2013	38
Highland Fire	October 4, 2013	150

Table 4-7. Alameda County Wildfires 2003-2015

Name	Date	Acres Affected*
Christensen Fire	May 28, 2015	242
Site Fire	June 5, 2015	300
Tesla Fire	June 25, 2015	53
Geary Fire	July 2, 2015	45
Tesla Fire	August 19, 2015	2,700

Source: Cal FIRE 2015

*Acres affected = total acreage.

Location: Public Resources Code 4201-4204 and Government Code 51175-89 directed CAL FIRE to map areas of significant fire hazards based on fuels, terrain, weather, and other relevant factors. These zones, referred to as Fire Hazard Severity Zones (FHSZ), are represented as very high, high, or moderate. Specifically, the maps were created using data and models describing development patterns, potential fuels over a 30- to 50-year time horizon, expected fire behavior, and expected burn probabilities. The maps are divided into local responsibility areas and state responsibility areas. Local responsibility areas generally include cities, cultivated agriculture lands, and portions of the desert. Local responsibility area fire protection is typically provided by city fire departments, fire protection districts, counties, and by CAL FIRE under contract to the local government. State responsibility area is a legal term defining the area where the state has financial responsibility for wildfire protection. Incorporated cities and federal ownership are not included. The prevention and suppression of fires in all areas that are not state responsibility areas are primarily the responsibility of federal or local agencies.

Map Figure-13 displays the areas of Alameda County most susceptible to wildfires. Within the County, very high FHSZs are located in high fuel density areas located in the mountainous or hillside areas of eastern Berkeley and Oakland, central Union City, and some portions of the south eastern corner of the County. Although these areas are not heavily developed, these boundaries are adjacent to the highly populated Berkeley and Oakland Hills.

Extent As shown on **Map Figure13**, in Alameda County there are 109 square miles in the moderate FHSZ, 228.4 square miles in the high FHSZ and 26.3 square miles in the very high FHSZ.

Probability of Future Events: Generally, fire susceptibility dramatically increases in the late summer and early autumn as vegetation dries out, decreasing plant moisture content and increasing the ratio of dead fuel to living fuel. However, various other factors, including humidity, wind speed and direction, fuel load and fuel type, as well as topography can all contribute to the intensity and spread of wildland fires. The common causes of wildland fires in California include arson and negligence. Based on previous occurrences, Alameda County can expect a wildfire annually, but large wildfires of over 2,000 acres occur much less often, roughly every four years.

Influence of Climate Change: As noted above, wildfire risk increases due to climate change because of higher temperatures and longer dry periods. Wildfire risk is exacerbated by drought

conditions which are linked to climate change. Climate change is also linked to longer fire seasons. Additionally, wildfire risk will also be influenced by potential changes in vegetation.

Research out of UC Merced has projected the future fire risk, impacted by climate change, compared to existing fire risk. In the Bay Area the results are mixed. The research projects some locations in the East Bay and South Bay to exhibit decreased fire risk, while areas on the Peninsula and North Bay exhibit a 150 percent increase in fire risk by 2085. Generally, across the Bay Area there is fairly limited change regarding fire risk in the year 2050, whereas the greatest shift will occur between 2050 and 2085, especially in the high emission scenario.

The future fire risk model analyzes two primary variables: fuel availability and flammability. In California the change in fire risk is a result of either a densely forested ecosystem becoming drier, or a dry climate experiencing large vegetation growth after a year of above average precipitation. In the first scenario the suite of climate impacts, which regard higher temperatures, less snow pack, and earlier springs, all result in previously wet dense fuel ecosystems becoming dry and ultimately increase the fire risk. In the second ecosystem, dominated by grass and low-density shrubs, the risk is often unchanged or decreased because the availability of fuel is the governing variable for fire risk, which remains unchanged or decreases as a result of projected precipitation.

The Bay Area, compared with other portions of California, especially those near the Oregon border, have a much lower projected increase in fire risk due to climate change. In the most northern portion of the State, near the California/Oregon border, many areas are expecting a 500 percent increase in fire risk by 2085, with some areas projected to see their fire risk increase more than 10 times.

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5.1 OVERVIEW

A vulnerability analysis predicts the extent of exposure that may result from a hazard event of a given intensity in a given area. The analysis provides quantitative data that may be used to identify and prioritize potential mitigation measures by allowing communities to focus attention on areas with the greatest risk of damage.

This vulnerability analysis consists of the following steps:

- Asset inventory
- Methodology
- Exposure analysis and summary of impacts
- RL properties

5.2 ASSET INVENTORY

Assets that are included in the exposure analysis are as follows:

- Population (illustrated in **Map Figure-14**)
- Housing Units (illustrated in **Map Figure-15**)
- Critical facilities and infrastructure (illustrated in **Map Figure-16**):
  - Community facilities, such as libraries and veterans memorial buildings
  - Correctional facilities
  - Emergency response facilities, including police and fire stations
  - Government facilities
  - Medical facilities (hospitals)
  - Public utilities, including pump stations, flood control channels, communications towers, and dams
  - Transportation infrastructure (bridges)

For the scope of this plan, critical facilities and infrastructure have been defined as County-owned, maintained, operated, or leased facilities, and ACFD facilities and ACFC&WCD facilities. For the County, the focus has been placed on County-owned, maintained, operated or leased facilities because the County has a level of authority with these types of facilities, enabling the County to perform mitigation.

As this plan focuses on the unincorporated portions of Alameda County, land, population, and housing units are listed in **Table 5-1** for the Unincorporated Alameda County. The total number of critical facilities and infrastructure identified for this plan (for the County of Alameda and the two special districts) are listed in **Table 5-1**, including the total number for each category of facility or infrastructure. In addition, local participant-specific assets are listed in each local participant-specific appendix (**Appendices F-H**).

Table 5-1. Summary of Total Assets

Category		Number
Land (square miles – Unincorporated Alameda County)		378.91
Population (Unincorporated Alameda County)		189,977
Housing Units (Unincorporated Alameda County)		67,725
Critical Facilities and Infrastructure	Community facilities, including libraries and community centers	7
	Correctional facilities, including jails and probation facilities	4
	Emergency response facilities, including fire and sheriff stations	56
	Government facilities	41
	Medical facilities	4
	Public utilities, including pump stations, reservoirs, communication facilities, and flood control channels	70
	Transportation infrastructure, including bridges maintained by the County of Alameda	48
	TOTAL	230

5.3 METHODOLOGY

A conservative exposure-level analysis was conducted to assess the risks associated with the identified hazards. This analysis is a simplified assessment of the potential effects of the hazards on values at risk, without consideration of the probability or level of damage. A quantitative exposure analysis has been prepared for the hazards listed in **Table 5-2.** Due to a combination of a lack of adequate information, the lack of a standard methodology for a quantitative exposure analysis, and limited GIS capabilities, the hazard of drought has not been included in the exposure analysis.

Table 5-2. Hazards Included in Exposure Analysis

Hazards	
Dam Failure Inundation	Liquefaction
Earthquake (Ground Shaking)	Tsunami
Flood (including Sea Level Rise)	Wildfire
Landslide	

*Drought has not been included in the exposure analysis

Population was derived from the U.S. Census Bureau's 2009-2013 5-Year American Community Survey (2009-2015 ACS), then a combination of spatial overlay and proportional analysis was used to determine the number of people in areas where hazards are likely to occur.

Similarly, using block group housing unit data building information from the 2009-2015 ACS, a combination of spatial overlay and proportional analysis was used to determine the number of housing units located where hazards are likely to occur.

Point locations for each critical facility and infrastructure were compared to locations where hazards are likely to occur. For each critical facility/infrastructure in a hazard area, exposure was calculated by assuming the worst-case scenario (that is, the asset would be completely destroyed and would have to be replaced). A similar analysis was used to evaluate the proportion of the population at risk. However, the analysis simply represents the number of people at risk; no estimate of the number of potential injuries or deaths was prepared. Additionally, the list of critical facilities/infrastructure includes flood control channels, which are not a single location. Therefore, many of the flood control channels cross more than one category of a hazard (i.e. a part of a flood control channel can be in very strong shaking and another part can be in violent shaking). In those cases the flood control channel was counted in both categories.

Replacement values and/or insured values are not included for housing units due to incomplete data, and are only included for critical facilities/facilities when available.

5.4 EXPOSURE ANALYSIS AND SUMMARY OF IMPACTS

The local hazard mitigation planning and floodplain management requirement for an LHMP's exposure analysis and corresponding summary of impacts is as follows:

Regulation Checklist – 44 CFR 201.6 Local Mitigation Plans
Element B: Hazard Identification and Risk Assessment
B3. Is there a description of each identified hazard's impact on the community as well as an overall summary of the community's vulnerability for each jurisdiction? (Requirement §201.6(c)(2)(ii))

Regulation Checklist – CRS 510 Floodplain Management Planning
CRS Step 5: Assess the Problem.
A. Summary of each hazard identified in the hazard assessment and their community impact.
B. Description of the impacts of hazards on:
(1) Life, safety, health, procedures for warning and evacuations
(3) Critical facilities and infrastructure
(5) The number and type of affected buildings

Tables 5-3 through **5-19** include the total exposure analysis by hazard. The exposure analysis details the number and percent of land, population, housing units, and critical facilities and infrastructure at risk to a hazard. This information is summarized in the summary of impact statement, followed by the exposure analysis table (as the focus of this plan is on the unincorporated portion of Alameda County, the summary of impact statements note the population impacts to census-designated places, the remaining unincorporated population and the unincorporated population as a whole (impacts to specific cities are not included). In addition, local participant-specific exposure analyses are listed in each local participant-specific appendix.

Finally, the impacts of flood hazards on life/safety procedures for warnings and evacuations are also discussed for flood.

5.4.1 Summary of Impacts due to Dam Failure Inundation

There are 25 State-regulated dams and 5 other dams within Alameda County as well as 5 dams outside of the County that could lead to inundation of portions of Alameda County. Areas throughout the County are vulnerable to inundation from a dam failure; the areas most susceptible to dam failure inundation include a western portion of the census-designated place Sunol (as well as the Cities of Fremont, Newark, and Pleasanton). Accordingly, the following percentages of the population are located within dam failure inundation zones: Ashland, 0.59 percent; Castro Valley, 6.45 percent; Cherryland, 3.97 percent; Fairview, 0.95 percent; San Lorenzo, 1.18%; Sunol, 11.05 percent; and Unincorporated Alameda County, 26.51 percent (remaining unincorporated population).

Table 5-3 below illustrates the summary of impacts from dam failure inundation on the entire County. This includes the level of impact to the County's landmass, population, housing units, and the critical facilities and infrastructure. It is important to note that this summary reflects the impacts due to failure of all dams with inundations areas in Alameda County, which is not ever anticipated to occur.

Table 5-3. Total: Dam Failure Inundation Exposure Analysis

Category		Number	% of Total
Land (square miles – Unincorporated Alameda County)		14.35	3.79%
Population (Unincorporated Alameda County)		20,041	10.55%
Housing Units (Unincorporated Alameda County)		7,618	11.25%
Critical Facilities and Infrastructure	Community facilities, including libraries and community centers	2	28.57%
	Correctional facilities, including jails and probation facilities	0	0.00%
	Emergency response facilities, including fire and sheriff stations	17	30.36%
	Government facilities	6	14.63%
	Medical facilities	0	0.00%
	Public utilities, including pump stations, reservoirs, communication facilities, and flood control channels	40	57.14%
	Transportation infrastructure, including bridges maintained by the County of Alameda	12	25.00%
	TOTAL	77	33.48%

5.4.2 Summary of Impacts due to Earthquakes (Strong Ground Shaking)

All of Alameda County is vulnerable to ground shaking from an earthquake and the entire County is in the strong, very strong, or violent ground shaking potential categories. Areas of strong ground shaking are found in the north-eastern and southeastern corners of the County and the northern portion of the County, which are sparsely populated. Strong ground shaking is anticipated for 0.28 percent of Unincorporated Alameda County's population (remaining unincorporated population).

Table 5-4 below illustrates the summary of impacts from earthquake shaking on Alameda County when looking at areas of strong ground shaking. This includes the level of impact to the County's landmass, population, housing units, and the critical facilities and infrastructure.

Table 5-4. Total: Earthquake Exposure Analysis (Strong Ground Shaking)

Category		Number	% of Total
Land (square miles – Unincorporated Alameda County)		74.50	19.66%
Population (Unincorporated Alameda County)		490	0.26%
Housing Units (Unincorporated Alameda County)		195	0.29%
Critical Facilities and Infrastructure	Community facilities, including libraries and community centers	0	0.00%
	Correctional facilities, including jails and probation facilities	0	0.00%
	Emergency response facilities, including fire and sheriff stations	0	0.00%
	Government facilities	0	0.00%
	Medical facilities	0	0.00%
	Public utilities, including pump stations, reservoirs, communication facilities, and flood control channels	0	0.00%
	Transportation infrastructure, including bridges maintained by the County of Alameda	2	4.17%
	TOTAL	2	0.87%

5.4.3 Summary of Impacts due to Earthquakes (Very Strong Ground Shaking)

All of Alameda County is vulnerable to ground shaking from an earthquake and the entire County is in the strong, very strong, or violent ground shaking potential categories. Areas of very strong ground shaking are found throughout the County, primarily east of the I-880 corridor. Very strong ground shaking is anticipated for 22.15 percent of Ashland's population; 62.69 percent of Castro Valley's population; 56.57 percent of Fairview's population; 95.07 percent of Sunol's population; and 81.68 percent of Unincorporated Alameda County's population (remaining unincorporated population).

Table 5-5 below illustrates the summary of impacts from earthquake shaking on Alameda County when looking at areas of very strong ground shaking. This includes the level of impact to the County's landmass, population, housing units, and the critical facilities and infrastructure.

Table 5-5. Total: Earthquake Exposure Analysis (Very Strong Ground Shaking)

Category		Number	% of Total
Land (square miles – Unincorporated Alameda County)		288.50	76.14%
Population (Unincorporated Alameda County)		94,583	49.79%
Housing Units (Unincorporated Alameda County)		33,592	49.60%
Critical Facilities and Infrastructure	Community facilities, including libraries and community centers	0	0.00%
	Correctional facilities, including jails and probation facilities	3	75.00%
	Emergency response facilities, including fire and sheriff stations	23	41.07%
	Government facilities	15	36.59%
	Medical facilities	3	75.00%
	Public utilities, including pump stations, reservoirs, communication facilities, and flood control channels	26	37.14%
	Transportation infrastructure, including bridges maintained by the County of Alameda	26	54.17%
	TOTAL	96	41.74%

5.4.4 Summary of Impacts due to Earthquakes (Violent Ground Shaking)

All of Alameda County is vulnerable to ground shaking from an earthquake and the entire County is in the strong, very strong, or violent ground shaking potential categories. Areas of violent ground shaking are found primarily along the I-880 and I-680 corridors. Violent ground shaking is anticipated for 78.14 percent of Ashland's population; 37.47 percent of Castro Valley's population; 100 percent of Cherryland's population; 44.23 percent of Fairview's population; 100 percent of San Lorenzo's population 4.93 percent of Sunol's population; and 17.48 percent of Unincorporated Alameda County's population (remaining unincorporated population).

Table 5-6 below illustrates the summary of impacts from earthquake shaking on Alameda County when looking at areas of violent ground shaking. This includes the level of impact to the County's landmass, population, housing units, and the critical facilities and infrastructure.

Table 5-6. Total: Earthquake Exposure Analysis (Violent Ground Shaking)

Category		Number	% of Total
Land (square miles – Unincorporated Alameda County)		15.87	4.19%
Population (Unincorporated Alameda County)		95,169	50.10%
Housing Units (Unincorporated Alameda County)		34,038	50.26%
Critical Facilities and Infrastructure	Community facilities, including libraries and community centers	7	100.00%
	Correctional facilities, including jails and probation facilities	1	25.00%
	Emergency response facilities, including fire and sheriff stations	32	57.14%
	Government facilities	26	63.41%
	Medical facilities	1	25.00%
	Public utilities, including pump stations, reservoirs, communication facilities, and flood control channels	54	77.14%
	Transportation infrastructure, including bridges maintained by the County of Alameda	11	22.92%
	TOTAL	132	57.39%

5.4.5 Summary of Impacts due to Flood (100-Year Flood Hazard Area)

Flooding affects all of Alameda County. Areas of likely flooding are defined by a 100-year and a 500-year flood hazards area. Communities throughout the County are located in the in the 100-year flood hazard area, but the census-designated place of San Lorenzo is the most vulnerable (as well as the Cities of Fremont, Hayward, and Newark). The following percentages of the population live in the 100-year flood hazard area: Ashland, 2.66 percent; Castro Valley, 2.25 percent; Cherryland, 5.07 percent; Fairview, 1.63 percent; San Lorenzo, 9.71 percent; Sunol, 2.38 percent; and Unincorporated Alameda County, 8.20 percent (remaining unincorporated population).

Table 5-7 below illustrates the summary of impacts of flooding on Alameda County when looking at the 100-year flood hazard area. This includes the level of impact to the County's landmass, population, housing units, and the critical facilities and infrastructure.

Table 5-7. Total: Flood Exposure Analysis (100-Year Flood Hazard Area)

Category		Number	% of Total
Land (square miles – Unincorporated Alameda County)		5.15	1.36%
Population (Unincorporated Alameda County)		9,959	5.24%
Housing Units (Unincorporated Alameda County)		3,510	5.18%
Critical Facilities and Infrastructure	Community facilities, including libraries and community centers	0	0.00%
	Correctional facilities, including jails and probation facilities	0	0.00%
	Emergency response facilities, including fire and sheriff stations	3	5.36%
	Government facilities	0	0.00%
	Medical facilities	0	0.00%
	Public utilities, including pump stations, reservoirs, communication facilities, and flood control channels	37	52.86%
	Transportation infrastructure, including bridges maintained by the County of Alameda	10	20.83%
	TOTAL	50	21.74%

Additional Life/Safety Information: In accordance with the requirements of CRS Activity 610, Alameda County Flood Control District operates a Flood Threat Recognition System in the form of approximately 90 rain and stream gauges positioned throughout the county. The hydrological data provided by these gauges are used to estimate potential flood conditions and monitor storm and flooding conditions. When the analysis of this data by hydrology staff of the Alameda County Flood Control and Water Conservation District prompts actions that require public emergency warning dissemination, the County is able to utilize sirens, the Emergency Alert System, and the Everbridge (implementation anticipated in 2016) mass notification system, which uses pre-programmed and geocoded telephone and SMS contacts to contact the public.

5.4.6 Summary of Impacts due to Flood (500-Year Flood Hazard Area)

While the entire County has segments of population that reside in the 500-year flood hazard area, those living in the census-designated place of San Lorenzo are most vulnerable. The following percentages of the population live in the 500-year flood hazard area: Ashland, 2.75 percent; Castro Valley, 3.84 percent; Cherryland, 1.57 percent; Fairview, 0.03 percent; San Lorenzo, 16.45 percent; Sunol, 0.85 percent; and Unincorporated Alameda County, 6.29 percent (remaining unincorporated population).

Table 5-8 below illustrates the summary of impacts of flooding on Alameda County when looking at the 500-year flood hazard area. This includes the level of impact to the County's landmass, population, housing units, and the critical facilities and infrastructure.

Table 5-8. Total: Flood Exposure Analysis (500-Year Flood Hazard Area)

Category		Number	% of Total
Land (square miles – Unincorporated Alameda County)		1.89	0.50%
Population (Unincorporated Alameda County)		10,604	5.58%
Housing Units (Unincorporated Alameda County)		3,754	5.54%
Critical Facilities and Infrastructure	Community facilities, including libraries and community centers	1	14.29%
	Correctional facilities, including jails and probation facilities	0	0.00%
	Emergency response facilities, including fire and sheriff stations	4	7.14%
	Government facilities	1	2.44%
	Medical facilities	0	0.00%
	Public utilities, including pump stations, reservoirs, communication facilities, and flood control channels	27	38.57%
	Transportation infrastructure, including bridges maintained by the County of Alameda	1	2.08%
	TOTAL	34	14.78%

5.4.7 Summary of Impacts due to Sea Level Rise (Inundation from Sea Level Rise – 3ft)

Although the effects of climate change are expected to continue to intensify hazards across the county, the coastline is the main area that will feel the impact from sea level rise due to climate change. For example, the census-designated place of San Lorenzo and several County owned/maintained facilities are vulnerable to temporary flooding and ultimately permanent inundation from sea level rise. Based upon inundation caused by a sea level rise increase of three feet, the following percentages of the population live in an inundation area: San Lorenzo, 2.62 percent.

Table 5-9 below illustrates the summary of impacts from a three-foot sea level rise due to climate change on Alameda County. This includes the level of impact to the County's landmass, population, housing units, and the critical facilities and infrastructure.

Table 5-9. Total: Sea Level Rise Exposure Analysis (Inundation from Sea Level Rise – 3ft)

Category		Number	% of Total
Land (square miles – Unincorporated Alameda County)		.004	0.00%
Population (Unincorporated Alameda County)		631	0.33%
Housing Units (Unincorporated Alameda County)		185	0.27%
Critical Facilities and Infrastructure	Community facilities, including libraries and community centers	0	0.00%
	Correctional facilities, including jails and probation facilities	0	0.00%
	Emergency response facilities, including fire and sheriff stations	1	1.79%
	Government facilities	0	0.00%
	Medical facilities	0	0.00%
	Public utilities, including pump stations, reservoirs, communication facilities, and flood control channels	25	35.71%
	Transportation infrastructure, including bridges maintained by the County of Alameda	0	0.00%
	TOTAL	26	11.30%

5.4.8 Summary of Impacts due to Sea Level Rise (Inundation from Sea Level Rise – 6ft)

Although the effects of climate change are expected to continue to intensify hazards across the county, the coastline is the main area that will feel the impact from sea level rise due to climate change. The census-designated place of San Lorenzo is vulnerable to inundation due to sea level rise, as well as County owned/maintained facilities that are located along the coast. Based upon inundation caused by a sea level rise increase of six feet, the following percentages of the population live in an inundation area: San Lorenzo, 8.83 percent.

Table 5-10 below illustrates the summary of impacts from a six-foot sea level rise due to climate change on Alameda County. This includes the level of impact to the County's landmass, population, housing units, and the critical facilities and infrastructure.

Table 5-10. Total: Sea Level Rise Exposure Analysis (Inundation from Sea Level Rise – 6ft)

Category		Number	% of Total
Land (square miles – Unincorporated Alameda County)		.22	0.06%
Population (Unincorporated Alameda County)		2,124	1.12%
Housing Units (Unincorporated Alameda County)		630	0.93%
Critical Facilities and Infrastructure	Community facilities, including libraries and community centers	0	0.00%
	Correctional facilities, including jails and probation facilities	0	0.00%
	Emergency response facilities, including fire and sheriff stations	4	7.14%
	Government facilities	0	0.00%
	Medical facilities	0	0.00%
	Public utilities, including pump stations, reservoirs, communication facilities, and flood control channels	41	58.57%
	Transportation infrastructure, including bridges maintained by the County of Alameda	0	0.00%
	TOTAL	45	19.57%

5.4.9 Summary of Impacts due to Landslides (Few Landslides – Landslide Zone)

The entire County is susceptible to landslides, but the areas most susceptible to landslides are in the mountainous areas of the County, which are not as densely populated as the flatlands. Three landslide zones exist for Alameda County: flatland, few landslides, and mostly landslide. The following percentages of the population live in the "few landslides" landslide zone: Ashland, 14.46 percent; Castro Valley, 63.01 percent; Cherryland, 1.70 percent; Fairview, 64.50 percent; Sunol, 62.75 percent; and Unincorporated Alameda County, 30.70 percent (remaining unincorporated population).

Table 5-11 below illustrates the summary of impacts from landslides on Alameda County when looking at the "few landslides" landslide zone. This includes the level of impact to the County's landmass, population, housing units, and the critical facilities and infrastructure.

Table 5-11. Total: Landslide Exposure Analysis (Few Landslides – Landslide Zone)

Category		Number	% of Total
Land (square miles – Unincorporated Alameda County)		157.51	41.57%
Population (Unincorporated Alameda County)		64,869	34.15%
Housing Units (Unincorporated Alameda County)		23,809	35.16%
Critical Facilities and Infrastructure	Community facilities, including libraries and community centers	1	14.29%
	Correctional facilities, including jails and probation facilities	3	75.00%
	Emergency response facilities, including fire and sheriff stations	11	19.64%
	Government facilities	10	24.39%
	Medical facilities	4	100.00%
	Public utilities, including pump stations, reservoirs, communication facilities, and flood control channels	13	18.57%
	Transportation infrastructure, including bridges maintained by the County of Alameda	13	27.08%
	TOTAL	55	23.91%

5.4.10 Summary of Impacts due to Landslides (Mostly Landslide – Landslide Zone)

Three landslide zones exist for Alameda County: flatlands, few landslides, and mostly landslide. The following percentages of the population live in the "mostly landslide" landslide zone: Castro Valley, 5.75 percent; Fairview, 0.33 percent; Sunol, 28.74 percent; and Unincorporated Alameda County, 19.71 percent (remaining unincorporated population).

Table 5-12 below illustrates the summary of impacts from landslides on Alameda County when looking at the "mostly landslide" landslide zone. This includes the level of impact to the County's landmass, population, housing units, and the critical facilities and infrastructure.

Table 5-12. Total: Landslide Exposure Analysis (Mostly Landslide – Landslide Zone)

Category		Number	% of Total
Land (square miles – Unincorporated Alameda County)		169.32	44.69%
Population (Unincorporated Alameda County)		14,705	7.74%
Housing Units (Unincorporated Alameda County)		5,102	7.53%
Critical Facilities and Infrastructure	Community facilities, including libraries and community centers	0	0.00%
	Correctional facilities, including jails and probation facilities	0	0.00%
	Emergency response facilities, including fire and sheriff stations	0	0.00%
	Government facilities	0	0.00%
	Medical facilities	0	0.00%
	Public utilities, including pump stations, reservoirs, communication facilities, and flood control channels	2	2.86%
	Transportation infrastructure, including bridges maintained by the County of Alameda	4	8.33%
	TOTAL	6	2.61%

5.4.11 Summary of Impacts due to Liquefaction (Moderate Susceptibility)

The entire County of Alameda is susceptible to liquefaction, but the most vulnerable areas are located primarily along the I-880 and I-680 corridors, including nearly all of the residents west of I-880. Liquefaction susceptibility has been broken up into five categories: very low, low, moderate, high, and very high susceptibility. For this exposure analysis we have focused on the top three most vulnerable categories. Therefore, the following percentages of the population live in moderate liquefaction susceptible areas: Ashland, 82.41 percent; Castro Valley, 20.84 percent; Cherryland, 96.57 percent, Fairview, 4.00 percent; San Lorenzo, 85.69 percent; Sunol, 9.69 percent; and Unincorporated Alameda County, 34.93 percent (remaining unincorporated population).

Table 5-13 below illustrates the summary of impacts from liquefaction on Alameda County when looking at the moderate susceptibility zone. This includes the level of impact to the County's landmass, population, housing units, and the critical facilities and infrastructure.

Table 5-13. Total: Liquefaction Exposure Analysis (Moderate Susceptibility)

Category		Number	% of Total
Land (square miles – Unincorporated Alameda County)		20.92	5.52%
Population (Unincorporated Alameda County)		88,091	46.37%
Housing Units (Unincorporated Alameda County)		30,255	44.67%
Critical Facilities and Infrastructure	Community facilities, including libraries and community centers	7	100.00%
	Correctional facilities, including jails and probation facilities	1	25.00%
	Emergency response facilities, including fire and sheriff stations	37	66.07%
	Government facilities	31	75.61%
	Medical facilities	1	25.00%
	Public utilities, including pump stations, reservoirs, communication facilities, and flood control channels	48	68.57%
	Transportation infrastructure, including bridges maintained by the County of Alameda	13	27.08%
	TOTAL	138	60.00%

5.4.12 Summary of Impacts due to Liquefaction (High Susceptibility)

The following percentages of the population live in high liquefaction susceptible areas: Castro Valley, 0.01 percent; San Lorenzo, 7.55 percent; Sunol, 1.70 percent; and Unincorporated Alameda County, 6.43 percent (remaining unincorporated population).

Table 5-15 below illustrates the summary of impacts from liquefaction on Alameda County when looking at the high susceptibility zone. This includes the level of impact to the County's landmass, population, housing units, and the critical facilities and infrastructure.

Table 5-14. Total: Liquefaction Exposure Analysis (High Susceptibility)

Category		Number	% of Total
Land (square miles – Unincorporated Alameda County)		5.40	1.43%
Population (Unincorporated Alameda County)		5,520	2.91%
Housing Units (Unincorporated Alameda County)		1,984	2.93%
Critical Facilities and Infrastructure	Community facilities, including libraries and community centers	0	0.00%
	Correctional facilities, including jails and probation facilities	0	0.00%
	Emergency response facilities, including fire and sheriff stations	2	3.57%
	Government facilities	0	0.00%
	Medical facilities	0	0.00%
	Public utilities, including pump stations, reservoirs, communication facilities, and flood control channels	7	10.00%
	Transportation infrastructure, including bridges maintained by the County of Alameda	3	6.25%
	TOTAL	12	5.22%

5.4.13 Summary of Impacts due to Liquefaction (Very High Susceptibility)

The following percentages of the population live in very high liquefaction susceptible areas: Ashland, 0.03 percent; Castro Valley, 0.92 percent; Cherryland, 0.69 percent, Fairview, 0.84 percent; San Lorenzo, 5.16 percent; Sunol, 0.68 percent; and Unincorporated Alameda County, 3.30 percent (remaining unincorporated population).

Table 5-15 below illustrates the summary of impacts from liquefaction on Alameda County when looking at the very high susceptibility zone. This includes the level of impact to the County's landmass, population, housing units, and the critical facilities and infrastructure.

Table 5-15. Total: Liquefaction Exposure Analysis (Very High Susceptibility)

Category		Number	% of Total
Land (square miles – Unincorporated Alameda County)		3.10	0.82%
Population (Unincorporated Alameda County)		3,882	2.04%
Housing Units (Unincorporated Alameda County)		1,390	2.05%
Critical Facilities and Infrastructure	Community facilities, including libraries and community centers	0	0.00%
	Correctional facilities, including jails and probation facilities	0	0.00%
	Emergency response facilities, including fire and sheriff stations	3	5.36%
	Government facilities	4	9.76%
	Medical facilities	0	0.00%
	Public utilities, including pump stations, reservoirs, communication facilities, and flood control channels	27	38.57%
	Transportation infrastructure, including bridges maintained by the County of Alameda	14	29.17%
	TOTAL	48	20.87%

5.4.14 Summary of Impacts due to Tsunami Inundation

In general, the entire coastal area of Alameda County is vulnerable to run-up from a tsunami. In particular, the area along the coast of the census-designated place of San Lorenzo is of most concern (as well as the Cities of Alameda, Albany, Berkeley, Emeryville, Hayward, Oakland, and San Leandro). The following percentages of the population live in the tsunami inundation area: San Lorenzo, 3.59 percent.

Table 5-16 below illustrates the summary of impacts of a tsunami on Alameda County. This includes the level of impact to the County's landmass, population, housing units, and the critical facilities and infrastructure.

Table 5-16. Total: Tsunami Inundation

Category		Number	% of Total
Land (square miles – Unincorporated Alameda County)		0.02	0.00%
Population (Unincorporated Alameda County)		864	0.45%
Housing Units (Unincorporated Alameda County)		248	0.37%
Critical Facilities and Infrastructure	Community facilities, including libraries and community centers	0	0.00%
	Correctional facilities, including jails and probation facilities	0	0.00%
	Emergency response facilities, including fire and sheriff stations	3	5.36%
	Government facilities	5	12.20%
	Medical facilities	0	0.00%
	Public utilities, including pump stations, reservoirs, communication facilities, and flood control channels	22	31.43%
	Transportation infrastructure, including bridges maintained by the County of Alameda	0	0.00%
	TOTAL	30	13.04%

5.4.15 Summary of Impacts due to Wildfires (Moderate FHSZ)

The entire County is vulnerable to wildfire, however, the areas of most concern are along the wildland-urban interface (the zone of transition between unoccupied land and human development). CAL FIRE has developed three FHSZ, including moderate, high, and very high. The vast majority of the areas susceptible to wildfire are east of State Routes 185 and 238. The following percentages of the population are located within the moderate FHSZ: Ashland, 1.49 percent; Castro Valley, 8.40 percent; Fairview, 10.51 percent; San Lorenzo, 0.38 percent; Sunol, 9.18 percent; and Unincorporated Alameda County, 26.52 percent (remaining unincorporated population).

Table 5-17 below illustrates the summary of impacts that wildfire has on the entire County within the moderate FHSZ. This includes the level of impact to the County's landmass, population, housing units, and the critical facilities and infrastructure.

Table 5-17. Total: Wildfire Exposure Analysis (Moderate FHSZ)

Category		Number	% of Total
Land (square miles – Unincorporated Alameda County)		109.04	28.78%
Population (Unincorporated Alameda County)		21,709	11.43%
Housing Units (Unincorporated Alameda County)		7,651	11.30%
Critical Facilities and Infrastructure	Community facilities, including libraries and community centers	0	0.00%
	Correctional facilities, including jails and probation facilities	1	25.00%
	Emergency response facilities, including fire and sheriff stations	8	14.29%
	Government facilities	6	14.63%
	Medical facilities	1	25.00%
	Public utilities, including pump stations, reservoirs, communication facilities, and flood control channels	11	15.71%
	Transportation infrastructure, including bridges maintained by the County of Alameda	11	22.92%
	TOTAL	38	16.52%

5.4.16 Summary of Impacts due to Wildfires (High FHSZ)

The census-designated place of Fairview is most susceptible to the high FHSZ. The following percentages of the population live in the high FHSZ: Ashland, 0.99 percent; Castro Valley, 23.80 percent; Fairview, 78.67 percent; San Lorenzo, 0.24 percent; Sunol, 21.60 percent; and Unincorporated Alameda County, 35.12 percent (remaining unincorporated population).

Table 5-18 below illustrates the summary of impacts that wildfire has on the entire County within the high FHSZ. This includes the level of impact to the County's landmass, population, residential structures, and the critical facilities and infrastructure.

Table 5-18. Total: Wildfire Exposure Analysis (High FHSZ)

Category		Number	% of Total
Land (square miles – Unincorporated Alameda County)		228.39	60.28%
Population (Unincorporated Alameda County)		43,632	22.97%
Housing Units (Unincorporated Alameda County)		15,333	22.64%
Critical Facilities and Infrastructure	Community facilities, including libraries and community centers	0	0.00%
	Correctional facilities, including jails and probation facilities	0	0.00%
	Emergency response facilities, including fire and sheriff stations	5	8.93%
	Government facilities	5	12.20%
	Medical facilities	1	25.00%
	Public utilities, including pump stations, reservoirs, communication facilities, and flood control channels	23	32.86%
	Transportation infrastructure, including bridges maintained by the County of Alameda	16	33.33%
	TOTAL	50	21.74%

5.4.17 Summary of Impacts due to Wildfires (Very High FHSZ)

Very little of the County's population falls within the very high FHSZ (however a good portion of the City of Oakland's population lives within the very high FHSZ). Accordingly, 13.35 percent of Castro Valley's population; 69.22 percent of Sunol's population; and 4.95 percent of Unincorporated Alameda County's population (remaining unincorporated population) reside in the very high FHSZ.

Table 5-19 below illustrates the summary of impacts that wildfire has on Alameda County within the very high FHSZ. This includes the level of impact to the County's landmass, population, housing units, and the critical facilities and infrastructure.

Table 5-19. Total: Wildfire Exposure Analysis (Very High FHSZ)

Category		Number	% of Total
Land (square miles – Unincorporated Alameda County)		26.25	6.93%
Population (Unincorporated Alameda County)		10,664	5.61%
Housing Units (Unincorporated Alameda County)		4,039	5.96%
Critical Facilities and Infrastructure	Community facilities, including libraries and community centers	0	0.00%
	Correctional facilities, including jails and probation facilities	2	50.00%
	Emergency response facilities, including fire and sheriff stations	1	1.79%
	Government facilities	2	4.88%
	Medical facilities	1	25.00%
	Public utilities, including pump stations, reservoirs, communication facilities, and flood control channels	3	4.29%
	Transportation infrastructure, including bridges maintained by the County of Alameda	3	6.25%
	TOTAL	12	5.22%

5.5 REPETITIVE LOSS PROPERTIES

The local hazard mitigation planning requirements for RL properties are as follows:

Regulation Checklist – 44 CFR 201.6 Local Mitigation Plans
Element B: Hazard Identification and Risk Assessment
B4. Does the Plan address NFIP insured structures within the jurisdiction that have been repetitively damaged by floods? (Requirement §201.6(c)(2)(ii))

A RL property is an NFIP-insured structure that has had at least two paid flood losses of more than $1,000 each in any 10-year period since 1978. A Severe RL (SRL) property consists of any NFIP-insured property that has met at least one of the following paid flood loss criteria since 1978, regardless of ownership: (1) four or more separate claim payments of more than $5,000 each (including building and contents payments); or (2) two or more separate claim payments (building payments only) where the total of the payments exceeds the current market value of the property. In either case, two of the claim payments must have occurred within 10 years of each other. **Table 5-20** shows the number of RL properties by jurisdiction in Alameda County and **Map Figure-17** shows the approximate location of RL properties as of September 2015 (there are no SRL properties located in Alameda County).

Table 5-20. Repetitive Loss Properties

Community Name	RL Properties
Unincorporated Alameda County	4
City of Alameda	0
City of Albany	0
City of Berkeley	0
City of Dublin	0
City of Emeryville	0
City of Fremont	0
City of Hayward	1
City of Livermore	0
City of Newark	0
City of Oakland	6
City of Piedmont	1
City of Pleasanton	1
City of San Leandro	0
City of Union City	1
TOTAL	14

Source: FEMA Region IX: November 2015.

6.1 OVERVIEW

A capability assessment identifies and evaluates the human and technical, financial, and legal and regulatory resources available for hazard mitigation; and describes the current, ongoing, and recently completed mitigation projects.

6.2 CAPABILITY ASSESSMENT

The local hazard mitigation planning and floodplain management requirements for a capability assessment are as follows:

Regulation Checklist – 44 CFR 201.6 Local Mitigation Plans
Element C: Mitigation Strategy
C1. Does the Plan document each jurisdiction's existing authorities, policies, programs and resources and its ability to expand on and improve these existing policies and programs? (Requirement § 201.6(c)(3))
C2. Does the Plan address each jurisdiction's participation in the NFIP and continued compliance with NFIP requirements, as appropriate? (Requirement § 201.6(c)(3)(i))

Regulation Checklist – CRS 510 Floodplain Management Planning
CRS Step 5: Assess the Problem
C. Review of all damaged buildings/flood insurance claims

Capability assessment tables for each local participant, including human and technical, financial, and legal and regulatory resources, are provided in the participant-specific appendices (**Appendices F-H**) of this plan. Additional information about the expansion and improvement of an existing policy or program is also included in the legal and regulatory resource tables. Finally, each appendix lists current and recently completed mitigation projects and programs.

As noted in **Section 1, Introduction**, Alameda County participates in the NFIP. The NFIP makes federally backed flood insurance available to homeowners, renters, and business owners in communities that adopt and enforce floodplain management ordinances to reduce future flood damage. As a participant of the NFIP, Alameda County enforces a floodplain management ordinance and participates in FEMA's Community Assisted Visits, which occur on a 3-to 5-year cycle. Specifics regarding the floodplain manager and floodplain management ordinances for Alameda County are contained in the capability assessment tables provided in the participant-specific appendix of this plan.

Table 6-1 lists the date of the initially mapped FIRM, the emergency/regular program entrance date into the NFIP, and the number of policies in force as of October 31, 2015. A review of all flood insurance claims for Unincorporated Alameda County is listed below as well.

Table 6-1. Date of Initially Mapped FIRM and Emergency/Regular Program Entrance Date into NFIP for Unincorporated Alameda County and Cities

Community Name	Date of Initially Mapped FIRM	Emergency/Regular Program Entrance Date into NFIP	# of Policies in Force
Unincorporated Alameda County	April 15, 1981	April 15, 1981	951
City of Alameda	August 1, 1978	August 1, 1978	141
City of Albany	February 1, 1980	February 1, 1980	31
City of Berkeley	September 1, 1978	September 1, 1978	97
City of Dublin	August 18, 1983	April 15, 1981	120
City of Emeryville	August 3, 2009	April 21, 1978	2
City of Fremont	May 2, 1983	May 2, 1983	401
City of Hayward	September 16, 1981	September 16, 1981	377
City of Livermore	July 5, 1977	July 5, 1977	70
City of Newark	December 1, 1978	December 1, 1978	94
City of Oakland	September 30, 1982	September 30, 1982	346
City of Piedmont	August 3, 2009	November 15, 1979	13
City of Pleasanton	December 16, 1980	December 16, 1980	97
City of San Leandro	March 18, 1980	March 18, 1980	840
City of Union City	December 1, 1978	December 1, 1978	103

Source: FEMA 2015 (Adam Lizarraga)

There are 951 policies and $271,732,000 of insurance in force in Unincorporated Alameda County as of October 31, 2015. The 951 insurance policies are broken out as follows: 895 1- to 4-family units; 27 all other residential units; and 29 nonresidential units. Since Unincorporated Alameda County joined the NFIP in 1981, 62 paid losses have been made for a total of $590,209. The 62 losses are broken out as follows: 58 1- to 4-family units; 1 small business; 2 all other residential units; and 1 nonresidential unit.

7.1 OVERVIEW

A mitigation strategy includes the identification of mitigation goals and actions that will reduce the risks of each hazard and vulnerability to the local population and built environment for each local participant.

In accordance with local mitigation planning requirements, this mitigation strategy consists of the following steps:

- Update of local hazard mitigation goals
- Review of the 2011 LHMP's local participants' mitigation action plans
- Identification of new and updated mitigation actions
- Prioritization of the 2016 LHMP's local participants' mitigation actions
- Implementation of the 2016 LHMP's local participants' mitigation action plans

In addition, this section addresses the following floodplain management planning activities:

- Set Goals
- Review possible activities
- Draft an action plan

7.2 UPDATE OF LOCAL HAZARD MITIGATION GOALS

The local hazard mitigation planning requirements and floodplain management planning activities for updating local hazard mitigation goals are as follows:

Regulation Checklist – 44 CFR 201.6 Local Mitigation Plans
Element C: Mitigation Strategy
C3. Does the Plan include goals to reduce/avoid long-term vulnerabilities to the identified hazards? (Requirement § 201.6(c)(3)(i))

Regulation Checklist – CRS 510 Floodplain Management Planning
CRS Step 6: Set Goals
No additional information.

Mitigation goals are defined as general guidelines that explain what a community wants to achieve in terms of hazard and loss prevention. Goal statements are typically long-range, policy-oriented statements representing a community-wide vision. **Table 7-1** shows the mitigation goal developed to reduce or avoid long-term vulnerability to hazards.

Table 7-1. Mitigation Goal

Goal Number	Goal Description
1	Maintain and enhance a disaster-resistant region by reducing the potential for loss of life, property damage, and environmental degradation from natural disasters, while accelerating economic recovery from those disasters.

7.3 REVIEW OF THE 2011 LHMP MITIGATION ACTION PLAN

The local hazard mitigation planning requirement for reviewing the 2011 LHMP's mitigation action plan is as follows:

Regulation Checklist – 44 CFR 201.6 Local Mitigation Plans
Element D: Plan Review, Evaluation, and Implementation
D2. Was the Plan revised to reflect progress in local mitigation efforts? (Requirement § 201.6(d)(3))

During the 2016 LHMP update process, the 2011 mitigation action plan was reviewed to determine which mitigation actions had been completed, deleted, deferred, or are ongoing. Mitigation actions are activities, measures, and/or projects that help achieve the goals of a mitigation plan. The results of this review, shown in each participant-specific capability assessment, illustrate the progress in their local mitigation efforts over the five year period, under the guidance of the 2011 LHMP.

7.4 IDENTIFICATION OF NEW AND UPDATED POTENTIAL MITIGATION ACTIONS

The local hazard mitigation planning requirements and floodplain management planning activities for identifying and updating the 2011 LHMP's potential mitigation actions are as follows:

Regulation Checklist – 44 CFR 201.6 Local Mitigation Plans
Element C: Mitigation Strategy
C4. Does the Plan identify and analyze a comprehensive range of specific mitigation actions and projects for each jurisdiction being considered to reduce the effects of hazards, with emphasis on new and existing buildings and infrastructure? (Requirement § 201.6(c)(3)(ii))

Regulation Checklist – CRS 510 Floodplain Management Planning
CRS Step 7: Review Possible Activities
A. Preventative activities.
B. Floodplain management regulatory/current and future conditions.
C. Property protection activities.
D. Natural resource protection activities.
E. Emergency services activities.
F. Structural projects.
G. Public information activities.

For this 2016 LHMP, the LHMP Planning Team developed overarching potential mitigation actions for all local participants. These potential mitigation actions are listed in **Table 7-2**. In addition, each local participant identified other participant-specific potential mitigation actions through the review of existing resources; identification of past successes and best management practices; and solicitation of input from pertinent departments, including planning, public works, and emergency management staff. Additional local participant-specific potential mitigation actions are provided in each local participant-specific appendix.

As shown in **Table 7-2**, for each potential mitigation action, the following information is listed: mitigation action description; mitigation action category (which includes local plans and regulations, structure and infrastructure projects, natural systems protection, and education and awareness programs); floodplain management activity (which includes preventive; property protection; natural resource protection; emergency services; structural projects; and public information); hazard(s) addressed; and type of development affected by mitigation action.

Table 7-2. Potential Mitigation Actions

No.	Description	Hazard	Mitigation Category	Floodplain Management Activity	New or Existing Construction
1	Develop and implement a methodology to systematically assess all hazards outlined in this Plan (including, but not limited to sea level rise, seismic risk, flood risk, protective design) and climate impacts (such as access to public transit) in considering building acquisitions and sales, portfolio planning, major retrofits, capital improvement planning, and master planning for County owned and leased facilities.	All	Local Plans and Regulations	Preventive	New/Existing
2	Continue the County's effort to enhance pre-disaster planning through development of plans such as Continuity of Government (COG) and Continuity of Operations (COOP) Plans, Department Operation Center Plans, and Emergency Public Information Plans.	All	Local Plans and Regulations	Preventive	Not Applicable
3	Educate Community Based Organizations and other agencies that support vulnerable populations about personal preparedness and Continuity of Operation Planning to ensure these organizations continue to serve their constituents in disasters. This will reduce the health impacts for vulnerable populations, such as seniors, those with physical and/or development disabilities, and the visual or hearing impaired.	All	Education and Awareness	Public Information	Not Applicable
4	Continue to support Medical Counter Measures operational and logistics plans for optimal use in Public Health Emergencies; includes strengthening the capability to respond to emerging infectious disease through detection and surveillance and disease containment, i.e. community mitigation strategies and post exposure prophylaxis.	All	Local Plans and Regulations	Preventive	Not Applicable
5	Develop a comprehensive energy policy for adoption by the County Board of Supervisors that sets energy efficiency and renewables as a priority, requires the development of design standards, and requires development of a strategic implementation plan for County owned, constructed and leased facilities.	Climate Change	Local Plans and Regulations	Preventive	New/Existing
6	Restore habitat and improve flood protection for low-lying areas by employing innovative techniques such as constructing levees coupled with gently sloping tidal marshes to help protect from storm wave action and tidal surge.	Climate Change	Natural Systems Protection	Natural Resource Protection	New/Existing

Table 7-2. Potential Mitigation Actions

No.	Description	Hazard	Mitigation Category	Floodplain Management Activity	New or Existing Construction
7	Leverage the County's existing communication channels and Board of Supervisor policies across the agencies to educate the public, schools, other jurisdictions, professional associations, and businesses and industry about reducing climate change pollution and how to prepare for inevitable climate changes.	Climate Change	Education and Awareness	Public Information	Not Applicable
8	Conduct comprehensive building performance evaluations and implement projects that ensure consistency with County's green building and energy policies and that demonstrate technologies that ensure energy effectiveness and independence.	Climate Change	Local Plans and Regulations	Preventive and Structural Projects	New/Existing
9	Update the County's green building policies to ensure the use of the latest environmental standards for materials and systems as well as prioritizing energy efficiency and renewable in new construction, and renovations of private facilities.	Climate Change	Local Plans and Regulations	Preventive and Structural Projects	New/Existing
10	Restore and protect the ability of natural ecosystems to capture and store carbon.	Climate Change	Natural Systems Protection	Preventive and Natural Resource Protection	New/Existing
11	Develop and implement a system to monitor and analyze building usage of utilities (electricity, natural gas, water) to provide timely and actionable information for operations staff to reduce the County's use of resources and operational costs.	Climate Change	Structure and Infrastructure Projects	Preventive	New/Existing
12	Develop an outreach program to educate property owners about the adjustments in flood zones due to levees, many property owners may be removed from a flood zone due to a levee. Continue the public outreach program that informs property owners located in the dam failure inundation areas about voluntary flood insurance.	Dam and Levee Failure Inundation	Education and Awareness	Public Information	Existing
13	Look into potentially vulnerable public and private utility systems including sanitation/sewer, and fuel pumping stations. Set up a lifelines council to discuss and address the importance of ensuring the operation and timely restoration of essential systems to reasonable levels of service after a disaster.	Earthquake	Education and Awareness	Emergency Services and Public Information	New/Existing

Table 7-2. Potential Mitigation Actions

No.	Description	Hazard	Mitigation Category	Floodplain Management Activity	New or Existing Construction
14	Identify, retrofit, upgrade, or replace deficient or vulnerable government facilities.	Earthquake	Structure and Infrastructure Projects	Property Protection and Structural Projects	Existing
15	Seismically retrofit or replace County and local ramps and bridges that are categorized as structurally deficient by Caltrans, are located in an high ground shaking areas, and/or are necessary for first responders to use during and/or immediate after a disaster or emergency.	Earthquake	Structure and Infrastructure Projects	Emergency Services and Structural Projects	Existing
16	Develop and implement plans to increase the building owner's general knowledge of and appreciation for the value of seismic upgrading of the building's structural and nonstructural elements.	Earthquake	Local Plans and Regulations & Awareness and Education	Public Information	Existing
17	Increase participation in the NFIP by maintaining the Community Rating System program which through enhanced floodplain management activities will allow property owners to receive a discount on their flood insurance.	Flood	All	Public Information and Property Protection	New/Existing (structures located within the 100-year floodplain)
18	Reinforce roads/bridges from flooding through protection activities, including elevating the roads/bridges and installing/widening culverts beneath the roads/bridges or upgrading storm drains.	Flood	Structure and Infrastructure Projects	Structural Projects	Existing
19	Continue to repair and make structural improvements to storm drains, pipelines and/or channels to enable them to perform to their design capacity in handling water flows.	Flood	Structure and Infrastructure Projects, Natural Systems Protection	Structural Projects	Existing
20	Implement landslide stabilization and/or protection measures. Stabilization measures include grading the unstable portion of the slope to a lower gradient, construction of rock buttresses and retaining walls, and drainage improvements. Protection measures include containment and/or diversion of the moving debris, such as walls, berms, ditches and catchment basins.	Landslide	Structure and Infrastructure Projects, Natural Systems Protection	Natural Resource Protection and Structural Projects	New/Existing

Table 7-2. Potential Mitigation Actions

No.	Description	Hazard	Mitigation Category	Floodplain Management Activity	New or Existing Construction
21	Look into becoming a National Weather Service TsunamiReady community.	Tsunami	Awareness and Education	Emergency Services and Public Information	Not Applicable
22	County staff in conjunction with State Agencies will continue to support vegetation management strategies and programs to address the changing vegetation management needs within the County	Wildfire	Natural Systems Protection	Preventive and Natural Resource Protection	New/Existing
23	Encourage farmers to cultivate and maintain a variety of crops in rural areas to increase agricultural diversity and crop-resiliency.	Climate Change	Natural Systems Protection	Natural Resource Protection	Not Applicable
24	Establish and implement 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.	Flood	Natural Systems Protection	Preventive and Natural Resource Protection	New/Existing

7.5 PRIORITIZATION OF THE 2016 LHMP MITIGATION ACTIONS

The requirements for the prioritization of mitigation actions, as stipulated in DMA 2000 and its implementing regulations, are described below.

Regulation Checklist – 44 CFR 201.6 Local Mitigation Plans
Element D: Plan Review, Evaluation, and Implementation
D3. Was the plan revised to reflect changes in priorities? (Requirement § 201.6(d)(3))

Regulation Checklist – 44 CFR 201.6 Local Mitigation Plans
Element C: Mitigation Strategy
C5. Does the Plan contain an action plan that describes how the actions identified will be prioritized (including cost benefit review), implemented, and administered by each jurisdiction? (Requirement § 201.6(c)(3)(iv)); (Requirement § 201.6(c)(3)(iii))

Regulation Checklist – CRS 510 Floodplain Management Planning
CRS Step 8: Draft an Action Plan
A. Actions must be prioritized

After the list of potential mitigation actions was developed, an analysis of each potential mitigation action under consideration was completed (**Table F-10**). The analysis looked at the pros/cons of each mitigation action, which involved discussing topics such as: the level of political support for the project, who would lead the project, funding options for the project and the likelihood of implementing the project within the next five years.

To further support the prioritization process, local participants considered HMA program requirements when selecting projects. It was suggested that selected met the majority of the HMA program requirements (**Table 7-3**), as these projects have the greatest chance of leading to enhanced project scoping and lowest probability of HMA funding delays. Therefore, these selected projects are considered high priority projects. Projects not selected as high priority projects may be considered at a later date for implementation if the priority projects have been completed or deferred, or as additional funding sources have become available.

Table 7-3. Priority Project Criteria (HMA Program Requirements)

Requirement	Description
Mitigation Planning	Links the existing mitigation plan, particularly the vulnerability analysis and capability assessment, to project scoping.
Technical Feasibility and Effectiveness	Conforms with accepted engineering practices, established codes, standards, modeling techniques, or best practices. Effective mitigation measures funded under HMA should provide a long-term or permanent solution.

Table 7-3. Priority Project Criteria (HMA Program Requirements)

Requirement	Description
Floodplain Management and Protection of Wetlands	Conforms to 44 CFR Part 9, which incorporates the requirements of Executive Order (EO) 11988 (Floodplain Management) and EO 11990 (Protection of Wetlands).
Environmental Planning and Historic Review and Compliance	Complies with all environmental and historic preservation (EHP) laws and with 44 CFR Part 10.
Cost Effectiveness	Is cost-effective or be in the interest of the National Flood Insurance Fund.
Cost Review	Is reasonable in costs compared to the probable benefits.
General Program Requirements	Is an eligible activity, including: property acquisition and structure demolition; property demolition and structure relocation; structure elevation; mitigation reconstruction; dry floodproofing of historic residential structures; dry floodproofing of nonresidential structures; minor localized flood reduction projects; structural retrofitting of existing buildings; non-structural retrofitting of existing buildings and facilities; infrastructure retrofit; soil stabilization; wildfire mitigation; post-disaster code enforcement

7.5.1 2016 LHMP Local Participant-Specific Mitigation Action Plans

Each local participant selected priority projects to include in their mitigation action plan (located in each local participant-specific appendix, **Appendices G-H**). As noted above, priority projects are projects that meet the Hazard Mitigation Assistance (HMA) Guidance program requirements identified in **Table 7-3**. Emphasis in this process was placed on cost-effectiveness and technical feasibility and effectiveness.

The following information has been included for local participant-specific mitigation action plan: mitigation action number and description; mitigation goal associated with each priority project; facility to be mitigated (if known and/or applicable); department/agency to oversee the implementation of the mitigation action; potential funding source; and implementation timeframe.

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8.1 OVERVIEW

This section describes a formal plan maintenance process to ensure that the 2016 LHMP remains an active and applicable document. It includes an explanation of how the Alameda County Project Management Team intends to organize its efforts to ensure that improvements and revisions to the 2016 LHMP occur in a well-managed, efficient, and coordinated manner.

The following three process steps are addressed in detail below:

- Monitoring, evaluating, and updating the LHMP
- Implementation through existing planning mechanisms
- Continued public involvement

In addition, revisions made from the 2011 LHMP plan update section to the 2016 LHMP plan maintenance section are discussed below.

8.2 MONITORING, EVALUATING, AND UPDATING THE PLAN

The local hazard mitigation planning and floodplain management planning requirements for monitoring, evaluating, and updating the LHMP are as follows.

Regulation Checklist – 44 CFR 201.6 Local Mitigation Plans
Element A: Planning Process
A6. Is there a description of the method and schedule for keeping the plan current (monitoring, evaluating, and updating the mitigation plan within a 5-year cycle? (Requirement § 201.6(c)(4)(1))

Regulation Checklist – CRS 510 Floodplain Management Planning
CRS Step 10: Implement, Evaluate and Revise.
A. Procedures to monitor and recommend revisions. **B.** Same planning committee or successor committee that qualifies under Section 511.a.2 (a) does the evaluation.

The Alameda County Project Management Team, led by County General Services Agency, will take the lead on monitoring, evaluating, and updating the 2016 LHMP through the following activities.

- **Monitoring:** Every 12 months from plan adoption, the Alameda County Project Management Team will email each member of the Planning Team an Annual Review Questionnaire to complete. As shown in **Appendix I**, the Annual Review Questionnaire is an evaluation of the following: planning process, hazard analysis, vulnerability analysis, capability assessment, and mitigation strategy.
- Additionally, mitigation actions will be monitored and updated through the use of the Mitigation Project Progress Report. During each annual review, each department or agency currently administering a mitigation project will submit a progress report to the Alameda County Project Management Team to review and evaluate. For projects that are

being funded by a FEMA mitigation grant, FEMA quarterly reports may be used as the preferred reporting tool. As shown in **Appendix I**, the progress report will discuss the current status of the mitigation project, including any changes made to the project, identify implementation problems, and describe appropriate strategies to overcome them.

- **Evaluating:** The Alameda County Project Management Team will collect all completed questionnaires and determine if the 2016 LHMP needs to be updated to address new or more threatening hazards, new technical reports or findings, and new or better-defined mitigation projects. The Alameda County Project Management Team will summarize these findings and email them out to the Planning Team. The Project Management Team will also submit this annual report to the Alameda County Board of Supervisors as part of the CRS recertification process. In addition, for the annual review of the 2016 LHMP, the report will be posted to the LHMP website for public review.
- If the Alameda County Project Management Team believes that the 2016 LHMP needs to be updated based on the findings, then a request will be made to the Planning Team to attend a formal LHMP update meeting. A media release will be issued that the update process has begun.
- **Updating:** To ensure that this update occurs, on the fourth year following plan adoption, the Alameda County Project Management Team will apply for funding or secure local funding to assist in the next LHMP update. Six months prior to the five-year adoption date, the Alameda County Project Management Team will organize the Planning Team to kick-off the next LHMP update. The process for the update will follow the process identified in **Section 3, Planning Process**.

8.3 IMPLEMENTATION THROUGH EXISTING PLANNING MECHANISMS

The local hazard mitigation planning requirement for integrating the LHMP into other planning mechanisms is as follow.

Regulation Checklist – 44 CFR 201.6 Local Mitigation Plans
Element C: Mitigation Strategy
C6. Does the Plan describe a process by which local governments will integrate the requirements of the mitigation plan into other planning mechanisms, such as comprehensive or capital improvement plans, when appropriate? (Requirement § 201.6(c)(4)(iii))

After the adoption of the 2016 LHMP, the Alameda County Project Management Team and Planning Team will work to incorporate applicable elements of the 2016 LHMP into other existing planning mechanisms. The processes for incorporating the 2016 LHMP into various planning documents will occur as (1) other plans and policies are updated and (2) new plans and policies are developed.

Therefore, Alameda County and the other local participants will undertake and/or continue to undertake the following activities:

- Incorporate information from the hazard analysis and mitigation strategy sections in the 2016 LHMP into the County's General Plan Safety Element (and future updates of the Safety Element).

- Use information from the hazard analysis and vulnerability analysis sections in 2016 LHMP for the update of their respective emergency operations or emergency response plans.
- Use information from the vulnerability analysis section in 2016 LHMP to develop and/or continue to develop emergency preparedness public information and related outreach efforts.
- Use information from the vulnerability analysis (specifically the RL properties analysis) in the 2016 LHMP to develop CRS-eligible activities and reduce the number of RL properties throughout the County.
- Refer to their respective mitigation action plans when updating their respective capital improvement plans/programs.

8.4 CONTINUED PUBLIC INVOLVEMENT

The requirement for continued public involvement, as stipulated in the DMA 2000 and its implementing regulations, is described below.

Regulation Checklist – 44 CFR 201.6 Local Mitigation Plans
Element A: Planning Process
A5. Is there discussion of how the community(ies) will continue public participation in the plan maintenance process? (Requirement § 201.6(c)(4))

The Alameda County Project Management Team and the Planning Team is dedicated to involving the public directly in the continual reshaping and updating of the 2016 LHMP. A downloadable copy of the 2016 LHMP and any proposed changes or updates will be posted on the 2016 LHMP website. The 2016 LHMP website will also contain an e-mail address and phone number to which people can direct their comments or concerns.

As noted above, the Alameda County Project Management Team will continue to oversee implementation, examine the annual review questionnaires and project progress reports, modify the implementation strategy and process as needed, and update the LHMP as required. The Alameda County Project Management Team will also identify opportunities to raise community awareness about the 2016 LHMP and the hazards that affect the county. This effort could include attendance and provision of materials at County- and City-sponsored events, programs and public mailings. Any public comments received regarding the 2016 LHMP will be collected by the Alameda County Project Management Team, included in the annual report, and considered during future LHMP updates.

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County of Alameda
2016 Local Hazard Mitigation Plan
Appendices

January 2016

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Appendix A

FEMA Documentation

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APPENDIX A:
LOCAL MITIGATION PLAN REVIEW TOOL

The *Local Mitigation Plan Review Tool* demonstrates how the Local Mitigation Plan meets the regulation in 44 CFR §201.6 and offers States and FEMA Mitigation Planners an opportunity to provide feedback to the community.

- The Regulation Checklist provides a summary of FEMA's evaluation of whether the Plan has addressed all requirements.
- The Plan Assessment identifies the plan's strengths as well as documents areas for future improvement.
- The Multi-jurisdiction Summary Sheet is an optional worksheet that can be used to document how each jurisdiction met the requirements of the each Element of the Plan (Planning Process; Hazard Identification and Risk Assessment; Mitigation Strategy; Plan Review, Evaluation, and Implementation; and Plan Adoption).

The FEMA Mitigation Planner must reference this *Local Mitigation Plan Review Guide* when completing the *Local Mitigation Plan Review Tool*.

Jurisdiction: Alameda County	**Title of Plan:** County of Alameda 2016 Local Hazard Mitigation Plan	**Date of Plan:** January 2016
Local Point of Contact: Michael E. Cadrecha **Title:** Architect, LEED AP BD+C **Agency:** Alameda County GSA-TSD	**Address:** Alameda County GSA-TSD Design & Construction Management 1401 Lakeside Drive, Suite 800 Oakland CA 94612	
Phone Number: 510-208-9589	**E-Mail:** michael.cadrecha@acgov.org	

State Reviewer:	**Title:**	**Date:**

FEMA Reviewer:	**Title:**	**Date:**
Date Received in FEMA Region *(insert #)*		
Plan Not Approved		
Plan Approvable Pending Adoption		
Plan Approved		

SECTION 1:

REGULATION CHECKLIST

INSTRUCTIONS: The Regulation Checklist must be completed by FEMA. The purpose of the Checklist is to identify the location of relevant or applicable content in the Plan by Element/sub-element and to determine if each requirement has been 'Met' or 'Not Met.' The 'Required Revisions' summary at the bottom of each Element must be completed by FEMA to provide a clear explanation of the revisions that are required for plan approval. Required revisions must be explained for each plan sub-element that is 'Not Met.' Sub-elements should be referenced in each summary by using the appropriate numbers (A1, B3, etc.), where applicable. Requirements for each Element and sub-element are described in detail in this *Plan Review Guide* in Section 4, Regulation Checklist.

1. REGULATION CHECKLIST **Regulation** (44 CFR 201.6 Local Mitigation Plans)	**Location in Plan** (section and/or page number)	**Met**	**Not Met**
ELEMENT A. PLANNING PROCESS			
A1. Does the Plan document the planning process, including how it was prepared and who was involved in the process for each jurisdiction? (Requirement §201.6(c)(1))	Section 3.3 and 3.4, Appendix C		
A2. Does the Plan document an opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, agencies that have the authority to regulate development as well as other interests to be involved in the planning process? (Requirement §201.6(b)(2))	Section 3.5, Appendix D		
A3. Does the Plan document how the public was involved in the planning process during the drafting stage? (Requirement §201.6(b)(1))	Section 3.5, Appendix D		
A4. Does the Plan describe the review and incorporation of existing plans, studies, reports, and technical information? (Requirement §201.6(b)(3))	Section 3.2		
A5. Is there discussion of how the community(ies) will continue public participation in the plan maintenance process? (Requirement §201.6(c)(4)(iii))	Section 8.4		
A6. Is there a description of the method and schedule for keeping the plan current (monitoring, evaluating and updating the mitigation plan within a 5-year cycle)? (Requirement §201.6(c)(4)(i))	Section 8.2, Appendix I		
ELEMENT A: REQUIRED REVISIONS			

1. REGULATION CHECKLIST **Regulation** (44 CFR 201.6 Local Mitigation Plans)	Location in Plan (section and/or page number)	Met	Not Met
ELEMENT B. HAZARD IDENTIFICATION AND RISK ASSESSMENT			
B1. Does the Plan include a description of the type, location, and extent of all natural hazards that can affect each jurisdiction(s)? (Requirement §201.6(c)(2)(i))	Subheaders "nature," "location" and "extent" for each of the following: 4.3.1 – Dam Failure Inundation 4.3.2 – Drought 4.3.3 – Earthquake 4.3.4 – Flood 4.3.5 – Landslide 4.3.6 – Liquefaction 4.3.7 – Tsunami 4.3.8 – Wildland Fire		
B2. Does the Plan include information on previous occurrences of hazard events and on the probability of future hazard events for each jurisdiction? (Requirement §201.6(c)(2)(i))	Subheaders "history" and "probability of future events" for each of the following: 4.3.1 – Dam Failure Inundation 4.3.2 – Drought 4.3.3 – Earthquake 4.3.4 – Flood 4.3.5 – Landslide 4.3.6 – Liquefaction 4.3.7 – Tsunami 4.3.8 – Wildland Fire		
B3. Is there a description of each identified hazard's impact on the community as well as an overall summary of the community's vulnerability for each jurisdiction? (Requirement §201.6(c)(2)(ii))	Section 5.4, Appendices F-H		
B4. Does the Plan address NFIP insured structures within the jurisdiction that have been repetitively damaged by floods? (Requirement §201.6(c)(2)(ii))	Section 5.5		
ELEMENT B: REQUIRED REVISIONS			
ELEMENT C. MITIGATION STRATEGY			
C1. Does the plan document each jurisdiction's existing authorities, policies, programs and resources and its ability to expand on and improve these existing policies and programs? (Requirement §201.6(c)(3))	Section 6.2, Appendices F-H		
C2. Does the Plan address each jurisdiction's participation in the NFIP and continued compliance with NFIP requirements, as appropriate? (Requirement §201.6(c)(3)(ii))	Section 6.2		
C3. Does the Plan include goals to reduce/avoid long-term vulnerabilities to the identified hazards? (Requirement §201.6(c)(3)(i))	Section 7.2, Table 7-1		
C4. Does the Plan identify and analyze a comprehensive range of specific mitigation actions and projects for each jurisdiction being considered to reduce the effects of hazards, with emphasis on new and existing buildings and infrastructure? (Requirement §201.6(c)(3)(ii))	Section 7.4, Table 7-2		
C5. Does the Plan contain an action plan that describes how the actions identified will be prioritized (including cost benefit review), implemented, and administered by each jurisdiction? (Requirement §201.6(c)(3)(iv)); (Requirement §201.6(c)(3)(iii))	Section 7.5, Table 7-3		

1. REGULATION CHECKLIST **Regulation** (44 CFR 201.6 Local Mitigation Plans)	Location in Plan (section and/or page number)	Met	Not Met
C6. Does the Plan describe a process by which local governments will integrate the requirements of the mitigation plan into other planning mechanisms, such as comprehensive or capital improvement plans, when appropriate? (Requirement §201.6(c)(4)(ii))	Section 8.3		
ELEMENT C: REQUIRED REVISIONS			
ELEMENT D. PLAN REVIEW, EVALUATION, AND IMPLEMENTATION (applicable to plan updates only)			
D1. Was the plan revised to reflect changes in development? (Requirement §201.6(d)(3))	Section 3.2.2		
D2. Was the plan revised to reflect progress in local mitigation efforts? (Requirement §201.6(d)(3))	Section 7.3, Appendices F-H		
D3. Was the plan revised to reflect changes in priorities? (Requirement §201.6(d)(3))	Section 7.5		
ELEMENT D: REQUIRED REVISIONS			
ELEMENT E. PLAN ADOPTION			
E1. Does the Plan include documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval? (Requirement §201.6(c)(5))	Section 1.6, Appendix B		
E2. For multi-jurisdictional plans, has each jurisdiction requesting approval of the plan documented formal plan adoption? (Requirement §201.6(c)(5))	Section 1.6, Appendix B		
ELEMENT E: REQUIRED REVISIONS			
ELEMENT F. ADDITIONAL STATE REQUIREMENTS (OPTIONAL FOR STATE REVIEWERS ONLY; NOT TO BE COMPLETED BY FEMA)			
F1.			
F2.			
ELEMENT F: REQUIRED REVISIONS			

SECTION 2:
PLAN ASSESSMENT

INSTRUCTIONS: The purpose of the Plan Assessment is to offer the local community more comprehensive feedback to the community on the quality and utility of the plan in a narrative format. The audience for the Plan Assessment is not only the plan developer/local community planner, but also elected officials, local departments and agencies, and others involved in implementing the Local Mitigation Plan. The Plan Assessment must be completed by FEMA. The Assessment is an opportunity for FEMA to provide feedback and information to the community on: 1) suggested improvements to the Plan; 2) specific sections in the Plan where the community has gone above and beyond minimum requirements; 3) recommendations for plan implementation; and 4) ongoing partnership(s) and information on other FEMA programs, specifically RiskMAP and Hazard Mitigation Assistance programs. The Plan Assessment is divided into two sections:

1. Plan Strengths and Opportunities for Improvement
2. Resources for Implementing Your Approved Plan

Plan Strengths and Opportunities for Improvement is organized according to the plan Elements listed in the Regulation Checklist. Each Element includes a series of italicized bulleted items that are suggested topics for consideration while evaluating plans, but it is not intended to be a comprehensive list. FEMA Mitigation Planners are not required to answer each bullet item, and should use them as a guide to paraphrase their own written assessment (2-3 sentences) of each Element.

The Plan Assessment must not reiterate the required revisions from the Regulation Checklist or be regulatory in nature, and should be open-ended and to provide the community with suggestions for improvements or recommended revisions. The recommended revisions are suggestions for improvement and are not required to be made for the Plan to meet Federal regulatory requirements. The italicized text should be deleted once FEMA has added comments regarding strengths of the plan and potential improvements for future plan revisions. It is recommended that the Plan Assessment be a short synopsis of the overall strengths and weaknesses of the Plan (no longer than two pages), rather than a complete recap section by section.

Resources for Implementing Your Approved Plan provides a place for FEMA to offer information, data sources and general suggestions on the overall plan implementation and maintenance process. Information on other possible sources of assistance including, but not limited to, existing publications, grant funding or training opportunities, can be provided. States may add state and local resources, if available.

A. Plan Strengths and Opportunities for Improvement

This section provides a discussion of the strengths of the plan document and identifies areas where these could be improved beyond minimum requirements.

Element A: Planning Process

How does the Plan go above and beyond minimum requirements to document the planning process with respect to:

- *Involvement of stakeholders (elected officials/decision makers, plan implementers, business owners, academic institutions, utility companies, water/sanitation districts, etc.);*
- *Involvement of Planning, Emergency Management, Public Works Departments or other planning agencies (i.e., regional planning councils);*
- *Diverse methods of participation (meetings, surveys, online, etc.); and*
- *Reflective of an open and inclusive public involvement process.*

Element B: Hazard Identification and Risk Assessment

In addition to the requirements listed in the Regulation Checklist, 44 CFR 201.6 Local Mitigation Plans identifies additional elements that should be included as part of a plan's risk assessment. The plan should describe vulnerability in terms of:

1) *A general description of land uses and future development trends within the community so that mitigation options can be considered in future land use decisions;*
2) *The types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard areas; and*
3) *A description of potential dollar losses to vulnerable structures, and a description of the methodology used to prepare the estimate.*

How does the Plan go above and beyond minimum requirements to document the Hazard Identification and Risk Assessment with respect to:

- *Use of best available data (flood maps, HAZUS, flood studies) to describe significant hazards;*
- *Communication of risk on people, property, and infrastructure to the public (through tables, charts, maps, photos, etc.);*
- *Incorporation of techniques and methodologies to estimate dollar losses to vulnerable structures;*
- *Incorporation of Risk MAP products (i.e., depth grids, Flood Risk Report, Changes Since Last FIRM, Areas of Mitigation Interest, etc.); and*
- *Identification of any data gaps that can be filled as new data became available.*

Element C: Mitigation Strategy

How does the Plan go above and beyond minimum requirements to document the Mitigation Strategy with respect to:

- *Key problems identified in, and linkages to, the vulnerability assessment;*
- *Serving as a blueprint for reducing potential losses identified in the Hazard Identification and Risk Assessment;*
- *Plan content flow from the risk assessment (problem identification) to goal setting to mitigation action development;*
- *An understanding of mitigation principles (diversity of actions that include structural projects, preventative measures, outreach activities, property protection measures, post-disaster actions, etc);*
- *Specific mitigation actions for each participating jurisdictions that reflects their unique risks and capabilities;*
- *Integration of mitigation actions with existing local authorities, policies, programs, and resources; and*
- *Discussion of existing programs (including the NFIP), plans, and policies that could be used to implement mitigation, as well as document past projects.*

Element D: Plan Update, Evaluation, and Implementation (*Plan Updates Only*)

How does the Plan go above and beyond minimum requirements to document the 5-year Evaluation and Implementation measures with respect to:

- *Status of previously recommended mitigation actions;*
- *Identification of barriers or obstacles to successful implementation or completion of mitigation actions, along with possible solutions for overcoming risk;*
- *Documentation of annual reviews and committee involvement;*
- *Identification of a lead person to take ownership of, and champion the Plan;*
- *Reducing risks from natural hazards and serving as a guide for decisions makers as they commit resources to reducing the effects of natural hazards;*
- *An approach to evaluating future conditions (i.e. socio-economic, environmental, demographic, change in built environment etc.);*
- *Discussion of how changing conditions and opportunities could impact community resilience in the long term; and*
- *Discussion of how the mitigation goals and actions support the long-term community vision for increased resilience.*

B. Resources for Implementing Your Approved Plan

Ideas may be offered on moving the mitigation plan forward and continuing the relationship with key mitigation stakeholders such as the following:

- *What FEMA assistance (funding) programs are available (for example, Hazard Mitigation Assistance (HMA)) to the jurisdiction(s) to assist with implementing the mitigation actions?*
- *What other Federal programs (National Flood Insurance Program (NFIP), Community Rating System (CRS), Risk MAP, etc.) may provide assistance for mitigation activities?*
- *What publications, technical guidance or other resources are available to the jurisdiction(s) relevant to the identified mitigation actions?*
- *Are there upcoming trainings/workshops (Benefit-Cost Analysis (BCA), HMA, etc.) to assist the jurisdictions(s)?*
- *What mitigation actions can be funded by other Federal agencies (for example, U.S. Forest Service, National Oceanic and Atmospheric Administration (NOAA), Environmental Protection Agency (EPA) Smart Growth, Housing and Urban Development (HUD) Sustainable Communities, etc.) and/or state and local agencies?*

OMB No 1660-0022
Expires June 30, 2007

Community: County of Alameda

County of Alameda LHMP 2016

510 FLOODPLAIN MANAGEMENT PLANNING

511.a Floodplain Management Planning (FMP)

Credit Points: *Enter the section or page number in the plan where each credited item can be found.*

CRS Step	Section/Page	Item Score	Step Total
1. Organize to prepare the plan. (max: 15)			
a. Involvement of Office Responsible for Community Planning (4)	Section 3.4.1		
b. Planning committee of department staff (9)	Section 3.4.1		
c. Process formally created by the community's governing board (2)			
2. Involve the public. (max: 120)			
a. Planning process conducted through a planning committee (60)	Section 3.4.1, Appendix C		
b. Public meetings held at the beginning of the planning process (15)	3.5, Appendix D		
c. Public meeting held on draft plan (15)			
d. Other public information activities to encourage input (up to 30)	Section 3.5, Appendix D		
3. Coordinate with other agencies. (max: 35)			
a. Review of existing studies and plans (REQUIRED) (5)	Section 3.2.1		
b. Coordinating with communities and other agencies (up to 30)			
4. Assess the hazard. (max 35)			
a. Plan includes an assessment of the flood hazard (REQUIRED) with:			
(1) A map of known flood hazards (5)	Appendix E (Map Figure-6)		
(2) A description of known flood hazard (5)	Section 4.3.4 (Nature), Section 5.5 (Repetitive		
(3) A discussion of past floods (5)	Section 4.3.4 (History)		
b. Plan includes assessment of less frequent floods (10)	Section 4.3.4 (Flood), Section 4.3.4.1 (Sea Level		
c. Plan includes assessment of areas likely to flood (5)	Section 4.3.6 (Nature), Section 4.3.4.1 (Sea Level		
b. The plan describes other natural hazards (REQUIRED FOR DMA) (5)	Section 4.3		
5. Assess the problem. (max 52)			
a. Summary of each hazard identified in the hazard assessment and their community impact (REQUIRED) (2)	Section 5.4		

Activity Worksheet AW 510-1 Edition 2006

OMB No 1660-0022
Expires June 30, 2007

Community: County of Alameda

b. Description of the impact of the hazards on:		
(1) Life, safety, health, procedures for warning and evacuation (5)	Section: 5.4.5 (Additional Life/Safety Information)	
(2) Public health including health hazards to floodwaters/mold (5)		
(3) Critical facilities and infrastructure (5)	Section 5.2, Section 5.4, Appendix F (County of Alameda), Appendix G (ACFC&WCD)	
(4) The community's economic and tax base (5)		
(5) Number of type of affected buildings (5)	Section 5.2, Section 5.4, Appendix F (County of Alameda), Appendix H (ACFC&WCD)	
c. Review of all damaged buildings/flood insurance claims (5)	Section 6.2	
d. Areas that provide natural floodplain functions (5)		
e. Development/redevelopment/population trends (7)	Section 3.2.2	
f. Impact of future flooding conditions outline in Step 4, item c (5)		
6. Set goals. (REQUIRED) (2)	Section 7.2	
7. Review possible activities. (max: 35)	Section 7.4 and Appendix F and H	
a. Preventive activities (5)	Appendix F, Tables F-9 and F-10, Appendix H, Table H-7	
b. Floodplain Management Regulatory/current & future conditions (5)	Appendix F, Tables F-9 and F-10, Appendix H, Table H-7	
c. Property Protection Activities (5)	Appendix F, Tables F-9 and F-10, Appendix H, Table H-7	
d. Natural resource protection activities (5)	Appendix F, Tables F-9 and F-10, Appendix H, Table H-7	
e. Emergency services activities (5)	Appendix F, Tables F-9 and F-10, Appendix H, Table H-7	
f. Structural projects (5)	Appendix F, Tables F-9 and F-10, Appendix H, Table H-7	
g. Public information activities (5)	Appendix F, Tables F-9 and F-10, Appendix H, Table H-7	
8. Draft an action plan. (max: 60)		
a. Actions must be prioritized (REQUIRED)	Section 7.5 and Appendix F and H	

Activity Worksheet AW 510-2 Edition 2006

OMB No 1660-0022
Expires June 30, 2007

Community: County of Alameda

a. Recommendations for activities from two of the six categories (10)		
b. Recommendations for activities from three of the six categories (20)		
c. Recommendations for activities from four of the six categories (30)		
d. Recommendations for activities from five of the six categories (45)	Appendix F, Table F-11 and Appendix H, Table H-8	
b. Post-disaster mitigation policies and procedures (10)		
c. Action items for mitigation of other hazards (5)	Appendix F, Table F-11 (#s 1, 2, 3, 4, 5, 8, 9, 14, 15, 16, 20, 23)	
9. Adopt the plan. (2)	Section 1.6, Appendix B	
10. Implement, evaluate and revise. (max: 26)		
a. Procedures to monitor and recommend revisions (REQUIRED) (2)	Section 8.2, Appendix I	
b. Same planning committee or successor committee that qualifies under Section 511.a.2 (a) does the evaluation (24)	Section 8.2, Appendix I	

Maximum Credit for 510 = 382 Plan Total: _____

Activity Worksheet AW 510-3 Edition 2006

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Appendix B

Adoption Resolutions

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To be inserted once obtained

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Appendix C

LHMP Planning Team

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County of Alameda GSA-TSD
Design & Construction Management

Mitigation Update 2011-2016
County Kick-Off

MEETING: ALCO Mitigation Plan 2011-2016 Kick-Off Meeting
MTG. DATE: Tuesday, 5/26/15, 2:00 PM
LOCATION: 1401 Lakeside Drive, Oakland CA

MEETING ATTENDEES

See Attached Sign-In Sheet for attendees

PREPARED BY: Michael Cadrecha

Please advise preparer of any revisions, deletions or corrections in writing within three (3) business days. If there are no changes, preparer will consider this document an accurate and complete record of the meeting.

MEETING AGENDA SUMMARY

- Establish Responsibilities
- Identify other stakeholders
- Refine the Scope, Meeting Dates, and Project Milestone Schedule
- Evaluation of mitigation progress during the past 5 years
- Identify potential points of planning coordination (general plan updates, climate adaptation planning, etc)
- Brainstorm and Develop the Community Engagement Strategy

HANDOUTS

1. Agenda
2. Milestone Schedule
3. 2010-2015 Mitigation Projects

DISTRIBUTION

1. Meeting Attendees
2. Team members not present (via email)

MEETING NOTES

1.1 Plan purpose and outcomes.

A. Planning Area confirmed: County owned and operated facilities and infrastructure.

B. Due date confirmed: Mitigation Plan 2016-2021 – FEMA/Cal EMA approval and BOS adoption due March 16, 2016.

1.2 Meeting Dates and Locations; Project Milestone Schedule

A. Regular Meetings shall be the 2nd and 4th Thursday's of every month, 10 AM. Location shall be the Alameda County EOC.
B. Project Milestone Schedule – see attached.

1.3 Establish Responsibilities.

A. General Services Agency (GSA) – project management, critical facilities assets list, sustainability and climate adaptation, community outreach plan development, and other duties as assigned.
B. Public Works Agency (PWA) – expertise in flood mitigation, planning, and design; watershed planning, building code / life safety, sustainability in infrastructure design and construction, GPS, and other duties as assigned.
C. Community Development Agency (CDA) – General planning and General Plan / Safety Element coordination and update, GPS, and other duties as assigned.
D. Health Care Services Agency (HCSA) – Public Health and Emergency Services providing expertise in emergency management planning, communicable disease control, emergency medical services, and community outreach plan development, and other duties as assigned.
E. Alameda County Sherriff's Office – Office of Emergency Services (OES) – expertise in homeland security and emergency management, community outreach plan development, and other duties as assigned.
F. Alameda County Fire Department (ACFD) – expertise in emergency management, community outreach plan development, and other duties as assigned.

1.4 Identify other stakeholders.

A. The group discussed considering adding the following outside entities as partners and information sources on a consulting basis:

    1. Utilities
    2. Sherriff Advisory Committee

B. The group discussed considering public representatives from key NGO's / CBO's as partners and information sources. CARD (Collaborating Agencies Responding to Disaster was mentioned as a useful group).

1.5 Identify potential points of planning coordination (general plan updates, climate adaptation planning, etc).

ALCO Capital Improvements Plan. **PWA will provide bullet points here**

ALCO Climate Action Plan. – **TSD Sustainability Group will provide your bullet points here.**

ALCO Strategic Visioning -

Multi-agency incorporation of mitigation and preparedness concepts into day-to-day operations – *identifying and addressing gaps that may lead to disaster vulnerabilities (Items 1-6 below are excerpted from the current Annex).*

Update: Corrective maintenance and repair – **BMD will provide their bullet points here. PWA will please provide there bullet points here for any corrective maintenance and repair on infrastructure.**

a) Responsible Agencies: GSA-BMD (buidings) and PWA (infrastructure).

b) non-structural mitigation projects as part of normal operation and maintenance of facilities.

Update: Inter-agency coordination for private and public sector development –

a) Responsible Agencies:

- Fire – **ACFD will provide your bullet points here.**
- CDA Planning – **CDA will provide their bullet points here.**
- PWA Flood Control, Water Conservation, BID, Grading, Watercourse Ordinance. **PWA will provide their bullet points here.**

b) Consistency/coordination.

Update: Status of the Safety Element in the County's General Plan – **Angela/Elizabeth, let MEC know if this language will suffice.**

a) A revised Safety Element was adopted in 2013 and amended in 2014 in order to comply with the requirements of the Central Valley Floor Protection Plan.

b) The County's Annex to the LHMP is incorporated into the document as an Implementation Plan.

Update: Building Code Ordinance - Imposes design standards to increase the ability of buildings to better withstand the forces of earthquakes so as to minimize loss of life and property. **PWA BID will provide their bullet points here on this item on any upgrades to the ordinance.**

Update: Grading Ordinance. **PWA will provide their bullet points here.**

Update: Watercourse Ordinance **PWA will their provide your bullet points here.**

1.6 Quick review the Current Mitigation Annex. Follow this link to access the County's current Annex http://resilience.abag.ca.gov/wp-content/documents/2010LHMP/AlamedaCo-Annex-2011.pdf

1.7 Evaluation of mitigation progress during the past 5 years – Review "*2010-2015 Mitigation Project, Exhibit E.*"

A. See attached Spreadsheet.

1.8 Brainstorm the Community Engagement Strategy

A. Suggestions from the current Annex

1. County Library – educational displays and standard forms for public input in the plan.

2. County PIO – partner with the PIO to tap into pre-existing channels of communication.

3. Existing Community Forums – Participate in regional advisory groups, Town Hall meetings.

4. Transit Organizations – display information posters at transit facilities and vehicles

B. Suggestions from the 1st ABAG Workshop ("Community Engagement Strategy")

1. Work with CBO's / NGO's

C. RECENT COUNTY EXPERIENCE: In the last 5 years, have any County agencies conducted community outreach for a mitigation project, or any other type of project, in which there was a community outreach and public input component that met with success? **This will be taken up in the Community Outreach Planning meetings.**

Assignments to be completed prior to next Meeting:

- GSA Update the Critical Facilities Asset List – Due date is 6/11/15
- PWA Update the Critical Infrastructure Asset List – Due date is 6/11/15
- GSA, OES, ACFD, and HCSA meet to develop a draft of the community outreach plan and report back to the team – Due date is 6/11/15
- Members register for ABAG Workshop 2 – Hazard & Risk Assessment – June 23, 2015 Foster City.
- Agencies provide bullet points of potential planning coordination (MEC will send email with directions)
- Agencies provide status of mitigation projects since 2011 (MEC will send email with directions)
- GSA will revise meeting dates for the 2nd and 4th Tuesdays of every month.

County of Alameda GSA-TSD
Design & Construction Management

Mitigation Update 2011-2016
Meeting 2: Capability Assessment

MEETING: ALCO Mitigation Plan 2011-2016 Capability Assessment Meeting
MTG. DATE: Tuesday, 6/11/15, 2:00 PM
LOCATION: Alameda County EOC - 4985 Broder Blvd, Dublin, CA 94568

MEETING ATTENDEES

Michael Cadrecha (GSA), Matt Muniz (GSA), Elizabeth McElligott (CDA), Hilda Quiroz (ACFD), Ron Seitz (HCSA), Carolyn Bloede (GSA)

PREPARED BY: Michael Cadrecha

Please advise preparer of any revisions, deletions or corrections in writing within three (3) business days. If there are no changes, preparer will consider this document an accurate and complete record of the meeting.

MEETING AGENDA SUMMARY

- Approve Previous Meeting Minutes from 5/26/15
- Confirm Responsibilities and Capabilities
- Evaluation of mitigation progress during the past 5 years
- Identify potential points of planning coordination (general plan updates, climate adaptation planning, etc)
- Set meeting for Community Engagement Strategy

HANDOUTS

1. Agenda
2. Meeting Minutes from 5/26/15
3. 2010-2015 Mitigation Projects – Status on Projects Since 2011

DISTRIBUTION

1. Meeting Attendees
2. Team members not present

ACTION ITEMS

- GSA update the Critical Facilities Asset List – **Due date is 6/19/15.**
- PWA update the Critical Infrastructure Asset List – **Due date is 6/19/15.**
- GSA, OES, CDA, ACFD, and HCSA meet to develop a draft of the community outreach plan and report back to the team – **Meeting Date is set for 6/19/15.**
- Attend ABAG Workshop 2 – Hazard & Risk Assessment – June 23, 2015 Foster City.
- Agencies provide bullet points of potential planning coordination – **Ongoing, due date is 6/19/15.**
- Agencies provide status of mitigation projects since 2011 – **Due date is 6/19/15 (see attached).**

MEETING NOTES – NEW ITEMS

2.1 Capability Assessment – The County reviewed capabilities via four criteria as outlined in the FEMA Local Mitigation Planning Handbook (March 2013). Said categories are as follows:

A. Administrative and Technical – *what internal resources does ALCO have?*

1. General Services Agency (GSA) – project management, critical facilities assets list, sustainability and climate adaptation, community outreach plan development, and other duties as assigned.

2. Public Works Agency (PWA) – expertise in flood mitigation, planning, and design; critical facilities assets list, watershed planning, building code / life safety, sustainability in infrastructure design and construction, **GIS**, and other duties as assigned.

3. Community Development Agency (CDA) – General planning and General Plan / Safety Element coordination and update, GIS, community outreach planning, and other duties as assigned.

4. Health Care Services Agency (HCSA) – Public Health and Emergency Services providing expertise in emergency management planning, communicable disease control, emergency medical services, and community outreach plan development, and other duties as assigned.

5. Alameda County Sherriff's Office – Office of Emergency Services (OES) – expertise in homeland security and emergency management, community outreach plan development, and other duties as assigned.

6. Alameda County Fire Department (ACFD) – expertise in emergency management, mitigation, community outreach plan development, and other duties as assigned.

B. Local Planning and Regulatory –
Each agency will provide, from their perspective, planning and regulatory capabilities that enable mitigation, and those which need to be modified to enhance our mitigation capabilities.

1. Internal ordinances and policies that regulate County facilities and infrastructure:

- **PWA: Alameda County Building Ordinance**
- **PWA: Grading, Watercourse, Flood Control, Strom Water Management Ordinances**

2. Local laws and State statutes

- **PWA: State Building Code**
- **PWA BID: The 2013 CBC Code series have been adopted by the BOS and been effective since Jan. 2014. These adopted codes include the latest building designs to resist earthquake load. In addition, the county also adopted the CBC Section 3417 through 3424 for earthquake evaluation and design for retrofit of existing buildings**
- **PWA: California Water Code – Department of Water Resources Division of Safety of Dams**

3. Federal law and policy

- **PWA Flood Control: NFIP**
- **PWA Flood Control: Community Rating System**
- **PWA: FEMA Policy - Guidelines and Standards**
- **PWA: USACE Disaster Operations (Public Law 84-99) - Flood Control and Coastal Emergency Act**

C. Financial – *Costs associated with implementing mitigation strategies*

1. Formalizing Mitigation Projects in the County Capital Improvement Plan: Team members will review budgetary strategies to support mitigation projects, and report back to the group.

2. Grant applications. The County may ask for grant research and writing assistance from the mitigation consultant after the mitigation plan is completed.

D. Existing Education and Outreach

1. ACFD –

- Citizen Emergency Response Teams and Personal Preparedness training have been recently expanded. This will be noted in the spreadsheet entitled "Progress on Mitigation Projects since 2011."
- Get Ready 5th Grade – elementary school preparedness training via 5th grade as a way to reach students / families in Alameda County.

2. HCSA – Emergency Preparedness Trainings for local residents via phone, and in multiple languages, currently underway.

MEETING NOTES – OUTSTANDING ITEMS (new elements shown **in bold**)

1.4 Identify other stakeholders.

A. The group discussed considering adding the following outside entities as partners and information sources on a consulting basis:

1. Utilities
2. Sherriff Advisory Committee

B. The group discussed considering public representatives from key NGO's / CBO's as partners and information sources. CARD (Collaborating Agencies Responding to Disaster was mentioned as a useful group). **ALCO VOADS (Alameda County Volunteers Organizing Active in Disasters)**

1.7 Evaluation of mitigation progress during the past 5 years – Review "*2010-2015 Mitigation Project, Exhibit E.*"

A. See attached Spreadsheet. **Each agency will update and return to GSA-TSD by 6/19/15.**

1.8 Brainstorm the Community Engagement Strategy – **Meeting set for Friday June 19 2015 (PM)**

County of Alameda GSA-TSD
Design & Construction Management

Mitigation Update 2011-2016
Meeting 3: Outreach Strategy

MEETING: ALCO Mitigation Plan 2011-2016 Outreach Strategy Kick Off; **updates from 7/9/15 team meeting.**
MTG. DATE: Thursday, 6/25/15, 10:00 AM
LOCATION: Offices at CDA – 224 West Winton Avenue, Room 111 Hayward, CA

MEETING ATTENDEES

Michael Cadrecha (GSA), Elizabeth McElligott (CDA), Angela Robinson-Pinon (CDA), Hilda Quiroz (ACFD), Theresa Langdon (ACSO); Cynthia Frankel (EMS – Public Health)

PREPARED BY: Michael Cadrecha

Please advise preparer of any revisions, deletions or corrections in writing within three (3) business days. If there are no changes, preparer will consider this document an accurate and complete record of the meeting.

MEETING AGENDA SUMMARY

- Brainstorm a preliminary outline of possible outreach strategies to improve public input for the mitigation plan.

HANDOUTS

1. None

DISTRIBUTION

1. Meeting Attendees
2. Team members prior to next meeting.

ACTION ITEMS

- Theresa will verify with her Captain if the agendas for Sherriff's Advisory Committee can accommodate our Outreach strategy in upcoming agendas.
- Cynthia will verify with PHD if ALCO Medical Reserve Corps is a viable avenue for community outreach.
- The mitigation team needs to identify additional stakeholders, especially those with which the County may share interdependencies.
- The public outreach events will be rescheduled to allow more input and development from the consultant.
- Share this draft with mitigation team and consultant for refinement.

MEETING NOTES – NEW ITEMS

3.1 Possible strategies, some which were outlined in the 2011-2015 Annex to the ABAG Plan are as follows:

A. County Library Displays

1) Educational displays and standard forms for public input in the plan. The soon-to-be-selected consultant could develop appropriate materials for display.

2) Determine if this strategy requires a person to host the displays, answer questions, etc.

B. County PIO – We should develop a means to coordinate with the County PIO. **Michael will contact.**

C. Existing Community Forums – take a short powerpoint to certain targeted forums with Q&A / surveys.

1) Unincorporated Services Committee (Supervisors Chan and Miley) meets the 4th Wednesday of the month (alternates location between CVL and SLVHA).

2) Sherriff's Advisory Board – meets Monday from 4 to 5pm at SLVHA. Upcoming meetings are 08/03, 09/21, 10/12, 11/09, and 12/14. Theresa will verify if our outreach strategy can be accommodated in any of the upcoming meetings.

3) Castro Valley Municipal Advisory Council (CV MAC) – Meets the 3rd Monday of every month at the CV Library.

4) ALCO Medical Reserve Corps – Cynthia will verify with PHD if this is a viable avenue to pursue.

D. Internet outlets for announcements and Survey Monkey questionnaires developed by the County with consultant assistance.

1) ready.acgov.org.

2) Unincorporated Webiste at http://www.acgov.org/uninc/

3) Develop outside website for project (easier and quicker to revise during plan development, then gets uploaded to IT upon completion.

E. Work with CBO's / NGO's (CARD, ALCO-VOAD)

3.2 Develop an Outreach Message for each outreach strategy, based on the following outline:

A. Market – who is the communication to be addressed to?

B. Mission – what is the objective of the communication?

C. Message – what are the specific points to be communicated?

D. Media – which vehicles will be used to convey the message?

E. Money (Commitment) – how much (time/$) will be spent in the effort?

F. Measurement – how will impact be assessed during/after the campaign?

3.3 Mitigation Branding and Identity – Might we design a logo that defines us, and is used for web announcements and surveys? **Team members will send branding ideas to Michael NLT 7/24/15.**

County of Alameda GSA-TSD
Design & Construction Management

Mitigation Update 2011-2016
Meeting 4: Review of Team Progress

MEETING: ALCO Mitigation Plan 2011-2016 Review of Team Progress
MTG. DATE: Tuesday, 7/9/15, 10:00 AM
LOCATION: Dial-In Teleconference

MEETING ATTENDEES

Michael Cadrecha (GSA), Hilda Quiroz (ACFD), Allan Lang (PWA BID), Moses Tsang (PWA), Bill Lepere (PWA), Cynthia Frankel (HCSA EMS), Angela Robinson-Pinon (CDA), Hilda Quiroz (ACFD), Donata Nillson (HCSA), Ryan Bell (GSA Sustainability), Sandra Williams (AC Health Systems)

PREPARED BY: Michael Cadrecha

Please advise preparer of any revisions, deletions or corrections in writing within three (3) business days. If there are no changes, preparer will consider this document an accurate and complete record of the meeting.

MEETING AGENDA SUMMARY

1. ALCO 2010 Mitigation Projcets Progress
2. Capability Assessment
3. Outreach Strategy Outline Draft
4. Critical Facilities and Infrastructure List
5. Hazards – brief review

HANDOUTS (via email)

1. Agenda
2. Capability Assessment
3. Outreach Strategy
4. 2010-2015 Mitigation Projects – Status on Projects Since 2011

DISTRIBUTION

1. Meeting Attendees
2. Team members not present

ACTION ITEMS

- **Item 1.7: Each agency to send updates of *Item 3 Pre Disaster Planning* to Michael by 7/17/15. The updates shall be for emergency plans developed, in process, or updated since 2011.**
- GSA update to the Critical Facilities Asset List – **DONE.**
- PWA update to the Critical Infrastructure Asset List – **Ongoing, due 7/24/15, Angela from CDA will send Safety Element to PWA for list of critical facilities noted therein (due 7/17/15) for validation and coordination.**
- GSA, OES, CDA, ACFD, and HCSA will meet to develop a draft of the community outreach plan and report back to the team – **DONE, reviewed, team comments will be added by MEC.**
- Attend ABAG **Workshop 3 – August 2015 Oakland, date TBD.**

- Agencies provide bullet points of potential planning coordination – **Ongoing, due date is 7/17/15.**
- **Next Meeting is set for August 13 at 10 AM. Location TBD.**

MEETING NOTES – NEW ITEMS

4.1 Hazards:

Team will begin conducting a hazard assessment with the yet-to-be-selected Consultant sometime in Aug/Sep. Per the 2011 ABAG Multi-Jurisdictional Mitigation Plan, ABAG noted nine hazards that impact the Bay Area:

- 5 related to earthquakes (faulting, shaking, earthquake-induced landslides, liquefaction, and tsunamis)
- 4 related to weather (flooding, landslides, wildfires, and drought).

In the Alameda County Annex of ABAG's 2011 Plan, the County determined that earthquakes (particularly shaking and liquefaction), flooding (including dam failure), wildfire, and landslides (including unstable earth) posed the most significant risks for potential loss in Alameda County. In addition, it was also stated that tsunamis do not pose a significant threat to Alameda County's facilities, infrastructure, or in the unincorporated areas, nor does the County face any natural disasters not listed in the ABAG multi-jurisdictional plan.

As the team reassesses those determinations with the consultant for the 2016-2021 plan, the team will also examine how climate change could exacerbate some of those hazards.

4.2 County Mitigation Team Identity – Anyone who wants to design a logo, a tag line, or develop an identifying name for our group can send them to Michael by 7/24/15. We'll vote on them when we meet again.

MEETING NOTES – OUTSTANDING ITEMS (new elements shown **in bold**)

1.4 Identify other stakeholders.

A. The group discussed considering adding the following outside entities as partners and information sources on a consulting basis:

1) Utilities
2) Sherriff Advisory Committee
3) **Business community in unincorporated areas (Castro Valley / Eden Area Chamber of Commerce). Angela will research and report back to team.**
4) **Academic and non-profits**

B. The group discussed considering public representatives from key NGO's / CBO's as partners and information sources. CARD (Collaborating Agencies Responding to Disaster) and ALCO VOADS (Alameda County Volunteers Organizing Active in Disasters) were mentioned as potential groups.

C. Additional stakeholders were discussed and are identified in the Outreach Strategy.

1.7 Evaluation of mitigation **project** progress during the past 5 years – Review "*2010-2015 Mitigation Project, Exhibit E.*"

A. Each agency will send updates of *Item 3 Pre Disaster Planning* to Michael by 7/17/15. The update shall be for emergency plans developed, in process, or updated since 2011.

2.1 Capability Assessment – The County reviewed capabilities via four criteria as outlined in the FEMA Local Mitigation Planning Handbook (March 2013). Said categories are as follows:

A. Administrative and Technical – *what internal resources does ALCO have?*

1. General Services Agency (GSA) – project management, critical facilities assets list, sustainability and climate adaptation, community outreach plan development, and other duties as assigned.

2. Public Works Agency (PWA) – expertise in flood mitigation, planning, and design; critical facilities assets list, watershed planning, building code / life safety, sustainability in infrastructure design and construction, **GIS**, and other duties as assigned.

3. Community Development Agency (CDA) – General planning and General Plan / Safety Element coordination and update, GIS, community outreach planning, and other duties as assigned.

4. Health Care Services Agency (HCSA) – Public Health and Emergency Services providing expertise in emergency management planning, communicable disease control, emergency medical services, and community outreach plan development, and other duties as assigned.

5. Alameda County Sherriff's Office – Office of Emergency Services (OES) – expertise in homeland security and emergency management, community outreach plan development, and other duties as assigned.

6. Alameda County Fire Department (ACFD) – expertise in emergency management, mitigation, community outreach plan development, and other duties as assigned.

B. Local Planning and Regulatory –
Each agency will provide, from their perspective, planning and regulatory capabilities that enable mitigation, and those which need to be modified to enhance our mitigation capabilities.

1. Internal ordinances and policies that regulate County facilities and infrastructure:

- PWA: Alameda County Building Ordinance
- PWA: Grading, Watercourse, Flood Control, Strom Water Management Ordinances

2. Local laws and State statutes

- PWA: State Building Code
- PWA BID: The 2013 CBC Code series have been adopted by the BOS and been effective since Jan. 2014. These adopted codes include the latest building designs to resist earthquake load. In

addition, the county also adopted the CBC Section 3417 through 3424 for earthquake evaluation and design for retrofit of existing buildings
- PWA: California Water Code – Department of Water Resources Division of Safety of Dams

3.Federal law and policy
- PWA Flood Control: NFIP
- PWA Flood Control: Community Rating System
- PWA: FEMA Policy - Guidelines and Standards
- PWA: USACE Disaster Operations (Public Law 84-99) - Flood Control and Coastal Emergency Act

C. Financial – *Costs associated with implementing mitigation strategies*

1. Formalizing Mitigation Projects in the County Capital Improvement Plan: Team members will review budgetary strategies to support mitigation projects, and report back to the group.

2. Grant applications. The County may ask for grant research and writing assistance from the mitigation consultant after the mitigation plan is completed.

D. Existing Education and Outreach

1. ACFD –

- Citizen Emergency Response Teams **(CERT)** training **has been recently expanded and are offered in English and Spanish.** This will be noted in the spreadsheet entitled "Progress on Mitigation Projects since 2011."
- Get Ready 5th Grade – elementary school preparedness training via 5th grade as a way to reach students / families in Alameda County. **It is currently offered in English, Spanish, and Cantonese.**
- **Personal Emergency Preparedness – This has recently been expanded and is offered in English and Spanish.**

2. HCSA – Emergency Preparedness Trainings for local residents via phone, and in multiple languages, is currently underway.

ALAMEDA COUNTY
2015 LHMP UPDATE
LHMP PLANNING TEAM MEETING #5
September 10, 2015

AGENDA

Introductions

- County of Alameda Project Management
- AECOM
- Local Hazard Mitigation Plan (LHMP) Planning Team Members

LHMP Update Overview

- 2015 LHMP Outline*
- 2015 LHMP Schedule*

Items to Discuss

- Hazard Identification and Hazard Map Sources*
- Capability Assessment*
- Critical Facilities and Infrastructure*

Public Outreach

ABAG Meeting

- Resilience Planning Workshop 3 - Implementing Mitigation & Adaptation Strategies (Monday, September 14)

Next Meetings

- **Planning Team Meeting #6 – 10/22/15** (review vulnerability assessment, develop mitigation goals, discuss potential mitigation measures for 2015)
- **Planning Team Meeting #7 – 11/19/15** (finalize 2015 Mitigation Action Plan, discuss draft plan)

Questions & Answers

* Handout

1

County of Alameda GSA-TSD
Design & Construction Management

Mitigation Update 2011-2016
Meeting 5: Kickoff with Consultant

MEETING: ALCO Mitigation Plan 2011-2016, Kickoff with Consultant
MTG. DATE: Thursday, 9/10/15, 10:00 AM
LOCATION: CDA's Public Hearing Room (Room 160), 224 West Winton Avenue, Hayward, CA

MEETING ATTENDEES

Name	Agency	Email Address
Andy Otsuka	Public Works Agency - Watershed Planning Section	andy@acpwa.org
Angela Robinson-Pinon	Community Development Agency	Angela.Robinson-Pinon@acgov.org
Bill Lepere	Public Works Agency	bill@acpwa.org
Cynthia Frankel	Public Health - Emergency Medical Services	cynthia.frankel@acgov.org
Elizabeth McElligott	Community Development Agency	elizabeth.mcelligott@acgov.org
Lindsey Trumpy	AECOM	Lindsey.Trumpy@aecom.com
Matt Muniz	General Services Agency - Building Maintenance Department	MMUNIZ@acgov.org
Michael Cadrecha	General Services Agency - Technical Services Department	michael.cadrecha@acgov.org
Moses Tsang	Public Works Agency - Flood Design Section	moses@acpwa.org
Ryan Bell	General Services Agency - Sustainability Department	ryan.bell@acgov.org

PREPARED BY: Lindsey Trumpy (AECOM)

Please advise preparer of any revisions, deletions or corrections in writing within three (3) business days. If there are no changes, preparer will consider this document an accurate and complete record of the meeting.

MEETING AGENDA SUMMARY

- Introductions
- LHMP Update Overview
- Items to Discuss
- Public Outreach
- AGAB Meeting
- Next Meetings
- Questions & Answers

HANDOUTS

1. Agenda
2. 2015 LHMP Outline
3. 2015 LHMP Schedule

4. Hazard Identification and Hazard Map Sources
5. Capability Assessment
6. Critical Facilities and Infrastructure

DISTRIBUTION

- Meeting Attendees
- Team members not present (via email)

MEETING NOTES

1.1 Introductions

- County Project Manager - Michael Cadrecha
- Project Consultant – Lindsey Trumpy (AECOM)
- Local Hazard Mitigation Plan (LHMP) Planning Team members

1.2 LHMP Update Overview

2015 LHMP Outline

- The following table illustrates the sections that will be included in the 2015 LHMP and how they compare to the 2010 LHMP

Section #	2015 Section Name	2010 Section Name
1	Introduction	N/A
2	Community Profile	Introduction
3	Planning Process	Regional Planning Process & Local Planning Process
4	Hazards Assessment	Hazards Assessment
5	Risk Assessment	Risk Assessment
6	Capability Assessment	N/A
7	Mitigation Strategy	Mitigation Goals and Objectives
8	Plan Maintenance	Plan Update Process
9	References	N/A

(Sections were not previously numbered – so assigned numbers to more clearly define each section)

- New "Introduction" Section will talk more about HMPs in general, and the various grant programs
- Previous "Introduction" contained demographic information for the County, this information will remain in the plan, but be retitled as "Community Profile"
- "Planning Process" will still address both the regional and the local planning process, it will also address public outreach activities
- "Hazards Assessment" will be updated so that it is broken out by hazard and nature, history, location, extent and probability of future events is covered for each

- The "Risk Assessment" discusses the vulnerability analysis. This includes an analysis of County owned, maintained and leased critical facilities, we'll add in population and residential building stock. We will provide vulnerabilities for each individual facility
- The "Capability Assessment" section is new to the 2015 LHMP, this was not a requirement when the 2010 LHMP was developed
- The "Mitigation Strategy" will includes goals objectives and priorities for the next 5 years
- "Plan Maintenance" will discuss how the plan will remain a living document over the next five years and will also address how to update the plan as the 5 year timeline is coming to an end
- "References" will be added to the plan
- Additionally, we will be using this plan to help the County gain Community Rating System (CRS) points and these items will be weaved throughout the project. Participation in CRS can lead to a reduction in flood insurance rates (CRS is further discussed on a later slide)
- *It was discussed that Flood Control District and some other districts may want to participate in the planning process as an "official participant" rather than as a county stakeholder. Being an official participant provides the opportunity to apply directly to FEMA for grand funding, requires additional participation in the planning process, and adoption of the plan by their governing board*
  - *Michael and Lindsey will set up a separate meeting with Public Works Agency/Flood Control District to better understand their structure and determine what level of participation is best*
- The following table illustrates the proposed appendices for the 2015 LHMP

Appendix Letter	Appendix Name
A	FEMA Compliance Documents
B	Adoption Resolution
C	LHMP Planning Team
D	Public Outreach and Stakeholder Involvement
E	Figures/Maps
F	Risk Assessment Tables*
G	Plan Maintenance Documents

*Full Critical facilities and infrastructure list, summary tables will be provided in the main body of the LHMP

- Appendix A will include our documentation illustrating that the plan meets all of FEMA's requirements, it will also include documentation illustrating the various CRS activities that are included as part of the LHMP planning process/plan development
- Appendix B will contain the County's adoption resolution once obtained
- Appendix C will include documentation of the LHMP planning team – meeting agendas and minutes
- Appendix D will include documentation of the various public outreach and stakeholder activities that occurred throughout the project
- Appendix E will contain the various maps developed for the project – hazard maps, but also critical facilities and population and residential building density maps
- Appendix F will contain the results from the Risk Assessment. Summary tables will be included in the main body of the plan, Appendix F will have the complete tables

- Appendix G will include documents to help track the status of mitigation actions identified in the LHMP

Floodplain Management Planning/Community Rating System

- 2015 LHMP will support the County's participation in the National Flood Insurance Program's (NFIP) Community Rating System (CRS) program (https://www.fema.gov/national-flood-insurance-program-community-rating-system) by addressing the program's Floodplain Management Planning activities
- To earn CRS credits and participate in the CRS program, communities must illustrate that they have gone beyond the minimum floodplain protection requirements and have developed extra measures to provide protection to their community from flooding.
- Alameda County currently participates in CRS as a Class 7 community; Class 7 provides a 15% discount on flood insurance policies for those in a Special Flood Hazard Area (in County Unincorporated)

2015 LHMP Schedule

- A complete schedule was provided to the group (and attached), blue items are those that AECOM (the consultant) is responsible for, red items are the "homework" items for the LHMP planning team, purple items are the public outreach activities, and light blue is the Cal OES/FEMA review period
- The table below highlights the key deliverable dates:

Activity	Due Date
Develop Hazard Maps	Sept. 30
Risk Assessment (Vulnerability Assessment/Estimate of Potential Losses)	Oct 14
Planning Team Meeting #6	Oct 22
Mitigation Action Plan	Oct 30
Administrative Draft LHMP	Nov 5
Planning Team Meeting #7	Nov 19 (tentative date, to be confirmed)
Public Review LHMP	Nov 20 – Dec 7
Final Draft LHMP	Dec 11
Final LHMP	TBD post-FEMA approval

- The table below highlights the responsibilities for the LHMP planning team

Committee Meeting	Activity	Task Completion Date
N/A	Review and Finalize Hazard Map Data Sources	Sept. 10
#5	Finalize Capability Assessment & Finalize Critical Facility and Infrastructure List	Sept. 25
#6	Review Risk Assessment (vulnerability assessment), Develop Mitigation Goals & Discuss Potential Mitigation Measures	Oct 22
N/A	Develop Mitigation Action Plan	Oct 30
N/A	Provide Comments on Administrative Draft LHMP	Nov 18
#7	Finalize 2015 Mitigation Action Plan	Nov 19

1.3 Items to Discuss

Hazard Identification and Hazard Map Sources

- Based upon discussions in previous meetings, the following are the hazards that will be addressed in the 2015 LHMP: Climate Change (sea-level rise, extreme high tides); Dam Failure; Drought; Earthquake; Flood; Landslide; Liquefaction; Tsunami; and Wildfire
  - It's important to note that climate change will be addressed throughout the document (its relationship to other hazards), but the two aspects of climate change called out above are two maps that will be developed specific to climate change
- *The addition of terrorism as a hazard was brought up. It was decided to talk with the Sheriff and determine whether it's best to address terrorism in this plan or another document*
- A handout was provided with a list of data sources that we typically use to develop our hazard maps, the group reviewed the list to determine if other data sources should be used or considered
- *For the population density map and the residential building stock density map we will look into what's available in terms of County Assessor's data and American Community Survey data (as opposed to the 2010 census data)*

Capability Assessment

- A Capability Assessment was not a requirement when the 2010 LHMP was developed so, this is a new to the 2015 LHMP
- A draft capability assessment was provided to the LHMP planning team prior to this meeting; we want to take this opportunity to go over the document, fill in any missing information and answer any questions about the document
- *Some adjustments were made to the tables during the meeting (GIS added to human and technical resources, airport land use plans and County ordinance for hazardous waste added to the legal and regulatory resources, and it was determined that the city ordinances that are specific to building construction should be removed)*
- *Additional edits should be emailed to Michael Cadrecha (michael.cadrecha@acgov.org) by Friday, September 25th*
- As noted in the table below, "current and completed hazard mitigation projects and programs" are also part of the capability assessment. However, in previous meetings the group developed a list of current and completed mitigation projects/programs, which is why that table was not provided in your handout

Capability Assessment Tables
Human and Technical Resources
Financial Resources
Legal and Regulatory Resources
Current and Completed Hazard Mitigation Projects and Programs

Critical Facilities and Infrastructure

- Broadly defined - critical facilities and infrastructure are assets that if severely damaged, would reduce the availability of essential community services necessary to cope with an emergency.

  Examples of Critical Facilities and Infrastructure:

  - Government facilities for Alameda County (County owned and or maintained)

  - Community facilities, including libraries, community centers, and parks
  - County jails
  - Emergency response facilities, including police and fire stations
  - Public hospitals and medical clinics
  - Public utilities, including pump stations, electric substations, potable water facilities, wastewater facilities, wells, dams, reservoirs, debris basins, hydrostations, meter stations, and stream and river gages
  - Educational facilities, including school buildings and district offices
  - Transportation infrastructure, including airports, transit stations, and County-maintained bridges
- These are examples of critical facilities; all types do not need to be included on the County's list
- The County is discussing how to address leased buildings
- *It was noted that there are County owned medical clinics missing from the list – these have been added since the 9.10.15 meeting*
- *Angela Robinson-Pinon will also re-send a list of critical facilities she had previously provided*

1.4 Public Outreach

- The group had previously developed a public outreach strategy, Michael and Lindsey are meeting with Caroline Judy (GSA - Acting Director) and will review the outreach strategy with her

1.5 ABAG Meeting

- The third hazard mitigation ABAG meeting is on Monday, we would like everyone from Alameda County to sit together so please look for familiar Alameda County faces when you arrive

1.6 Next Meetings

- Meeting #6 is scheduled for October 22, 2015
  - At this meeting we will review the vulnerability assessment, development mitigation goals, and discuss potential mitigation measures
- Meeting #7 is tentatively scheduled for November 19, 2015
  - At this meeting we will finalize the 2015 LHMP, and discuss the administrative draft LHMP (administrative draft will be reviewed by the planning team prior to development of a public review draft which will be available for public comment)

Additional Item

- A chart of all the Disaster Preparedness plans for Alameda County was provided (attached). Red indicates plans that have not been started, yellow plans are in progress, green plans are complete and blue is existing programs
- Please take a look at the chart and provide feedback on updates/changes (this draft is from 2012)

PLANNING TEAM ASSIGNMENTS

Item	Deadline
ALCO Disaster Preparedness Org Chart Review – Identify new or updated plans for the chart	Sept. 25
Capability Assessment – Provide any additional updates	Sept. 25
Critical Facility List – Provide any additional updates	Sept. 25
Provide input to Michael Cadrecha (michael.cadrecha@acgov.org)	

Project Consultant Contact Information:

Lindsey Trumpy
Lindsey.Trumpy@aecom.com
510-874-3171

ALAMEDA COUNTY
2015 LHMP UPDATE
LHMP PLANNING TEAM MEETING #6
October 22, 2015

AGENDA

Introductions

Hazard Maps

- Hazard Profiles
- Draft Map Review

Critical Facility Review

Vulnerability Analysis

- Process and Examples

Mitigation Strategy

- 2011 Mitigation Strategy
- Mitigation Goals
- Mitigation Strategy Workbook*
- Eligible vs. Ineligible Activities*

Next Steps

Next Meeting

- **Planning Team Meeting #7 – 11/19/15** (finalize 2015 Mitigation Action Plan, discuss draft plan)

Questions & Answers

* Handout

1

County of Alameda GSA-TSD
Design & Construction Management

Mitigation Update 2011-2016
Meeting 6: Hazard Maps & Mitigation Strategy

MEETING: ALCO Mitigation Plan 2011-2016, Hazard Maps & Mitigation Strategy
MTG. DATE: Thursday, 10/22/15, 10:00 AM (a follow-up meeting occurred on Thursday, 10/29/15 to further discuss the Mitigation Strategy Process)
LOCATION: Annex Training Room (Room 217A), 399 Elmhurst Street, Hayward, CA

MEETING ATTENDEES

Name	Agency	Email Address
Angela Robinson-Pinon	Community Development Agency	Angela.Robinson-Pinon@acgov.org
Anna Swardenski	Swardenski Consulting	arswardenski@gmail.com
Bill Lepere	Public Works Agency	bill@acpwa.org
Carolyn Bloede	General Services Agency - Sustainability Department	Carolyn.Bloede@acgov.org
Hilda Quiroz	Alameda County Fire Department	Hilda.Quiroz@acgov.org
Kay Vasilyeva	AECOM	Kay.Vasilyeva@aecom.com
Lindsey Trumpy	AECOM	Lindsey.Trumpy@aecom.com
Michael Cadrecha	General Services Agency - Technical Services Department	michael.cadrecha@acgov.org
Moses Tsang	Public Works Agency - Flood Design Section	moses@acpwa.org
Theresa (Terri) Langdon	Alameda County Sheriff's Office - Homeland Security & Emergency Services	TLangdon@acgov.org

PREPARED BY: Lindsey Trumpy (AECOM)

Please advise preparer of any revisions, deletions or corrections in writing within three (3) business days. If there are no changes, preparer will consider this document an accurate and complete record of the meeting.

MEETING AGENDA SUMMARY

- Introductions
- Hazard Maps
- Critical Facility Review
- Vulnerability Analysis Process
- Mitigation Strategy
- Next Steps
- Next Meetings
- Questions & Answers

HANDOUTS

1. Agenda
2. Mitigation Strategy Workbook

3. Eligible vs. Ineligible Activities

DISTRIBUTION

- Meeting Attendees
- Team members not present (via email)

MEETING NOTES

1.1 Introductions

- County Project Manager - Michael Cadrecha
- Project Consultant – Lindsey Trumpy (AECOM)
- Local Hazard Mitigation Plan (LHMP) Planning Team members

1.2 Hazard Maps Review

- For each hazard to be addressed in the Local Hazard Mitigation Plan (LHMP) we will develop a hazard profile, this includes discussing the nature, history, location, extent and probably of future events for each hazard.
- Hazard maps have been developed; these help us understand both the location and the extent. For each map, we would like you to let us know if anything looks unexpected (we are still working on the maps for sea level rise).

Hazard Map Review	
Map	**Comments**
Overall	• Add a distinct County boundary line • Add Community names • Adjust color scheme to be ADA compliant
Dam Inundation	• Label each dam with a number – have a key that notes the name and owner for each dam
Earthquake - Groundshaking	• Add fault lines and label major fault lines • Create a second, regional map that's more zoomed out
Earthquake – Historic Earthquakes	• Add fault lines and label major fault lines • Add the year next to the EQs that occurred in the 6.1-7.8M category • Create a second, regional map that's more zoomed out
Tsunami Inundation	• Note that this map does not take into account sea level rise
Historic Wildfires	• Add names of large fires to the map

1.3 Critical Facility Review

- The list of critical facilities has been compiled, but there are a variety of facilities that appear to be duplicates
- Each set of facilities that appear to be duplicates have been highlighted in the same color
- The first column of the spreadsheet notes why we would like the facilities to be reviewed

1.4 Vulnerability Analysis Process

- Critical facility/asset data as well as population and residential structure data is combined with hazard maps to produce the Vulnerability Analysis
  - In essence, the critical facilities are mapped then the map of each hazard is overlaid to determine which hazards fall into which hazard zones.
  - The analysis does not try to determine to what level a facility is vulnerable, i.e. 20% of the facility is within the flood zone or the facility will receive 1 foot of water. Rather a facility is simply in or out, if the hazard boundary touches a facility the facility is counted as being susceptible.
  - A similar approach is taken for population and residential structures.
- Examples of what the information obtained from the vulnerability analysis will look like were shown and discussed - for each critical facility identified it notes which of the chosen hazards the facility is susceptible to.
- For population and residential buildings, census data is used and we get the number of people and residential buildings susceptible to each hazard.

1.5 Mitigation Strategy

- To begin the mitigation strategy process, the 2011 Mitigation Strategy is reviewed: review the previous mitigation goals/objectives and analyze the previous mitigation actions - which were completed and which were not. The Planning Team has already provided a status update on the 2011 mitigation actions so that portion of the review is already complete.

Mitigation Goals

- In the 2011 plan one goal was identified. The consultant provided an option of updating the goals to two goals – goals that are a bit more specific that reference the LHMP and the mitigation efforts directly.
- The group decided to use the single, more general mitigation goal that was included in the 2011 plan.

Potential Mitigation Actions

- A list of potential mitigation actions has been developed (**Table 1** in the Mitigation Strategy handout).
  - It is suggested that additional mitigation actions, specific to your department/special district, are added to the list of potential mitigation actions. The list of potential mitigation actions is your laundry list that you enter all possible ideas onto, and then we will go through the list and narrow it down to a smaller list of "chosen" mitigation actions – our priorities for the next five years.

Eligible vs. Ineligible Mitigation Activities

- Developing an LHMP gains a jurisdiction eligibility to specific federal grant funds. A list was provided that illustrates eligible mitigation activities for three different funding sources and a list of example ineligible mitigation activities (attached). It is suggested that this list help guide the discussion of what mitigation actions to include.
- Examples of **Eligible** Activities:
  - Relocation and elevation of structures
  - Structural and non-structural retrofitting
  - Dry floodproofing (non-residential structures)
  - Protective measures for utilities (e.g. electric and gas), water & sanitary sewer systems and/or other infrastructure (e.g. roads, bridges)
  - Vegetation management
  - Storm water management
  - Localized flood control projects
- Examples of **Ineligible** Activities
  - Flood studies or flood mapping and major flood control projects
  - Studies that do not yield a project
  - Projects that solely address operations or maintenance (e.g. dredging, debris removal)
  - Any phase or part of a project that is dependent on another project
  - Preparedness measures and response equipment (e.g., response training, electronic evacuation road signs, interoperable communications equipment)
  - Projects for preparedness activities or temporary measures (e.g., sandbags, bladders, geotubes)

Potential Mitigation Action Analysis – Pro/Con Review

- To analyze the potential mitigation actions, we are asking pros and cons to be developed for each potential mitigation action (**Table 2**). To develop pros and cons for each potential mitigation action, the following topics are suggested for consideration:
  - The level of political support for the project.
  - Is there an agency that can/will lead the project?
  - What type of funding options exist?
  - What is the likelihood of the project occurring within the next five years?

Priority Mitigation Action Criteria

- It is strongly suggested that mitigation actions are chosen utilizing the following criteria (**Table 3**).
  - Mitigation Planning
  - Technical Feasibility and Effectiveness
  - Floodplain Management and Protection of Wetlands
  - Environmental Planning and Historic Review and Compliance

  - Cost Effectiveness
  - Cost Review
  - General Program Requirements
- These are the Hazard Mitigation Assistance (HMA) Program requirements. Incorporating these requirements into the prioritization process helps to identify high priority mitigation actions would lead to enhanced project scoping as well as development and prevent delays later for HMA funding.

Participant-Specific Mitigation Action Plan

- A Mitigation Strategy handout was provided to the group to help guide each member through the development of their own Mitigation Action Plan:
  1. Review Table 1 (list of potential mitigation actions)
  2. Complete Table 2, to analyze the list of potential mitigation actions
  3. Evaluate the items in both Tables 1 and 2 and establish priority actions for your jurisdiction
     - Use the requirements in Table 3 to choose your priority actions
     - Emphasis in this process should be placed on cost-effectiveness and technical feasibility and effectiveness.
  4. Enter your chosen mitigation actions into Table 4 and complete the remaining columns
- It is suggested that each department/agency choose between 1 and 5 mitigation actions and each special district choose between 5 and 10 mitigation actions, based upon your priorities and resources.

1.6 Next Steps

- Finalize Hazard Maps *(AECOM)*
- Finalize Critical Facility List *(LHMP Planning Team)*
- Complete Vulnerability Analysis *(AECOM)*
- Complete Participant-Specific Mitigation Action Plan *(LHMP Planning Team)*
- Complete Draft Plan for Review *(AECOM)*

1.7 Next Meeting

- Meeting #7 is scheduled for November 19, 2015
  - At this meeting we will finalize the 2015 LHMP Mitigation Strategies, and discuss the administrative draft LHMP (administrative draft will be reviewed by the planning team prior to development of a public review draft which will be available for public comment)

Project Consultant Contact Information:

Lindsey Trumpy
Lindsey.Trumpy@aecom.com
510-874-3171

Hazard Mitigation Assistance Mitigation Activity Chart:
https://www.fema.gov/hazard-mitigation-assistance-mitigation-activity-chart

Table 3: Eligible Activities by Program
(Hazard Mitigation Assistance (HMA) Programs)

Eligible Activities	HMGP	PDM	FMA
1. Mitigation Projects	√	√	√
Property Acquisition and Structure Demolition	√	√	√
Property Acquisition and Structure Relocation	√	√	√
Structure Elevation	√	√	√
Mitigation Reconstruction			√
Dry Floodproofing of Historic Residential Structures	√	√	√
Dry Floodproofing of Non-residential Structures	√	√	√
Minor Localized Flood Reduction Projects	√	√	√
Structural Retrofitting of Existing Buildings	√	√	
Non-structural Retrofitting of Existing Buildings and Facilities	√	√	√
Safe Room Construction	√	√	
Wind Retrofit for One- and Two-Family Residences	√	√	
Infrastructure Retrofit	√	√	√
Soil Stabilization	√	√	√
Wildfire Mitigation	√	√	
Post-Disaster Code Enforcement	√		
Generators	√	√	
5 Percent Initiative Projects	√		
Advance Assistance	√		
2. Hazard Mitigation Planning	√	√	√
3. Management Costs	√	√	√

HMGP = Hazard Mitigation Grant Program
PDM = Pre-Disaster Mitigation (Grant Program)
FMA = Flood Mitigation Assistance (Program)

HMA information: https://www.fema.gov/hazard-mitigation-assistance

http://www.fema.gov/media-library-data/15463cb34a2267a900bde4774c3f42e4/FINAL_Guidance_081213_508.pdf

D.2 Ineligible Activities

The following list provides examples of activities that are not eligible for HMA funding:

- Projects that do not reduce the risk to people, structures, or infrastructure;
- Projects that are dependent on a contingent action in order to be effective and/or feasible (i.e., not a stand-alone mitigation project that solves a problem independently or constitutes a functional portion of a solution);
- Projects with the sole purpose of open space acquisition of unimproved land;
- Projects for which actual physical work such as groundbreaking, demolition, or construction of a raised foundation has occurred prior to award or final approval. Projects for which demolition and debris removal related to structures proposed for acquisition or mitigation reconstruction has already occurred may be eligible when such activities were initiated or completed under the FEMA Public Assistance program to alleviate a health or safety hazard as a result of a disaster;
- Projects that involve land that is contaminated with hazardous waste;
- Projects for preparedness activities or temporary measures (e.g., sandbags, bladders, geotubes);
- Projects that create revolving loan funds;
- Activities required as a result of negligence or intentional actions, or those intended to remedy a code violation, or the reimbursement of legal obligations such as those imposed by a legal settlement, court order, or State law;
- FEMA may, at its discretion, choose not to fund projects subject to ongoing litigation if such litigation may affect eligibility of the project or may substantially delay implementation of the project;
- All projects located in a CBRS Unit or in OPAs, other than property acquisition and structure demolition or relocation projects for open space under HMA. For details on property acquisition and structure demolition or relocation projects for open space within a CBRS Unit or OPAs see Addendum, Part A.2;
- Activities on Federal lands or associated with facilities owned by another Federal entity;
- Major flood control projects related to the construction, demolition, or repair of dams, dikes, levees, floodwalls, seawalls, groins, jetties, breakwaters, and erosion projects related to beach nourishment or re-nourishment;
- Projects for hazardous fuels reduction in excess of 2 miles from structures;
- Projects that address unmet needs from a disaster that are not related to mitigation;

- Retrofitting facilities primarily used for religious purposes, such as places of worship (or other projects that solely benefit religious organizations). However, a place of worship may be included in a property acquisition and structure demolition or relocation project provided that the project benefits the entire community, such as when the whole neighborhood or community is being removed from the hazard area;
- Activities that only address manmade hazards;
- Projects that address, without an increase in the level of protection, operation, deferred or future maintenance, repairs, or replacement of existing structures, facilities, or infrastructure (e.g., dredging, debris removal, replacement of obsolete utility systems, bridges, and facility repair/rehabilitation);
- Projects for the purpose of:
  - Landscaping for ornamentation (e.g., trees, shrubs);
  - Site remediation of hazardous materials (with the exception eligible activities, such as the abatement of asbestos and/or lead-based paint and the removal of household hazardous wastes to an approved landfill);
  - Water quality infrastructure;
  - Projects that primarily address ecological or agricultural issues;
  - Forest management;
  - Prescribed burning or clear-cutting;
  - Creation and maintenance of fire breaks, access roads, or staging areas;
  - Irrigation systems;
- Studies not directly related to the design and implementation of a proposed mitigation project; and
- Preparedness measures and response equipment (e.g., response training, electronic evacuation road signs, interoperable communications equipment).

All projects must also comply with any additional project-specific guidance provided in the Addendum.

D.3 Cost-effectiveness

Mitigation program authorizing statutes (Flood Mitigation Assistance at 42 U.S.C. 4104c, Pre-Disaster Hazard Mitigation at 42 U.S.C. 5133, and Hazard Mitigation at 42 U.S.C. 5170c) require that FEMA provide funding for mitigation measures that are cost-effective or are in the interest of the NFIF. FEMA has specified minimum project criteria via regulation (44 CFR Part 79 and 44 CFR Section 206.434), including that Applicants must demonstrate mitigation projects are cost-effective. The determination of cost-effectiveness is performed in a variety of ways. It

ALAMEDA COUNTY
2015 LHMP UPDATE
LHMP PLANNING TEAM MEETING #7
November 19, 2015

AGENDA

Introductions

Mitigation Strategy*

- Potential Mitigation Actions – Pros and Cons
- Participant-Specific Mitigation Action Plan

Review of the Administrative Draft Plan

- Questions and general comments

Next Steps

Questions & Answers

* Handout

County of Alameda GSA-TSD
Design & Construction Management

Mitigation Update 2011-2016
Meeting 7: Finalize Mitigation Action Plan & Administrative Draft Review

MEETING: ALCO Mitigation Plan 2011-2016, Hazard Maps & Mitigation Strategy
MTG. DATE: Thursday, 11/19/15, 10:00 AM
LOCATION: Annex Training Room (Room 217A), 399 Elmhurst Street, Hayward, CA

MEETING ATTENDEES

Name	Agency	Email Address
Angela Robinson-Pinon	Community Development Agency	Angela.Robinson-Pinon@acgov.org
Anna Swardenski	Swardenski Consulting	arswardenski@gmail.com
Bill Lepere	Public Works Agency	bill@acpwa.org
Carolyn Bloede	General Services Agency - Sustainability Department	Carolyn.Bloede@acgov.org
Kay Vasilyeva	AECOM	Kay.Vasilyeva@aecom.com
Lindsey Trumpy	AECOM	Lindsey.Trumpy@aecom.com
Michael Cadrecha	General Services Agency - Technical Services Department	michael.cadrecha@acgov.org
Moses Tsang	Public Works Agency - Flood Design Section	moses@acpwa.org
Theresa (Terri) Langdon	Alameda County Sheriff's Office - Homeland Security & Emergency Services	TLangdon@acgov.org

PREPARED BY: Lindsey Trumpy (AECOM)

Please advise preparer of any revisions, deletions or corrections in writing within three (3) business days. If there are no changes, preparer will consider this document an accurate and complete record of the meeting.

MEETING AGENDA SUMMARY

- Introductions
- Mitigation Strategy
- Review of the Administrative Draft Plan
- Next Steps
- Questions & Answers

HANDOUTS

1. Agenda
2. Mitigation Strategy Workbook

DISTRIBUTION

- Meeting Attendees
- Team members not present (via email)

MEETING NOTES

1.1 Introductions

- County Project Manager - Michael Cadrecha
- Project Consultant – Lindsey Trumpy (AECOM)
- Local Hazard Mitigation Plan (LHMP) Planning Team members

1.2 Mitigation Strategy

Potential Mitigation Action Analysis – Pro/Con Review

- The pro/con review process was re-visited at meeting #7
- To analyze the potential mitigation actions, we are asking pros and cons to be developed for each potential mitigation action (Table 2). To develop pros and cons for each potential mitigation action, the following topics are suggested for consideration:
  - The level of political support for the project.
  - Is there an agency that can/will lead the project?
  - What types of funding options exist?
  - What is the likelihood of the project occurring within the next five years?
- The group walked through the list of Potential Mitigation Actions and completed the Pro/Con review for some of the potential mitigation action items.
- For the remaining potential mitigation actions the group identified the best planning team members to complete the pro/con review for each action.

Participant-Specific Mitigation Action Plan

- The process for choosing "priority" mitigation actions was re-visited at meeting #7
- A Mitigation Strategy handout was provided to the group to help guide each member through the development of their own Mitigation Action Plan:
  1. Review Table 1 (list of potential mitigation actions)
  2. Complete Table 2, to analyze the list of potential mitigation actions
  3. Evaluate the items in both Tables 1 and 2 and establish priority actions for your jurisdiction
     - Use the requirements in Table 3 to choose your priority actions
     - Emphasis in this process should be placed on cost-effectiveness and technical feasibility and effectiveness.
  4. Enter your chosen mitigation actions into Table 4 and complete the remaining columns
- It is suggested that each department/agency choose between 1 and 5 mitigation actions and each special district choose between 5 and 10 mitigation actions, based upon your priorities and resources.

1.3 Review of the Administrative Draft Plan

- It was questioned where the list of Critical Facilities came from (as it is significantly longer than the initial list the Planning Team developed)
  - At meeting #5 it was noted that critical facilities were missing from the initial list so additional facilities were provided by the Community Development Agency and Public Works
- The group decided to reduce the number of critical facilities back down and re-focus on those facilities owned, maintained and leased by the County
  - Matt Muniz agreed to go through the list and refine it
- It was questioned how the list of Potential Mitigation Action items was developed
  - The list was compiled by:
    - Reviewing the list of 2011mitigation actions and re-incorporating those actions that are still applicable
    - Reviewing the 2011 list of mitigation actions provided in the ABAG plan
    - Pulling from an inventory of mitigation actions that have been previously reviewed by FEMA
    - It is important to note that the list of potential mitigation actions needs to include at least one mitigation action for each hazard we identified in the plan

1.4 Next Steps

- Complete the pro/con analysis *(due Wednesday, December 2 – LHMP Planning Team)*
- Choose priority projects *(due Friday, December 11 – LHMP Planning Team)*
- Provide comments on the administrative draft plan *(due Friday, December 4 – LHMP Planning Team)*
- Develop Public Review Draft *(due Wednesday, December 16 – AECOM)*

Project Consultant Contact Information:

Lindsey Trumpy
Lindsey.Trumpy@aecom.com
510-874-3171

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Appendix D

Public Outreach and Stakeholder Involvement

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Multi-Media Releases

LHMP Media Release

CAROLINE JUDY, Acting Director
1401 LAKESIDE DRIVE, OAKLAND, CALIFORNIA 94612 510 208 9700 FAX 510 208 9711 www.acgov.org/gsa/

FOR IMMEDIATE RELEASE
November 13, 2015
CONTACT: Caroline Judy, Acting Director, Alameda County General Services Agency
(510) 208-9700

Alameda County Preparing 2016 Multi-Hazard Mitigation Plan Update
Two Workshops to be Held in November to Encourage Public Comment

Alameda County is launching a planning effort to re-assess risks posed by natural and human-caused disasters and identify ways to reduce those risks.

The planning process will result in the preparation of an updated Local Hazard Mitigation Plan (LHMP). The County developed their first LHMP annex in 2005, updated the plan in 2010 and is kicking-off the 2016 plan update process. An updated version of the plan is required under the Federal Disaster Mitigation Act of 2000 in order to be eligible to continue to receive certain forms of Federal disaster assistance.

Alameda County is vulnerable to a wide range of disasters. The 2016 LHMP will provide the County with the necessary tools to identify risks and prioritize future actions for reducing risks. Additionally, the plan will provide a framework for future requests for Federal assistance to institute risk-reducing actions.

The updated 2016 LHMP will incorporate climate adaptation planning by addressing the hazard of climate change and how climate change affects other hazards. In addition, the 2016 LHMP will also support the County's participation in the National Flood Insurance Program's Community Rating System (CRS) program by addressing the program's Floodplain Management Planning activities.

There will be an opportunity for public comments on the draft plan. The comment period is anticipated to occur in late November 2015. The community is encouraged to attend one of the following community presentations to learn more and to provide feedback:

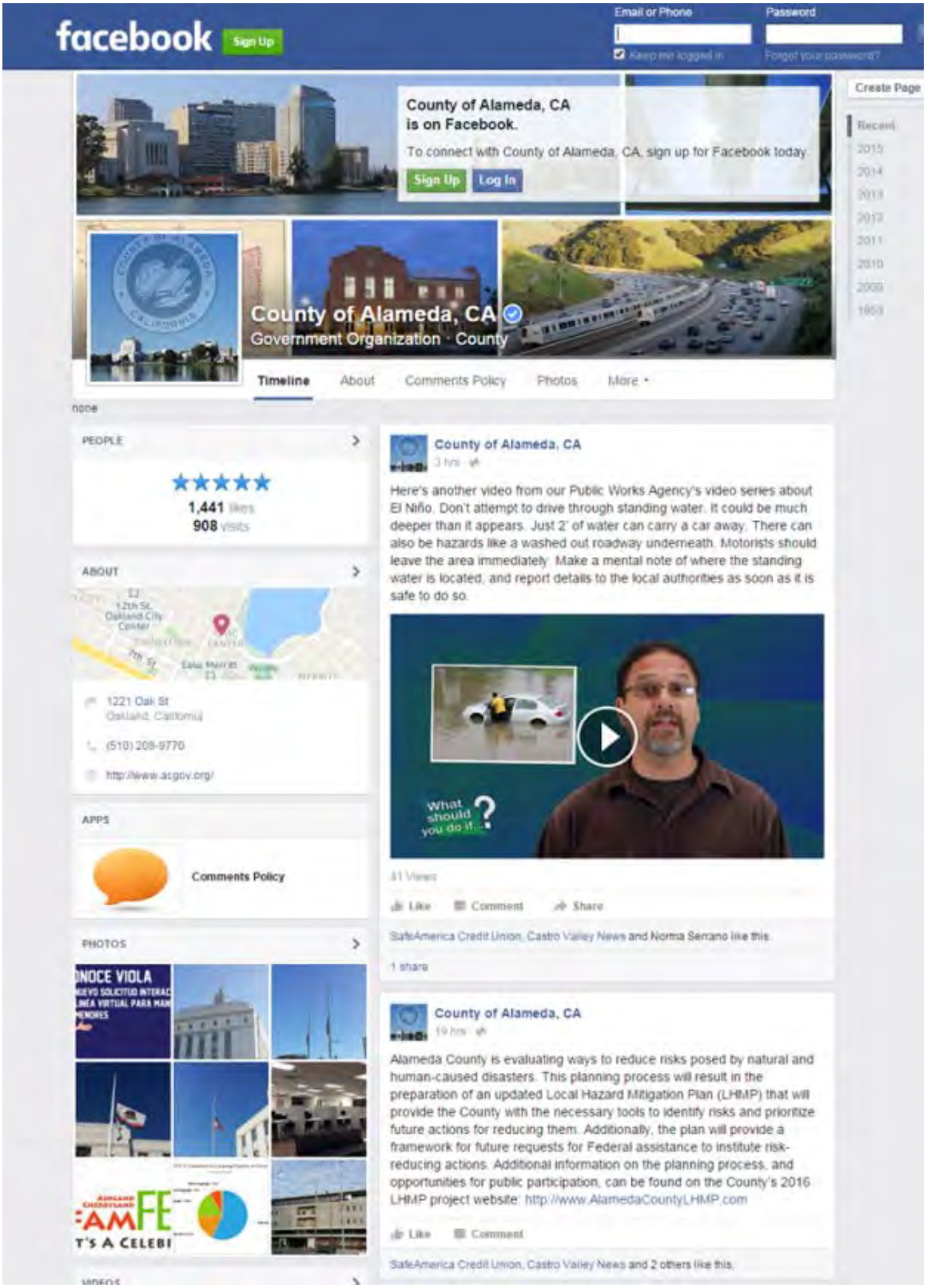
- Castro Valley Municipal Advisory Council (CV MAC) – **Monday, November 16th** (6:00 – 9:00pm, Castro Valley Library - 3600 Norbridge Ave, Castro Valley CA)
- Fire Advisory Commission – **Thursday, November 19th** (6:00-8:00pm, Alameda County Fire Department, Fire Admin, 6363 Clark Avenue, Dublin, CA)

Additional information on the planning process can be found on the 2016 LHMP project website: www.AlamedaCountyLHMP.com. Information about the CRS program can be found on the County webpage at: https://www.acgov.org/pwa/programs/fema.htm .

###

County of Alameda Facebook Account

https://www.facebook.com/AlamedaCounty/

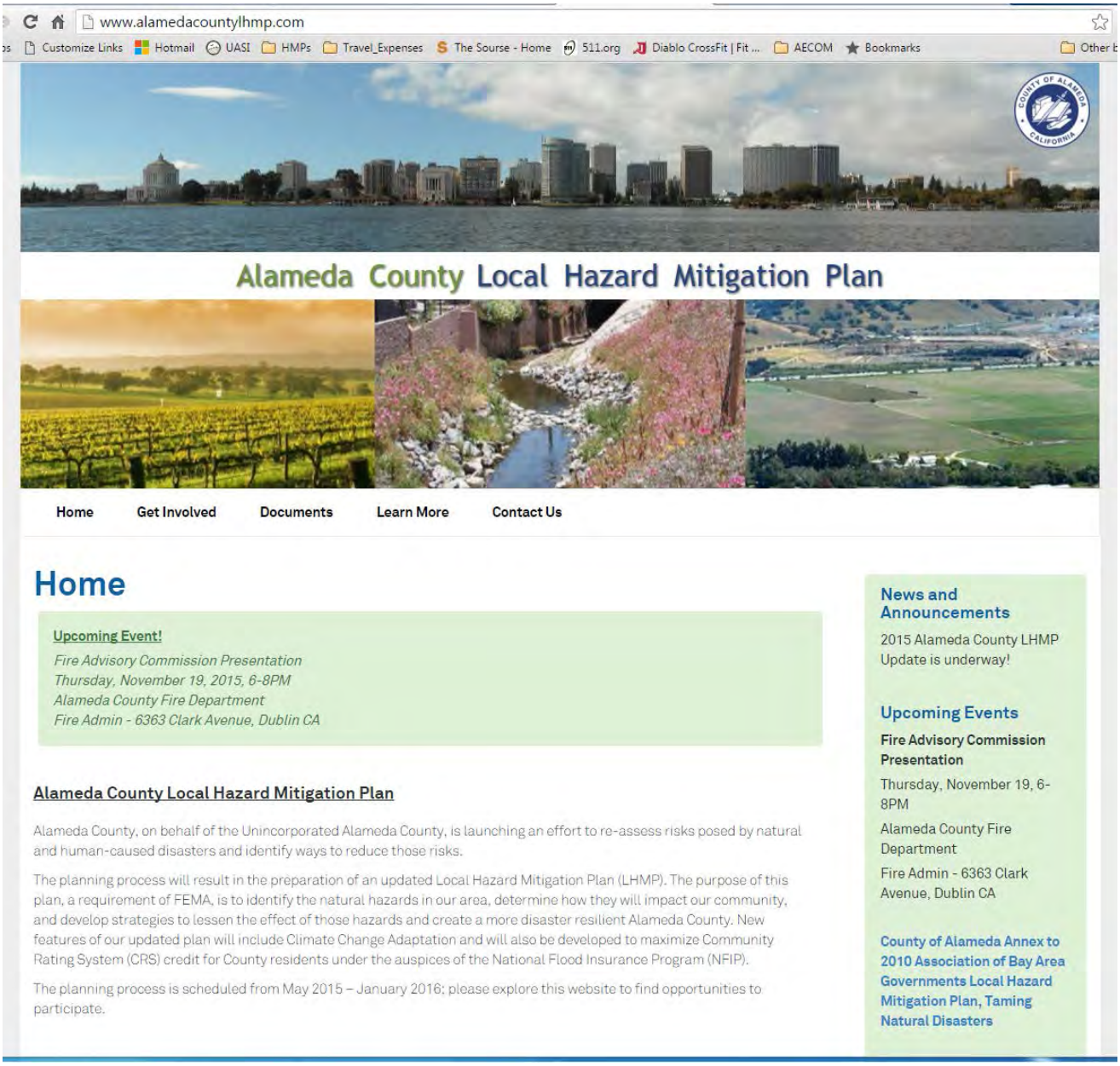


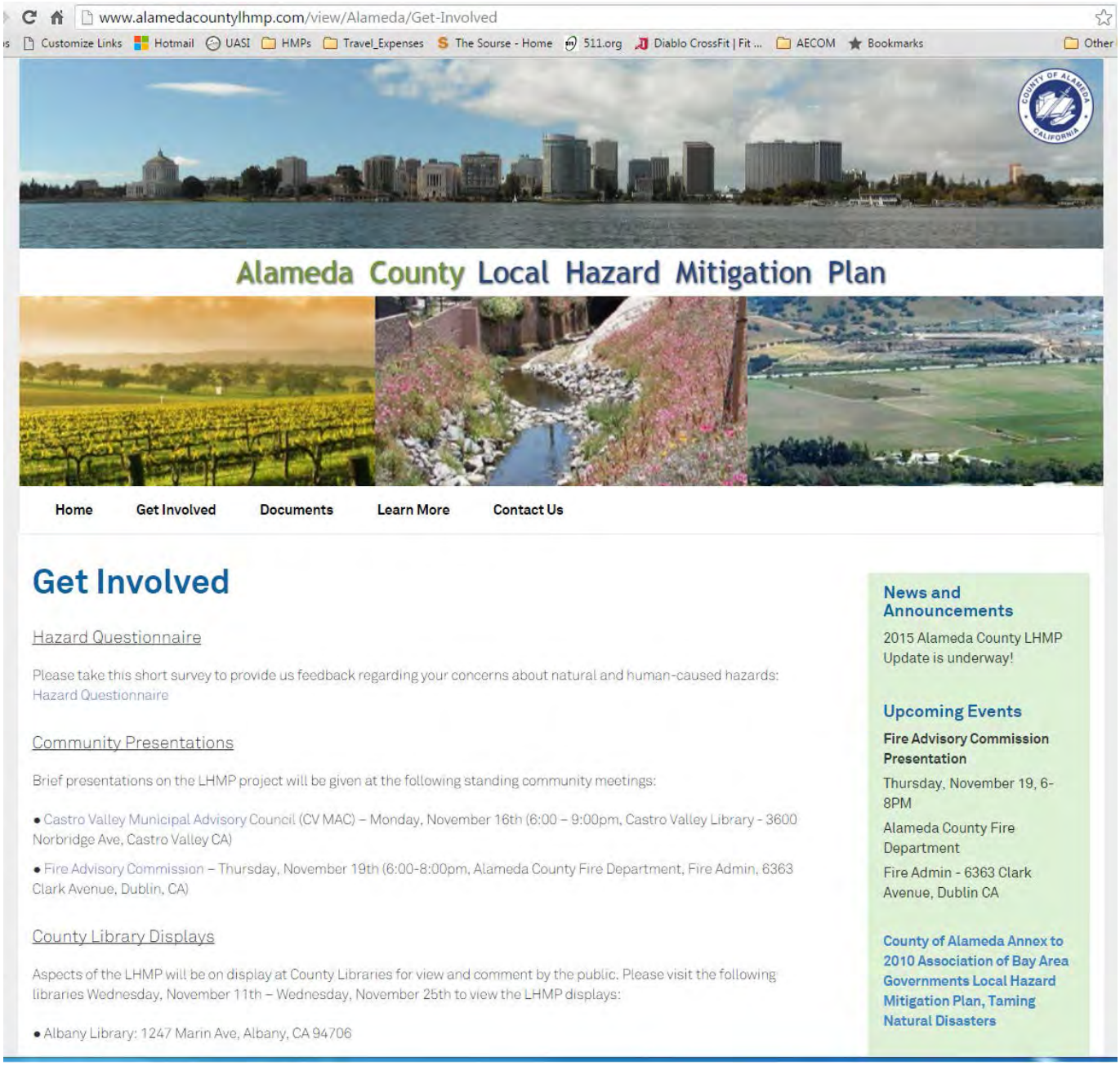
Alameda County Twitter Account
https://twitter.com/AlamedaCounty

LHMP Website

Alameda County LHMP Project Website

http://www.alamedacountylhmp.com/




www.alamedacountylhmp.com/view/Alameda/Get-Involved
Customize Links
Hotmail
UASI
HMPs
Travel_Expenses
The Sourse - Home
511.org
Diablo CrossFit | Fit ...
AECOM
Bookmarks
Other
Alameda County Local Hazard Mitigation Plan
Home
Get Involved
Documents
Learn More
Contact Us
Get Involved
Hazard Questionnaire
Please take this short survey to provide us feedback regarding your concerns about natural and human-caused hazards: Hazard Questionnaire
Community Presentations
Brief presentations on the LHMP project will be given at the following standing community meetings:
• Castro Valley Municipal Advisory Council (CV MAC) – Monday, November 16th (6:00 – 9:00pm, Castro Valley Library - 3600 Norbridge Ave, Castro Valley CA)
• Fire Advisory Commission – Thursday, November 19th (6:00-8:00pm, Alameda County Fire Department, Fire Admin, 6363 Clark Avenue, Dublin, CA)
County Library Displays
Aspects of the LHMP will be on display at County Libraries for view and comment by the public. Please visit the following libraries Wednesday, November 11th – Wednesday, November 25th to view the LHMP displays:
• Albany Library: 1247 Marin Ave, Albany, CA 94706
News and Announcements
2015 Alameda County LHMP Update is underway!
Upcoming Events
Fire Advisory Commission Presentation
Thursday, November 19, 6-8PM
Alameda County Fire Department
Fire Admin - 6363 Clark Avenue, Dublin CA
County of Alameda Annex to 2010 Association of Bay Area Governments Local Hazard Mitigation Plan, Taming Natural Disasters

Online Questionnaire

Online Questionnaire – Website Link Located on LHMP Website

Alameda County Local Hazard Mitigation Plan Questionnaire

This questionnaire is designed to help Alameda County identify the community's concerns about natural and human-caused hazards. The questionnaire should be completed by an adult, preferably the homeowner or the head of the household. All individual responses are strictly confidential and for research purposes only.

1. Are you a resident of Alameda County?

- ○ Yes
- ○ No

2. If "yes" to question 1, how many years have you lived in Alameda County?

- ○ 0-1 years
- ○ 2-5 years
- ○ 6-10 years
- ○ 11 or more years

3. Do you rent or own the home in which you currently live?

- ○ Rent
- ○ Own

4. What hazards have you personally experienced in Alameda County?
(check all that apply)

- ☐ Climate Change
- ☐ Dam Failure
- ☐ Drought
- ☐ Earthquake
- ☐ Flood

Online Questionnaire Analysis

A total of 38 Alameda County residents responded to the questionnaires distributed through the 5 library display sites.

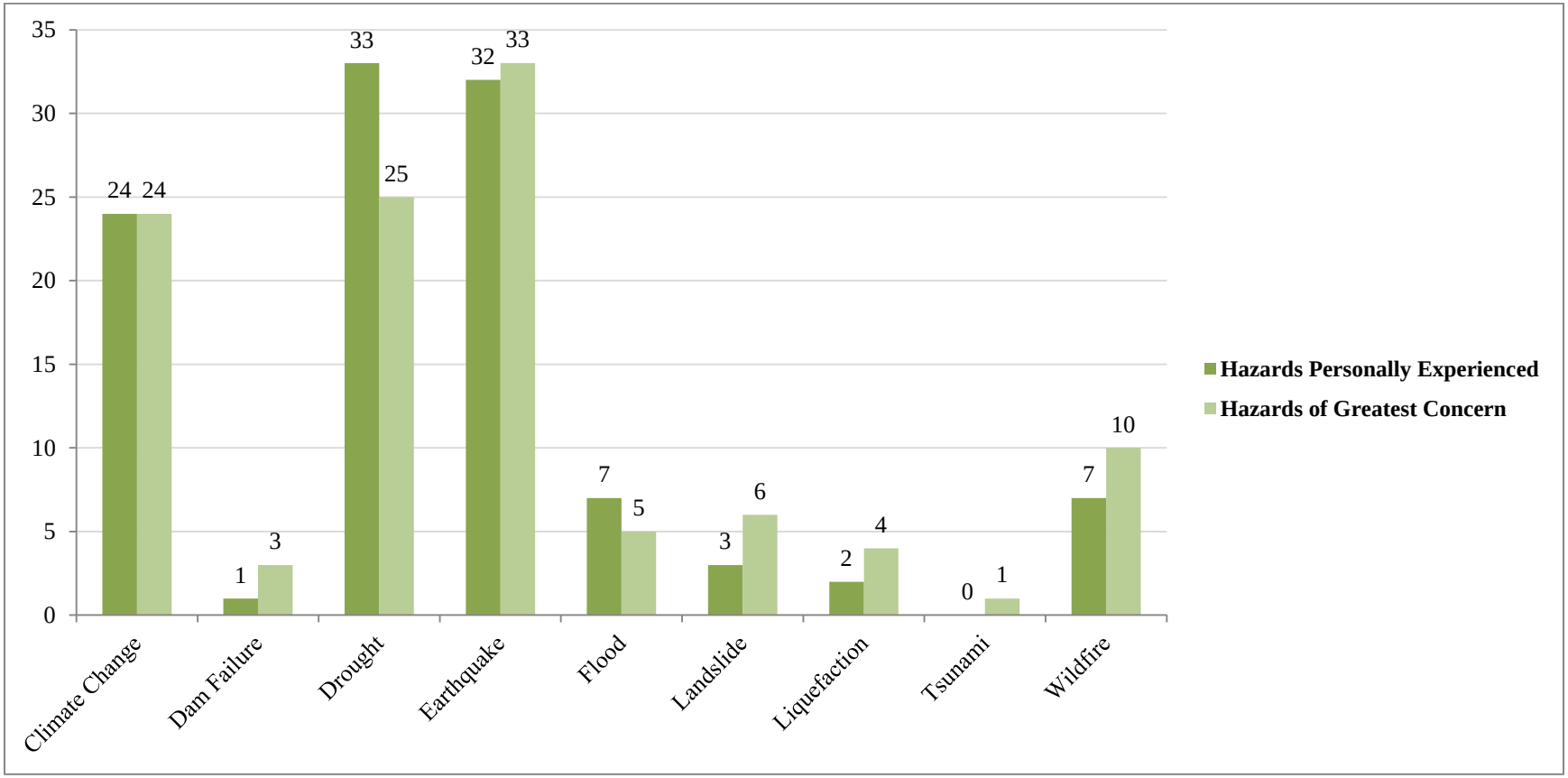
The following analysis of the questionnaire responses is broken down by **recent** (2-5 years), **medium-term** (6-10 years), and **long-term** (11+ years) residents; no respondents have lived in the County for less than 2 years.

Table D-1. Online Questionnaire Response Summary

Years in Alameda County	Total Responders	Home			Own Business?	In/Near Floodplain?			Flood Insurance?			Disaster Preparedness Activities					Aware of Hazard Mitigation Plan?	Aware of CRS Participation?	Average Personal Preparedness Measure (1-5, 5 is most prepared)
		Own	Rent	Unknown		Yes	No	Not Sure	Yes	No	Not Sure	Attended mtgs/received written info	Talked with family members	Have household/family emergency plan	Have disasters supply kit	First Aid/CPR training			
0-1	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-5	2	2	--	--	--	--	--	2	--	2	--	--	--	--	--	--	--	--	2
6-10	3	1	1	1	--	--	--	3	--	3	--	--	1	--	1	--	--	--	2
11+	33	21	11	1	6	2	10	21	1	22	10	16	21	14	21	15	8	4	3

The following column graph compares the hazards that questionnaire respondents reported to have personally experienced in Alameda County to the hazards they are most concerend about:

Table D-2. Hazards Experienced vs. Hazards of Concern



The top three hazards of greatest concern correspond to the hazards personally experienced by the greatest number of responders: climate change, drought, and earthquake.

The following table and bar graphs summarize the modifications and/or practices undertaken by questionnaire responders to mitigate the risks of earthquakes and floods and to reduce water usage due to drought conditions. All responses reflect modifications or practices that apply to the responders' homes.

Table D-3. Modifications/Mitigation Practices Completed by Responders

Modification	Number	Visual Representation
Earthquake		
Anchor bookcases, cabinets to wall	12	
Secure water heater to wall	23	
Install latches on drawers/cabinets	4	
Fit gas appliances with flexible connections	15	
Secure home to foundation	9	
Brace inside of cripple wall with sheathing	6	
Brace unreinforced chimney	4	
Brace unreinforced masonry & concrete walls and foundations	3	
Flood		
Use of flood resistant materials	0	
Install backflow valves and/or internal drainage systems	2	
Elevation of living area	5	
Elevation of electrical systems	1	
Install flood vents	2	

Table D-3. Modifications/Mitigation Practices Completed by Responders

Modification	Number	Visual Representation
Water Usage Reduction		
Install a low-flow showerhead	18	
Reduce the length of your shower	27	
Replace ornamental landscaping with drought resistant plants	15	
Water in the early morning or the evening	18	
Water your favorite plants by hand instead of using sprinklers	19	
Turn off the faucet while brushing your teeth	30	
Use a reusable water bottle (rather than buying bottled water)	22	
Run dishwasher only when full	22	
Use a light wash setting on the dishwasher	6	
Skip car washes	25	
Replaced old toilets with newer, more water efficient toilets	12	
Install faucet aerators	7	

A summary of additional comments to the questionnaire:

- One responder suggested that an extra push is needed to help develop disaster supply kits.
- One responder reported being CERT trained.
- One responder reported having FEMA training.
- One responder said the survey prompted them to talk to their family about preparedness.
- One responder commented that the Oakland Hills fire blighted their neighborhood for years and destroyed the community.
- Two responders suggested using shower water to water outdoor plants.
- Two responders suggested skipping watering the lawn altogether.

Web Portal

Images to be added once Web Portal is developed

Community Presentations

Alameda County Voluntary Organizations Active in Disaster Presentations
Thursday, October 29, 2016

Alameda County VOAD Meeting October 29, 2015

Alameda County VOAD
Thursday, October 29, 2015 from 9:30 AM to 11:30 AM (PDT)
San Leandro, CA

ALCoVOAD
(Alameda County Voluntary Organizations Active In Disaster)
Quarterly Member Meeting

WHEN: Thursday October, 29, 2015
TIME: *9:30AM – 11:30AM*
WHERE: Public Health Redwood Conference Room
1100 San Leandro (in Creekside Plaza), San Leandro, CA, 94578

(Free parking is available and BART is across the street)

*****

Participate

Honoring the Contributions and Commitment of Ollie Arnold, Past ALCoVOAD Chairperson

Build

Understanding of how your agency or organization fits in the ALCoVOAD network

Add

Directory of disaster resources in Alameda County

*****

A NETWORKING OPPORTUNITY YOU DO NOT WANT TO MISS!

Why Should You Attend?

When a disaster strikes many people, organizations and businesses will need assistance in their post-disaster recovery. Organizations and agencies across Alameda County will be called upon to participate in the post-disaster recovery process. To provide needed services in a timely and effective manner we have to know each other before the event so we understand the role our organizations play in the recovery and how we can support each other as we provide services to the community

ALCoVOAD

Room
1100 San Leandro Blvd (in Creekside Plaza)
San Leandro, CA 94578

Thursday, October 29, 2015 from 9:30 AM to 11:30 AM (PDT)

Add to my calendar

Organizer

Alameda County VOAD

Voluntary Organizations Active in Disaster (VOAD) is a humanitarian association of independent voluntary organizations active in emergency disaster relief. National VOAD (www.nvoad.org) was founded in 1970 with the purpose of coordinating relief efforts between voluntary agencies, faith based groups, and government organizations involved in disaster response. The mission of VOAD is to provide efficient services to all disaster victims and eliminate the duplications of services. VOAD is organized on a national, state and county basis to help meet emergency needs.

AlCo VOAD is the Alameda County component of the VOAD movement.

Contact the Organizer

View organizer profile

Alameda County VOAD Meeting
October 29, 2015

San Leandro, CA Events

Networking Charity & Causes

Castro Valley Municipal Advisory Council Presentation
Monday, November 16, 2015

CASTRO VALLEY

MUNICIPAL ADVISORY COUNCIL

Advisory to Supervisor Nate Miley, 4th District
224 W. Winton Avenue, Suite 111, Hayward, CA 94544 (510) 670-5400 FAX (510) 785-8793

GENERAL PURPOSE MEETING

Monday, November 16, 2015

6:00 p.m.

Council members: Marc Crawford; Chair, Cheryl Miraglia; Vice Chair, Dave Sadoff, Sheila Cunha, Chuck Moore, Janet Everson

Location: Castro Valley Library – 3600 Norbridge Avenue, Castro Valley, CA 94646

AGENDA

PUBLIC COMMENT

I. **Approval of Minutes** - October 2015

II. **Local Hazard Mitigation Plan – General Services Agency**

III. **Potential Community Identifier at 580 Overpass/Redwood Road (Informational Only) – Public Works Agency**

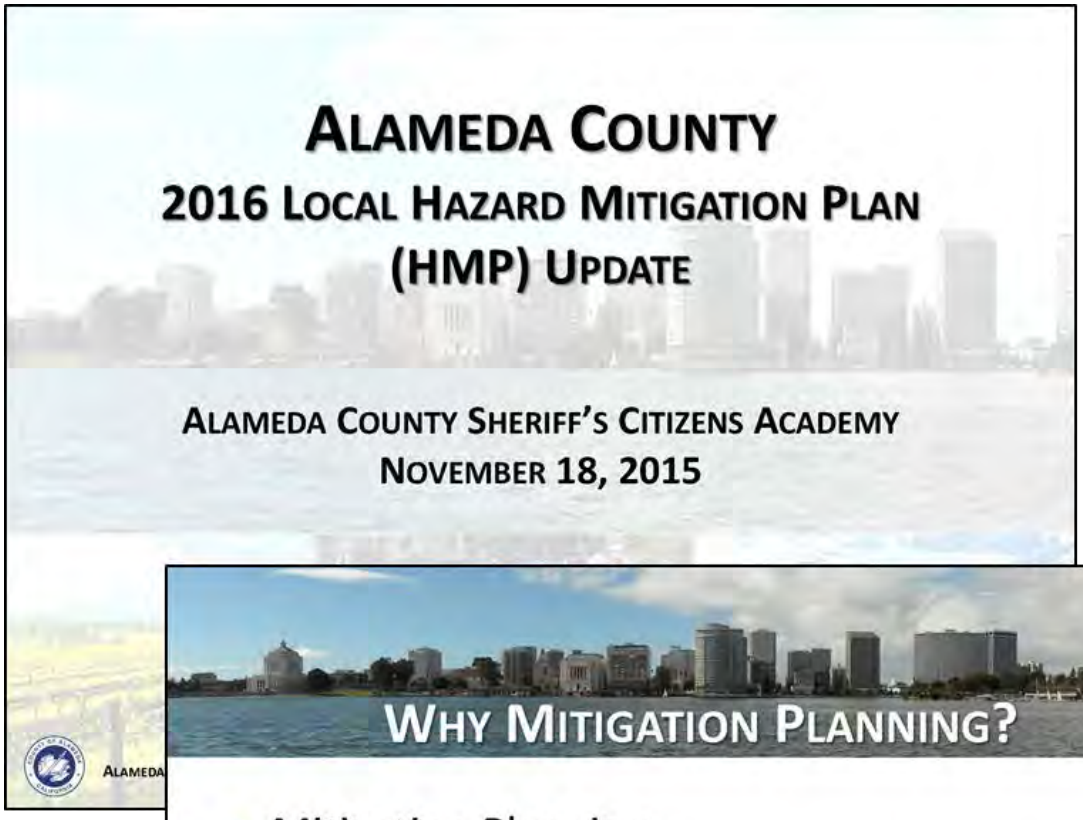
IV. **Council & Staff Comments**

Adjourn

Next meeting date: December 16, 2015

P:\BOS comms\CVMAC\ November 16, 2015 agenda

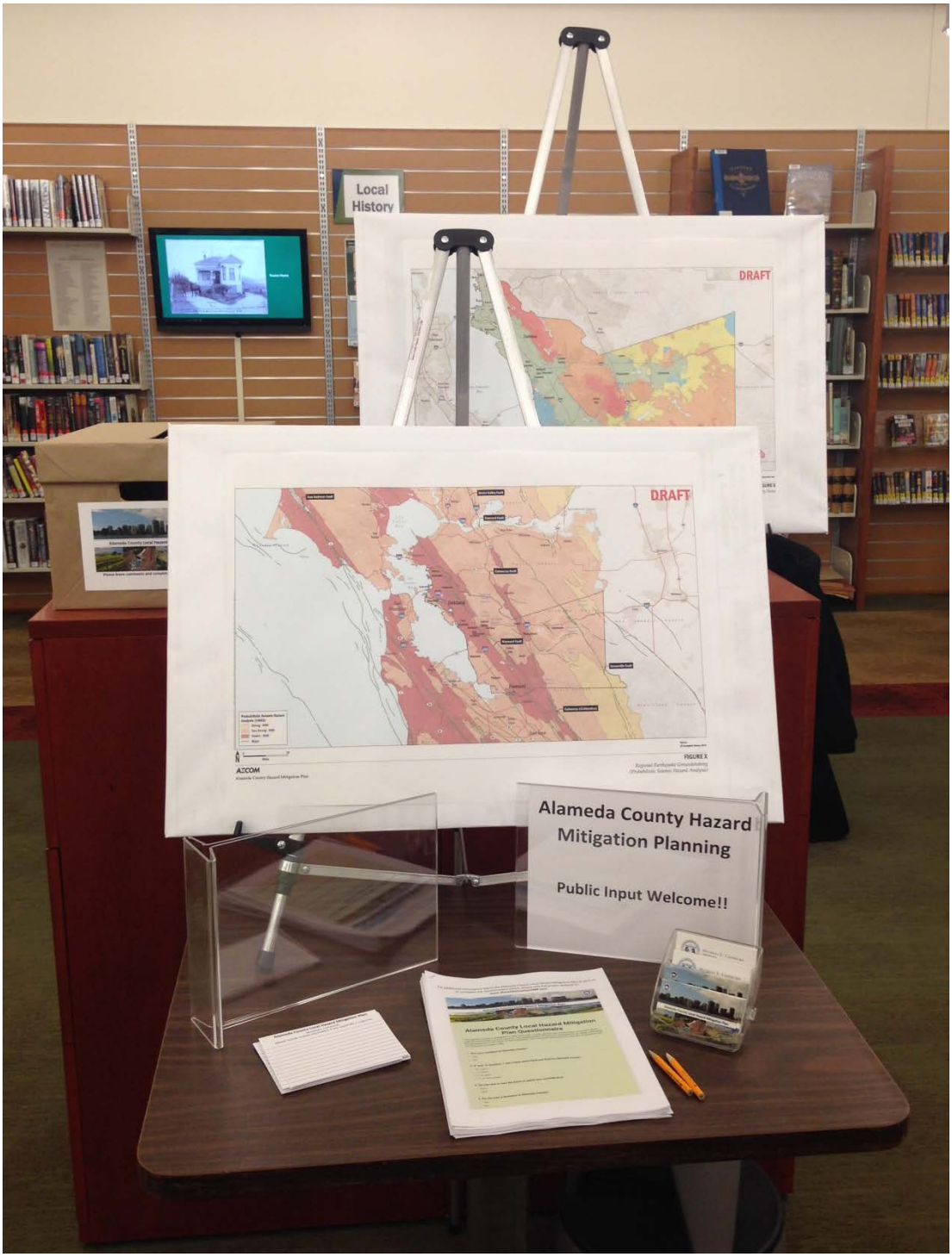
Alameda County Sheriff's Citizens Academy Presentation
Wednesday, November 18, 2015



Fire Advisory Commission Presentation
Thursday, November 19, 2015

Library Displays

Library Display Example – Castro Valley Library



Library Display Comment Card and Business Size Cards Advertising the Project Website

Comment Card

Alameda County Local Hazard Mitigation Plan

Questions, Comments

(please include contact information if you would like a response)

my name is Daniel P. Ramirez a Fremont Resident my whole life. I appreciate the awesome "water Districts" Safe water ways & security on AC Creek. Now is there a WAY that it would be possible to have portapotties by all bridges and by the Vet hospital on mission is it possible to have a 4ft wide "Desinated walk are alongside RR Crossings for places of public access that have ground lights as walk ways (solar) it gets dark by dams information report projects and Environmental a Unified Community

Front

Back

MITIGATION – Take action now - before the next disaster - to reduce human and financial impacts.

Want to Lean more? Interested in providing input?

Visit www.AlamedaCountyLHMP.com to:

- *Learn more about hazard mitigation planning*
- *Respond to a hazard questionnaire located under the "Plan Participation" section*
- *Participate in public review and comment sessions*

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Appendix E

Map Figures

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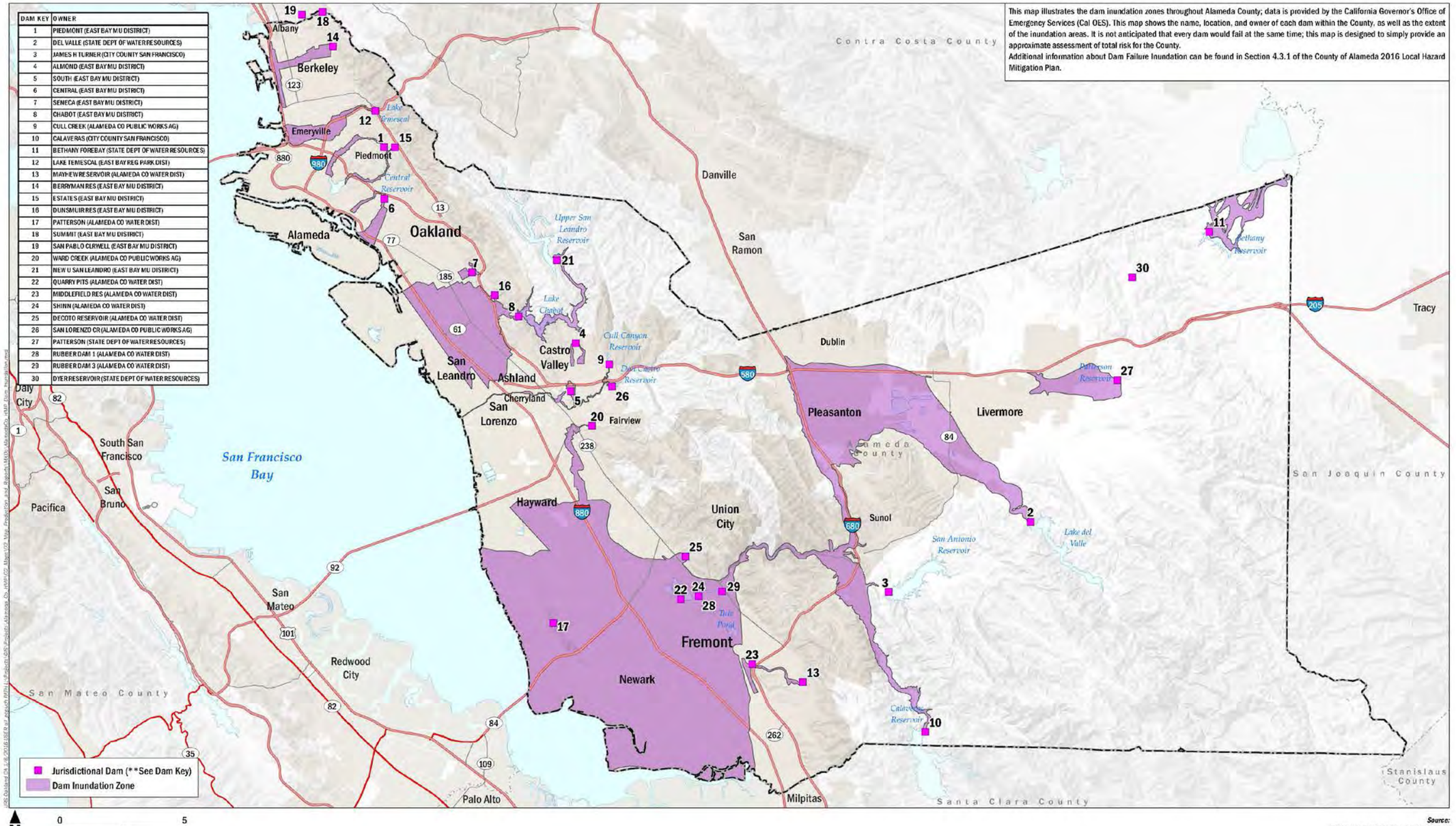
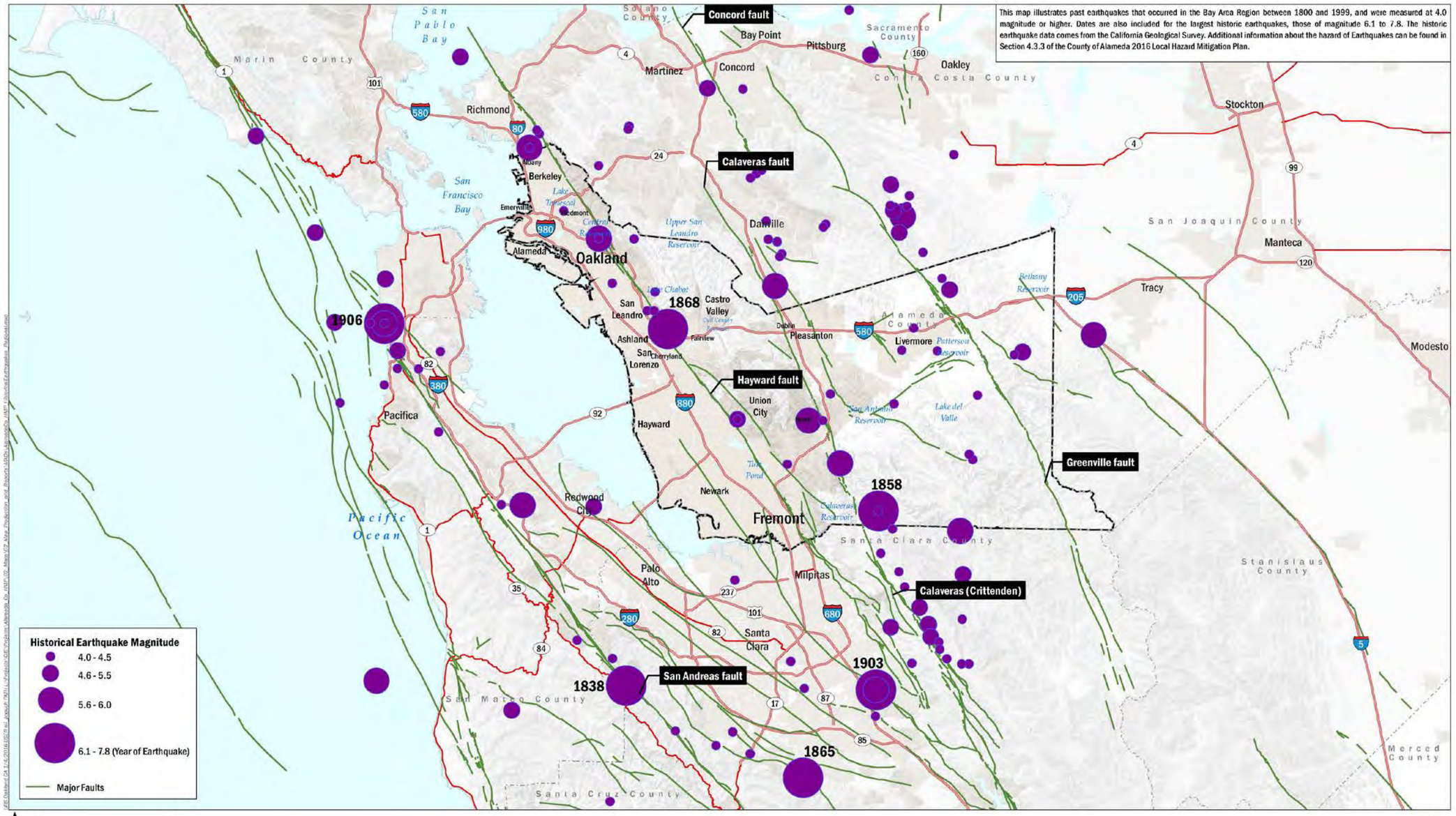


AECOM

Alameda County Hazard Mitigation Plan

MAP FIGURE-1

Dam Inundation Zones



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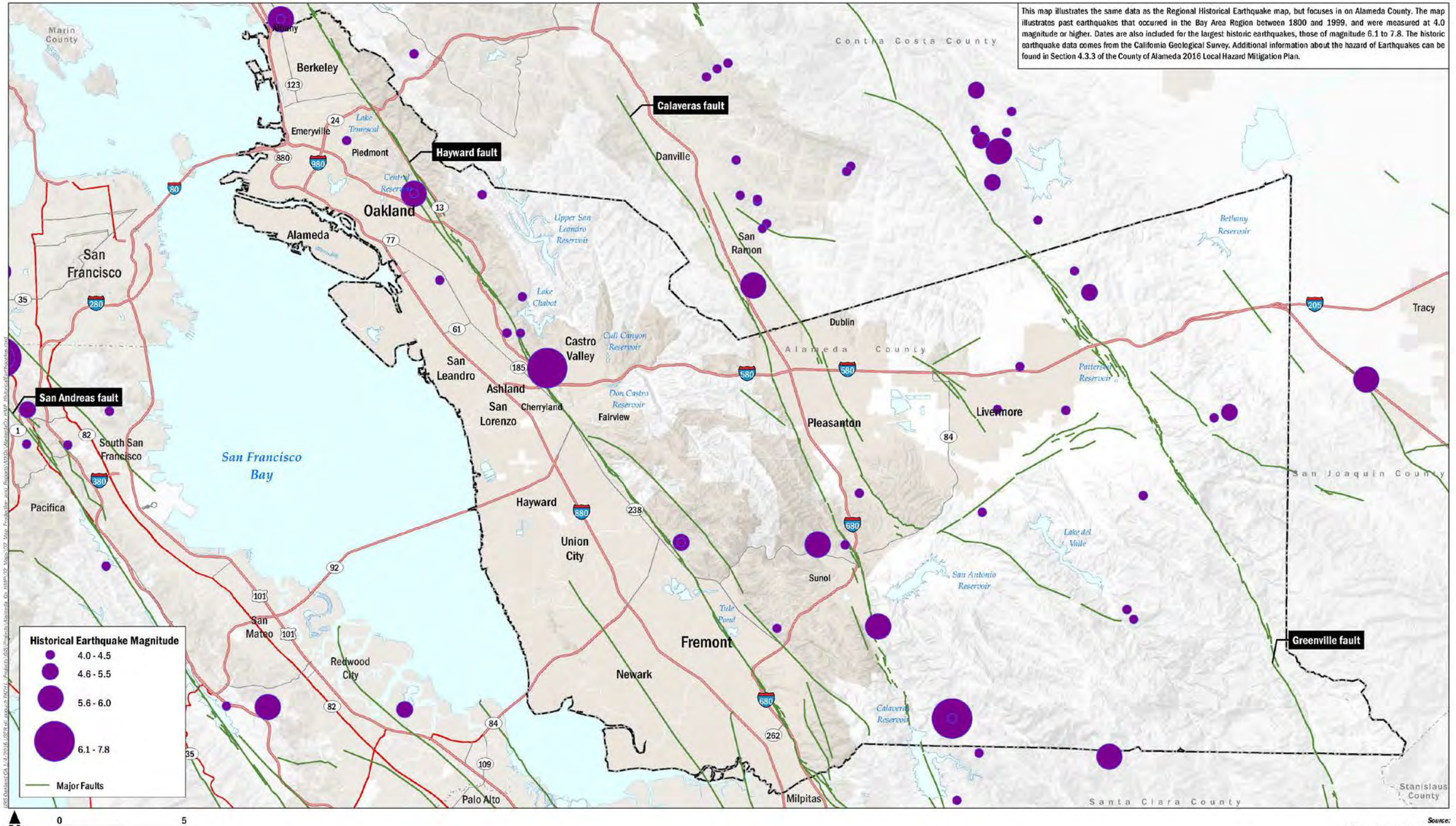
MAP FIGURE-2
Regional Historical Earthquakes (1800-1999)



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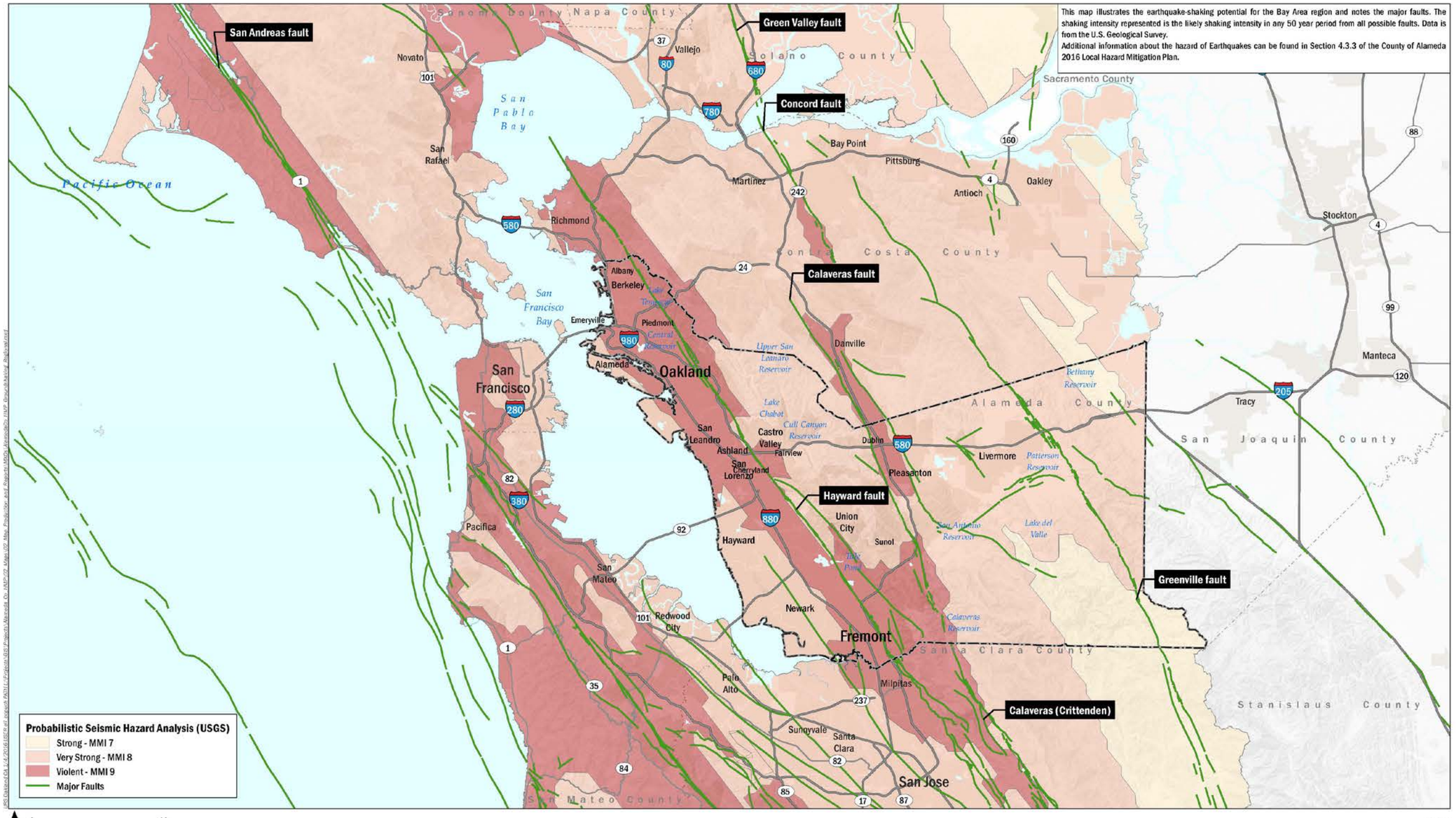
MAP FIGURE-3

Historical Earthquakes (1800-1999)



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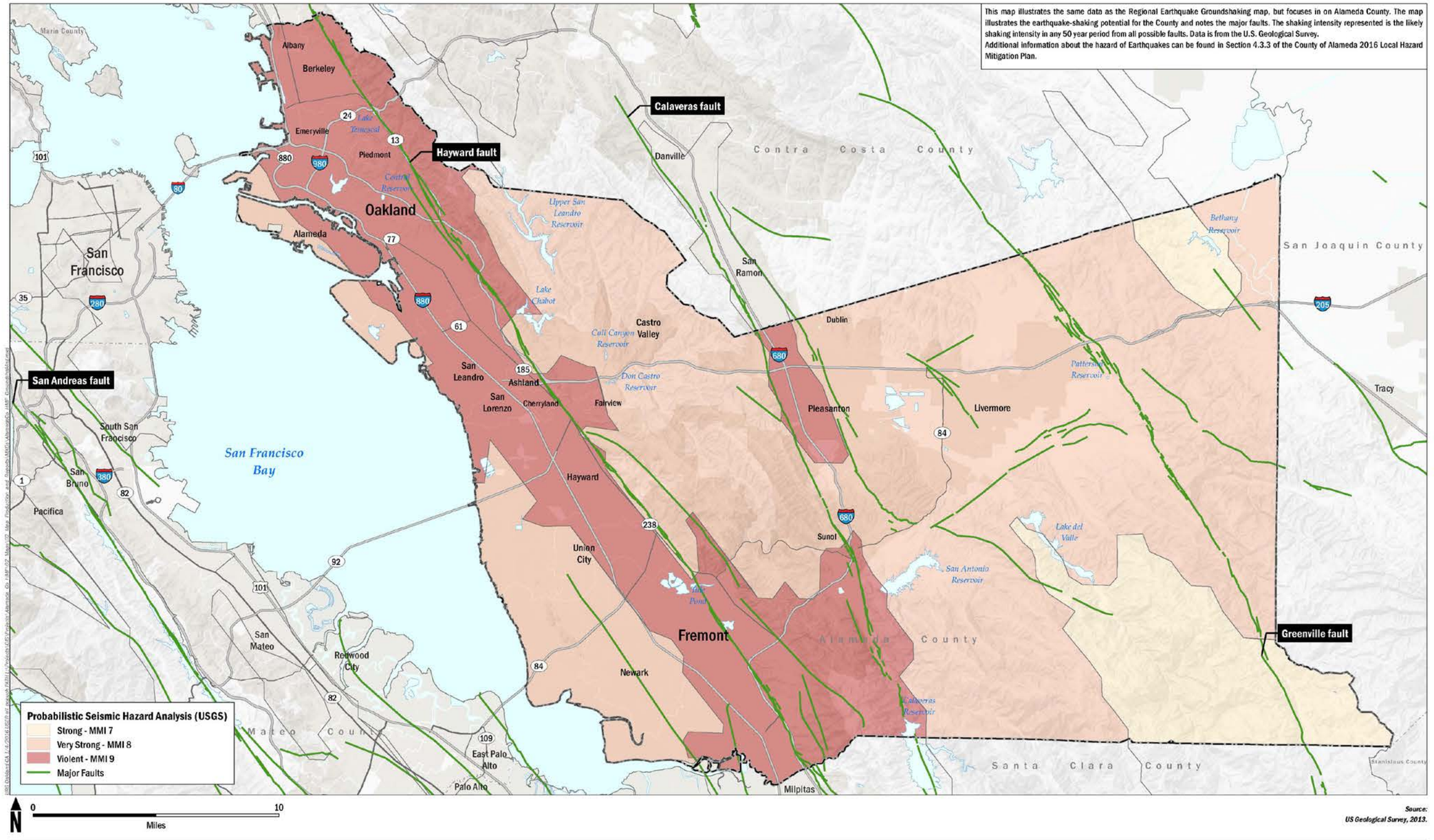
MAP FIGURE-4

Regional Earthquake Groundshaking (Probabilistic Seismic Hazard Analysis)

This map illustrates the same data as the Regional Earthquake Groundshaking map, but focuses in on Alameda County. The map illustrates the earthquake-shaking potential for the County and notes the major faults. The shaking intensity represented is the likely shaking intensity in any 50 year period from all possible faults. Data is from the U.S. Geological Survey.
Additional information about the hazard of Earthquakes can be found in Section 4.3.3 of the County of Alameda 2016 Local Hazard Mitigation Plan.



Source: US Geological Survey, 2013.

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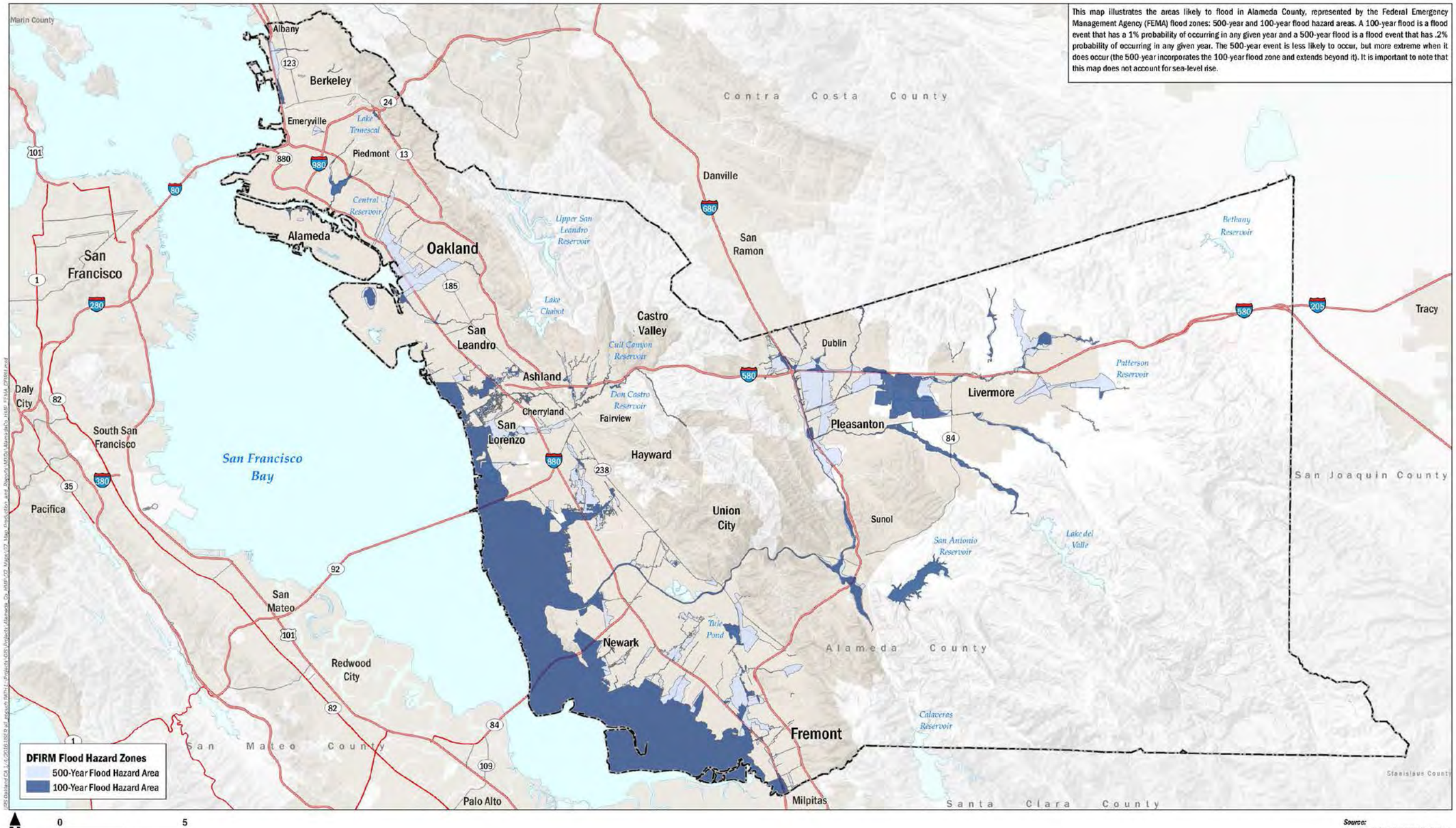
MAP FIGURE-5
Earthquake Groundshaking
(Probabilistic Seismic Hazard Analysis)



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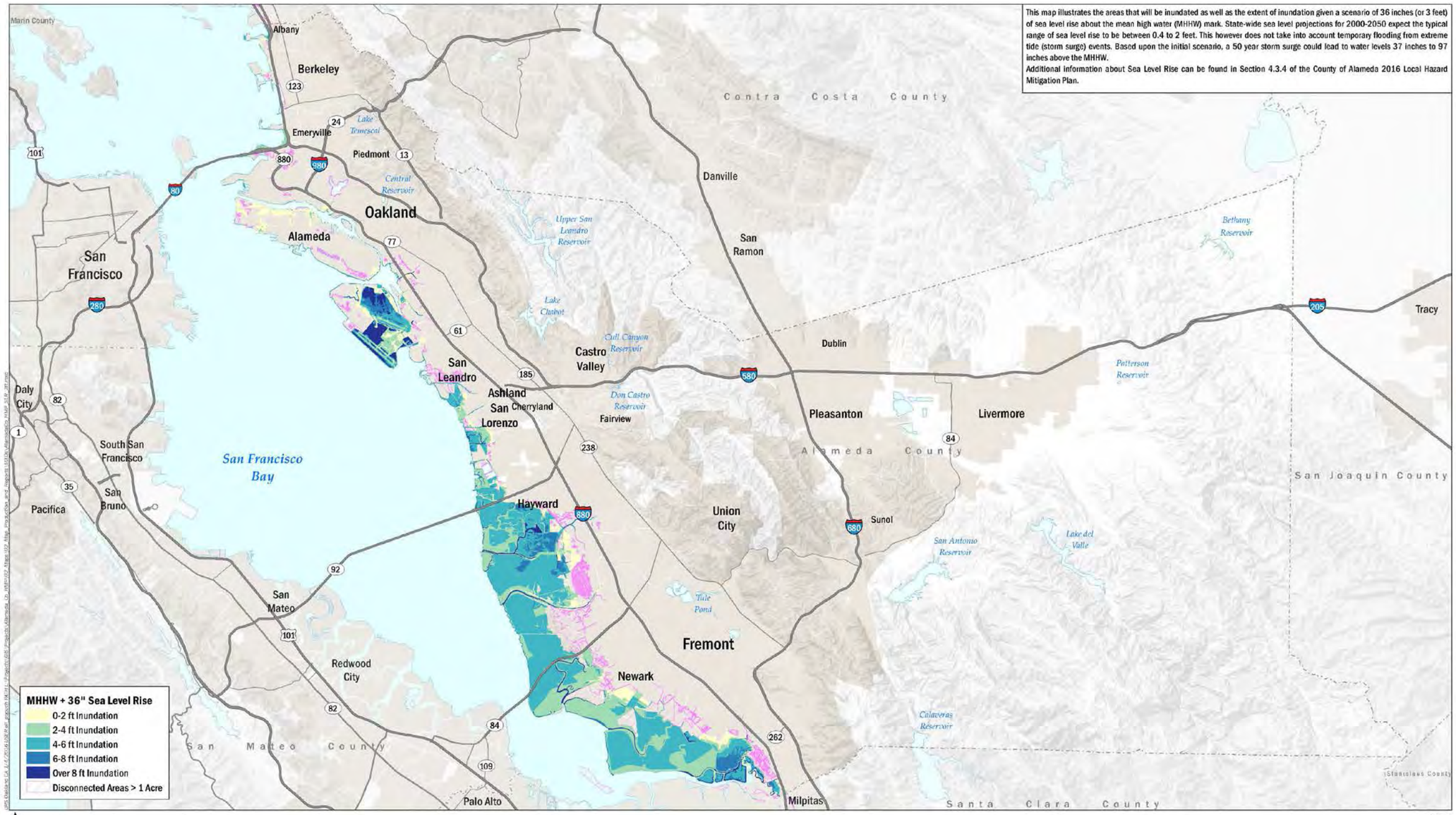
MAP FIGURE-6

DFIRM Flood Hazard Zones

This map illustrates the areas that will be inundated as well as the extent of inundation given a scenario of 36 inches (or 3 feet) of sea level rise about the mean high water (MHHW) mark. State-wide sea level projections for 2000-2050 expect the typical range of sea level rise to be between 0.4 to 2 feet. This however does not take into account temporary flooding from extreme tide (storm surge) events. Based upon the initial scenario, a 50 year storm surge could lead to water levels 37 inches to 97 inches above the MHHW.
Additional information about Sea Level Rise can be found in Section 4.3.4 of the County of Alameda 2016 Local Hazard Mitigation Plan.



Source:
Adapting to Rising Tides: Alameda County Shoreline Vulnerability Assessment. Alameda County Flood Control and Conservation District; BCDC, 2015.

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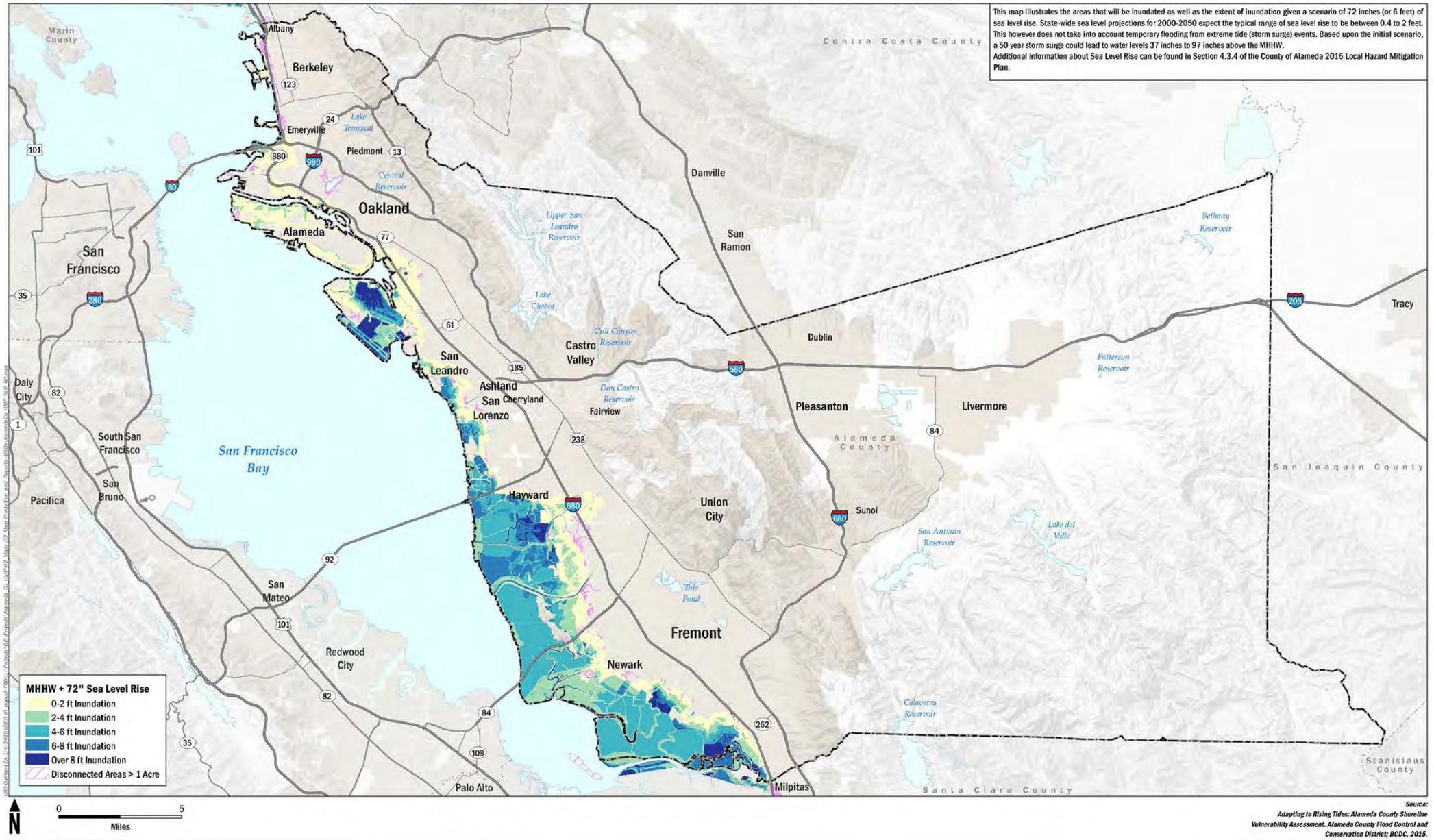
MAP FIGURE-7
Inundation from Sea Level Rise
(Mean Higher High Water Mark + 36 inches Sea Level Rise)



Source:
Adapting to Rising Tides; Alameda County Shoreline Vulnerability Assessment. Alameda County Flood Control and Conservation District; BCDC, 2015.

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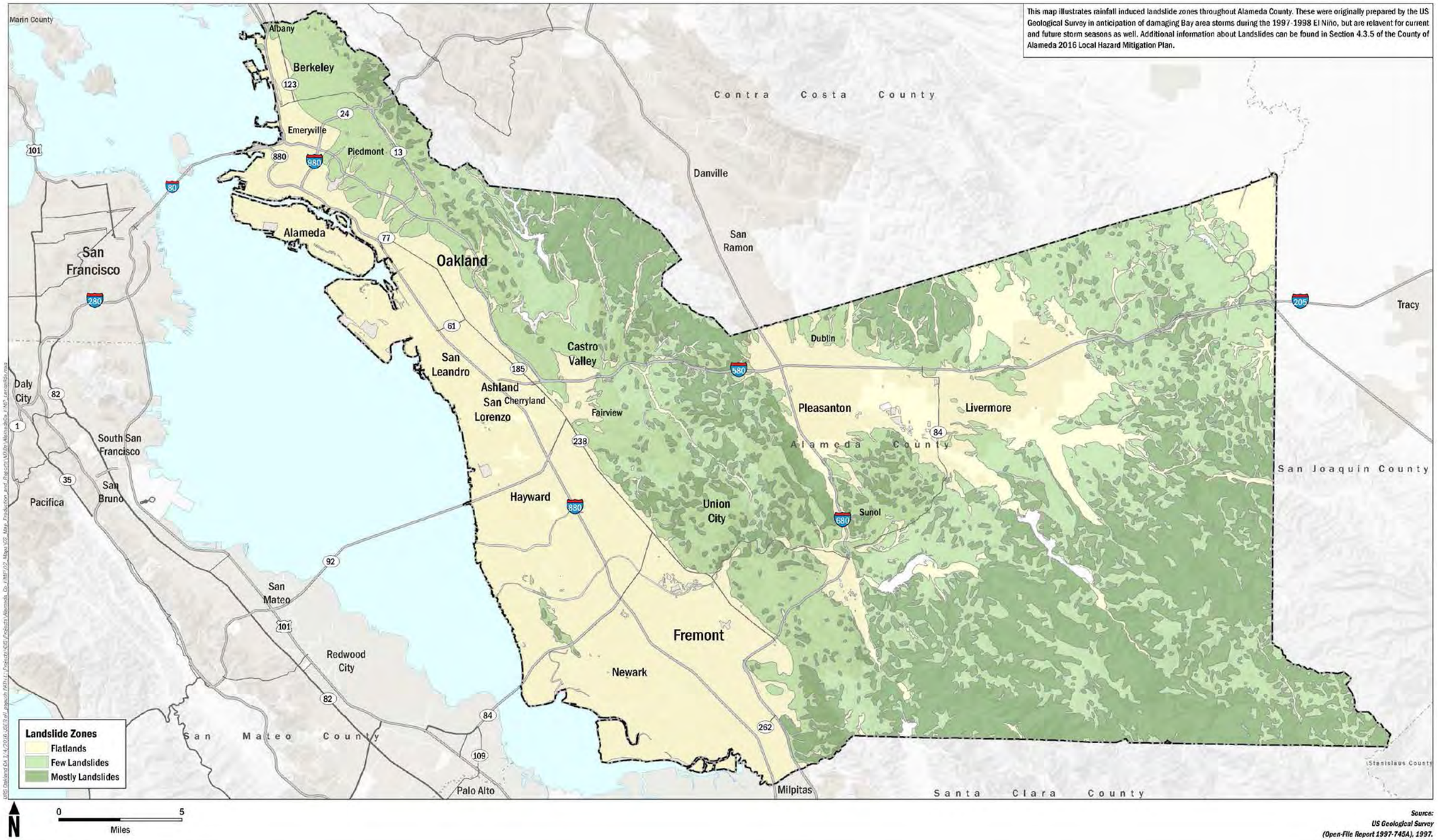
MAP FIGURE-8
Inundation from Sea Level Rise
(Mean Higher High Water Mark + 72 inches Sea Level Rise)



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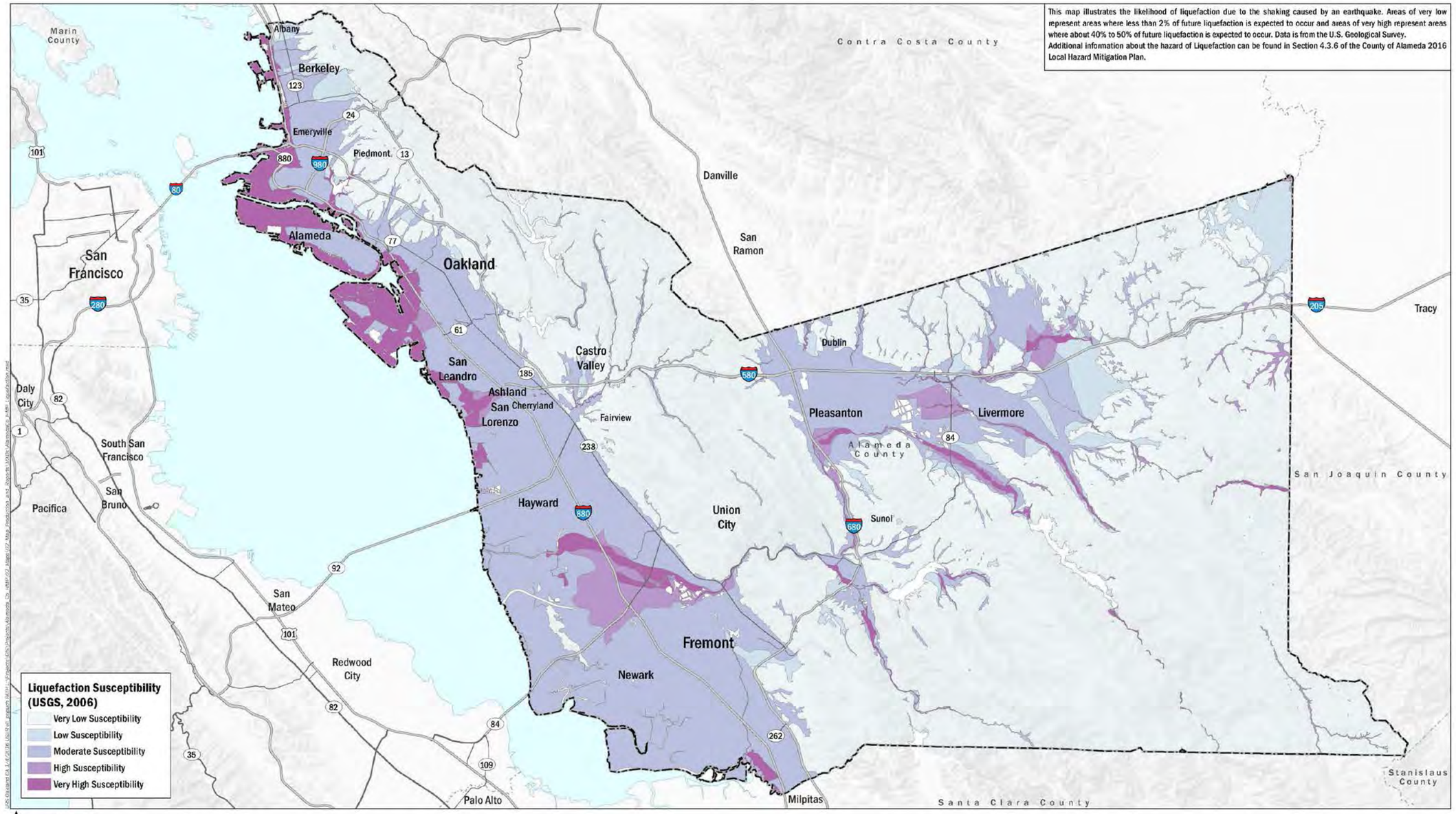
MAP FIGURE-9
Landslide Zones



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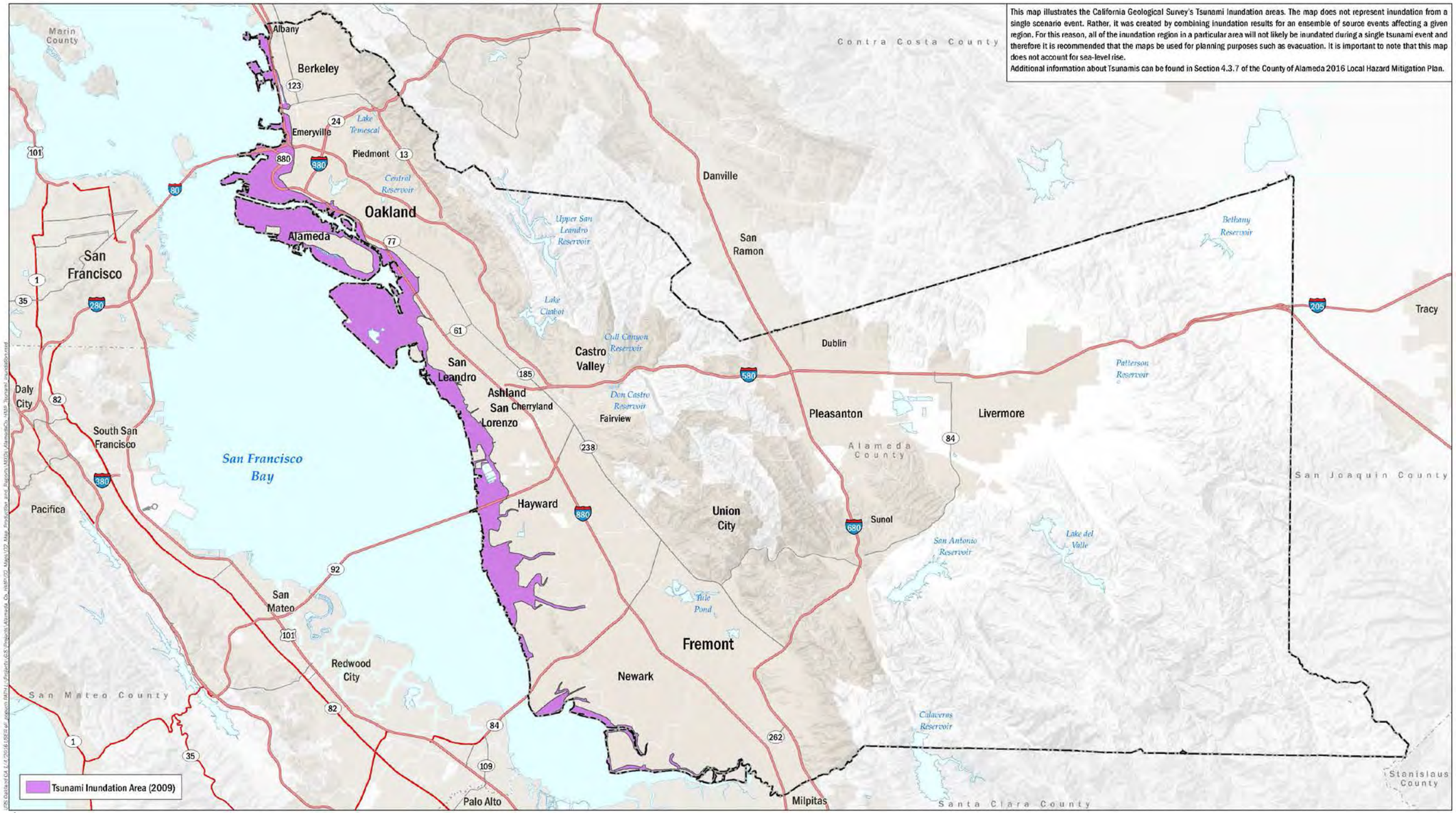
Alameda County Hazard Mitigation Plan

MAP FIGURE-10
Liquefaction Susceptability



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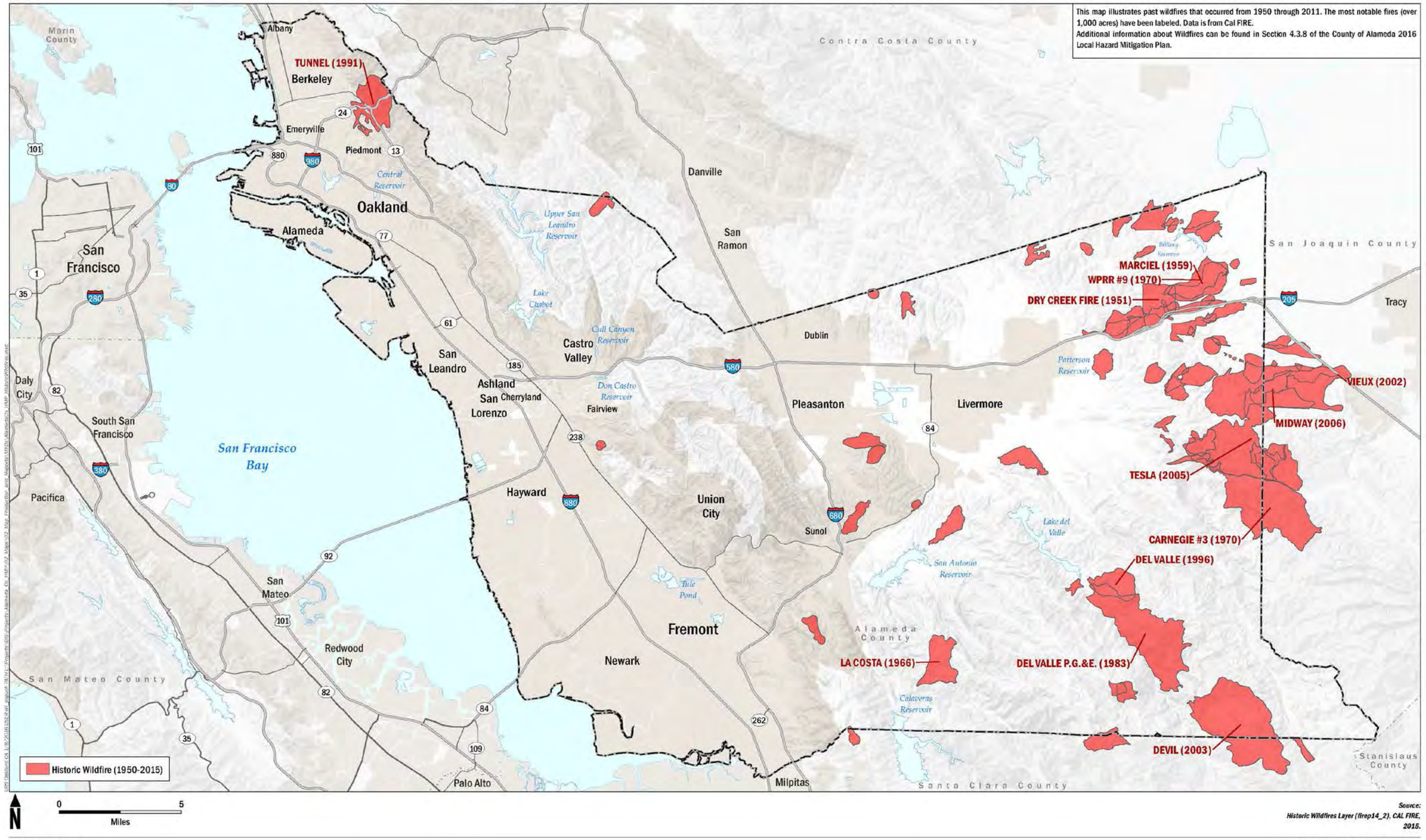
Alameda County Hazard Mitigation Plan

MAP FIGURE-11
Tsunami Inundation Areas



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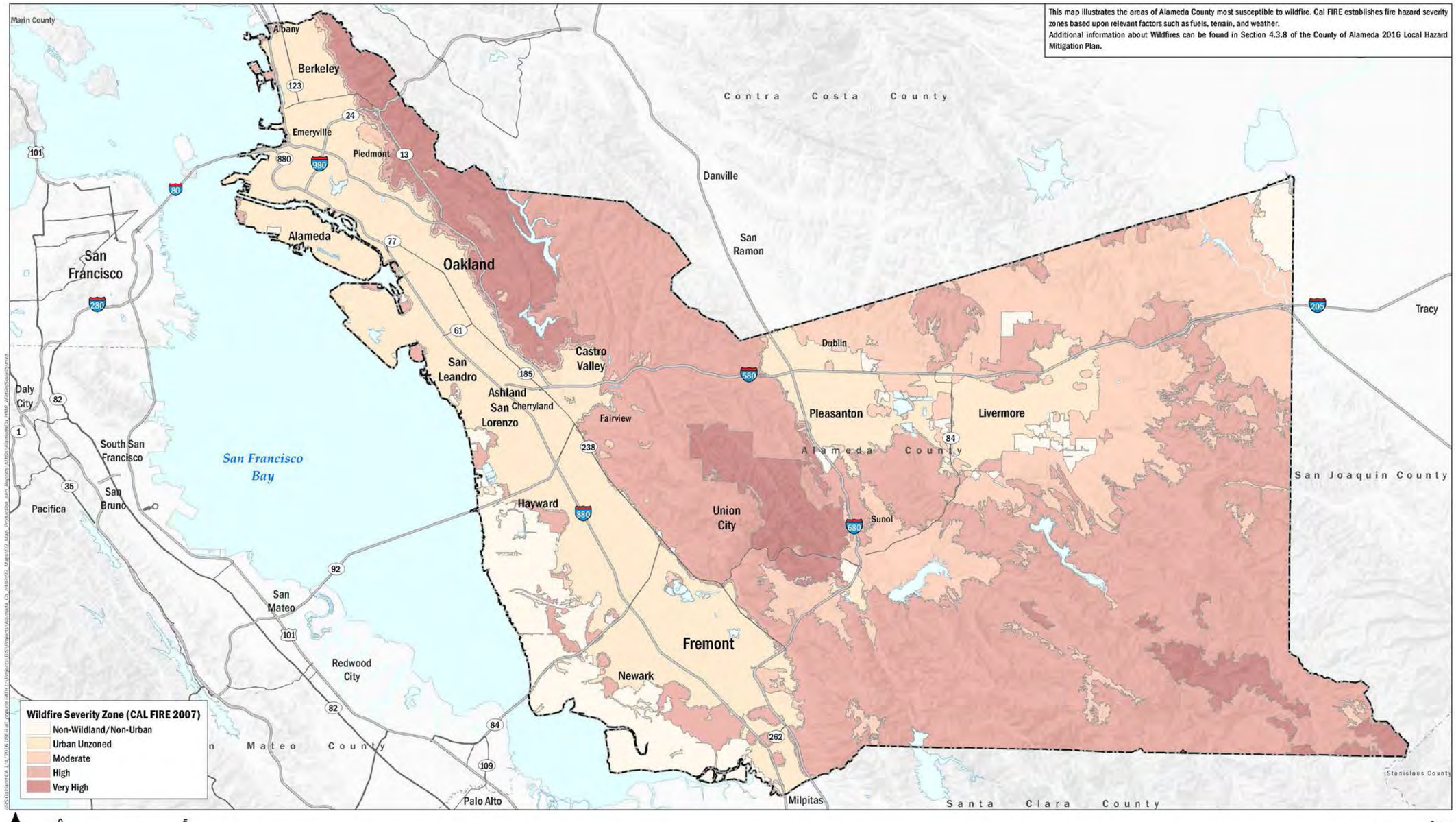
Alameda County Hazard Mitigation Plan

MAP FIGURE-12
Historic Wildfires(1950-2011)

This map illustrates the areas of Alameda County most susceptible to wildfire. Cal FIRE establishes fire hazard severity zones based upon relevant factors such as fuels, terrain, and weather.
Additional information about Wildfires can be found in Section 4.3.8 of the County of Alameda 2016 Local Hazard Mitigation Plan.



Source: Fire Hazard Severity Zone Re-Mapping Project Layer (c1fhszl06_1), CAL FIRE, 2007.

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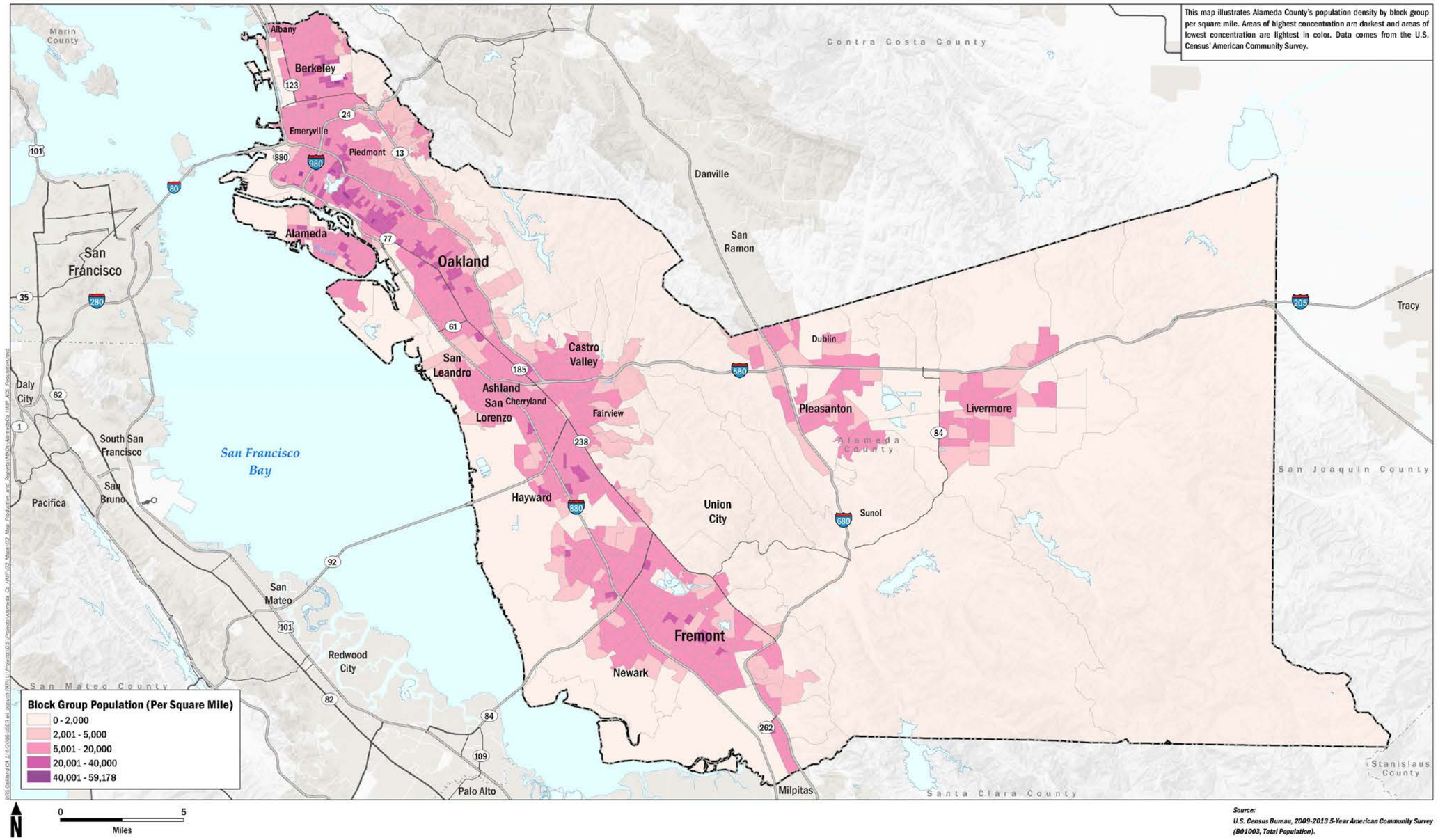
MAP FIGURE-13
CAL FIRE Wildfire Severity Zones



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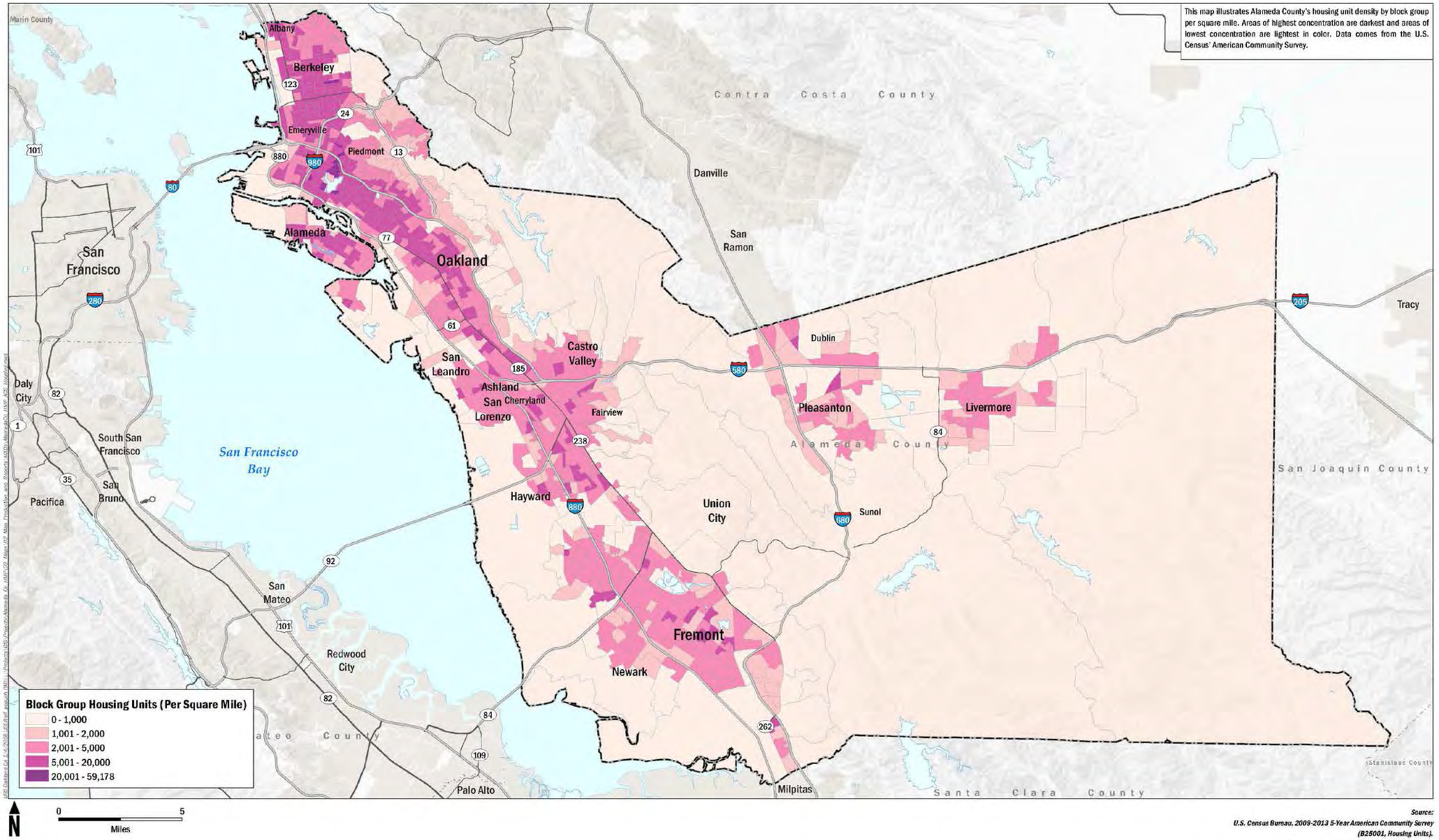
Alameda County Hazard Mitigation Plan

MAP FIGURE-14
American Community Survey: Population Density



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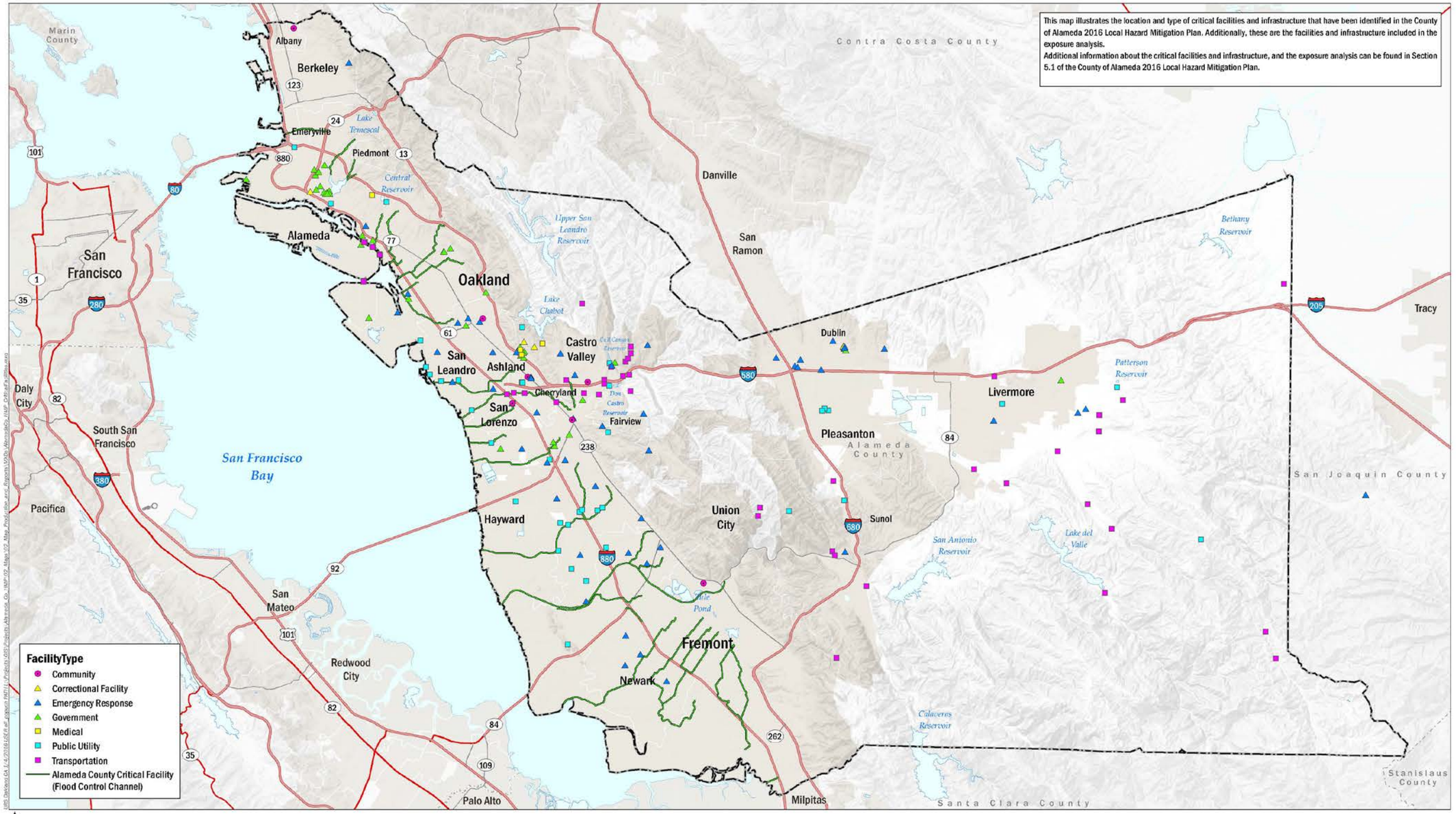
MAP FIGURE-15
American Community Survey: Housing Unit Density



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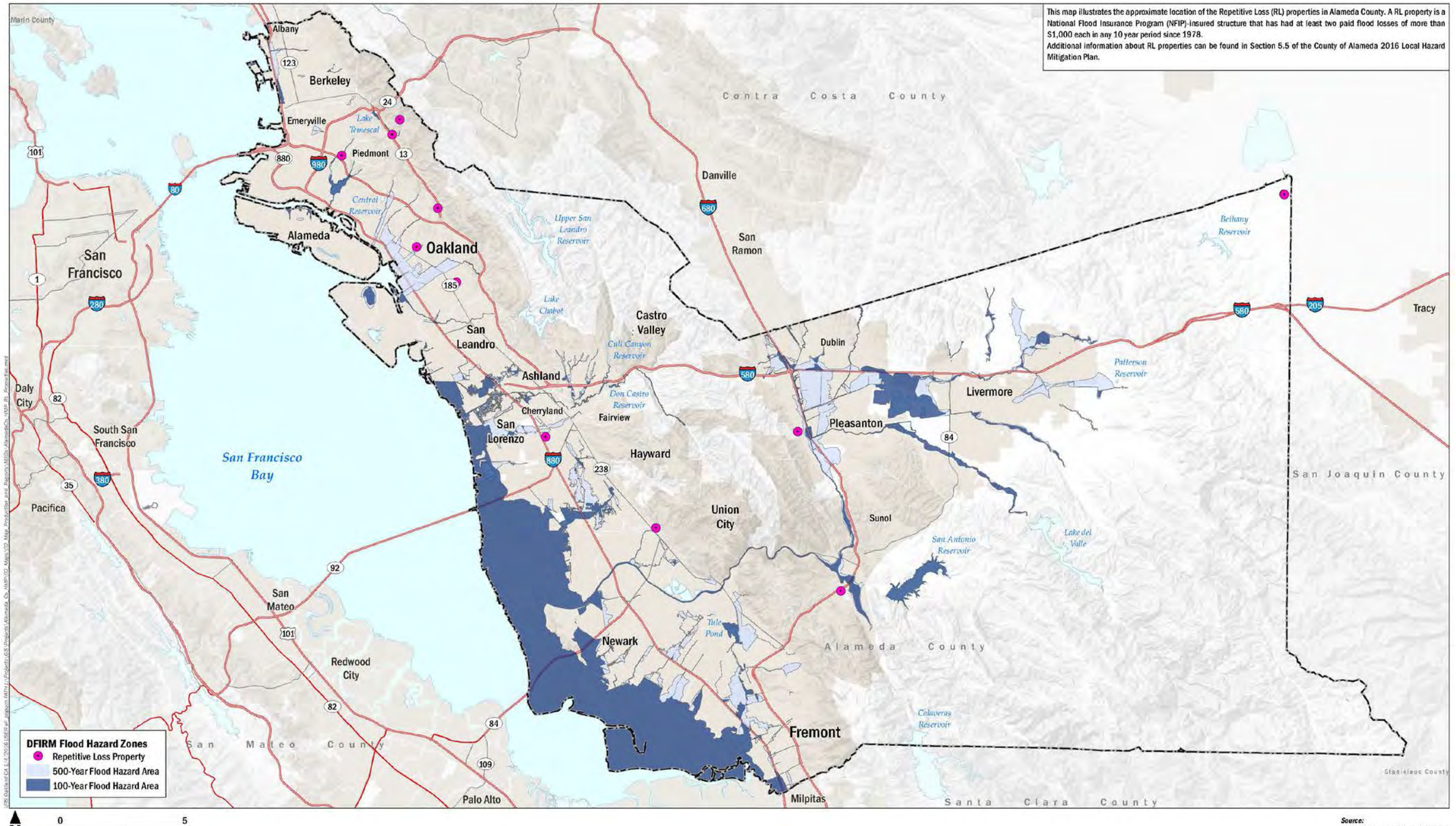
Alameda County Hazard Mitigation Plan

MAP FIGURE-16

Critical Facilities



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Alameda County Hazard Mitigation Plan

MAP FIGURE-17

Repetitive Loss Properties

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Appendix F

County of Alameda (Unincorporated) – Risk Assessment Tables

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Table F-1. County of Alameda (Unincorporated), Total Population and Residential Buildings

	Population[1]	Residential Buildings[1]
Alameda County	1,535,248	584,652
Alameda County Unincorporated	189,977	67,725

[1] Census Data, 2009-2013 American Community Survey

Table F-2. County of Alameda (Unincorporated), Total Critical Facilities and Infrastructure, is not included in this redacted version of the plan.

If you are interested in this table, please contact Michael Cadrecha, Alameda County GSA-TSD (michael.cadrecha@acgov.org or (510) 208-9589).

Table F-3. County of Alameda (Unincorporated), Summary of Impacts for Population and Residential Buildings

Hazard	Population	% of Population	No. of Residential Buildings	% of Residential Buildings
Dam Failure Inundation	20,041	10.55%	7,618	11.25%
Earthquake Ground Shaking - Strong	490	0.26%	195	0.29%
Earthquake Ground Shaking – Very Strong	94,583	49.79%	33,592	49.60%
Earthquake Ground Shaking - Violent	95,169	50.10%	34,038	50.26%
Flood - 100 Year	9,959	5.24%	3,510	5.18%
Flood - 500 Year	10,604	5.58%	3,754	5.54%
Sea Level Rise – 3ft.	631	0.33%	185	0.27%
Sea Level Rise – 6ft.	2,124	1.12%	630	0.93%
Landslide Susceptibility – Flatland	64,869	34.15%	23,809	35.16%
Landslide Susceptibility – Few Landslides	14,705	7.74%	5,102	7.53%
Landslide Susceptibility – Mostly Landslides	88,091	46.37%	30,255	44.67%
Liquefaction - Moderate	5,520	2.91%	1,984	2.93%
Liquefaction - High	3,882	2.04%	1,390	2.05%
Liquefaction – Very High	864	0.45%	248	0.37%
Tsunami Inundation	21,709	11.43%	7,651	11.30%
Wildfire - Moderate	43,632	22.97%	15,333	22.64%
Wildfire - High	10,664	5.61%	4,039	5.96%
Wildfire - Very High	20,041	10.55%	7,618	11.25%

Table F-4. County of Alameda (Unincorporated), Summary of Impacts for Critical Facilities and Infrastructure

Hazard	No. of Critical Facilities and Infrastructure	% of Critical Facilities and Infrastructure
Dam Failure Inundation	28	20.44%
Earthquake Ground Shaking - Strong	2	1.46%
Earthquake Ground Shaking - Very Strong	62	45.26%
Earthquake Ground Shaking - Violent	63	45.99%
Flood - 100 Year	10	7.30%
Flood - 500 Year	7	5.11%
Sea Level Rise - 3ft.	1	0.73%
Sea Level Rise - 6ft.	2	1.46%
Landslide Susceptibility - Flatland	80	58.39%
Landslide Susceptibility - Few Landslides	40	29.20%
Landslide Susceptibility - Mostly Landslides	6	4.38%
Liquefaction - Moderate	71	51.82%
Liquefaction - High	3	2.19%
Liquefaction - Very High	20	14.60%
Tsunami Inundation	7	5.11%
Wildfire - Moderate	24	17.52%
Wildfire - High	27	19.71%
Wildfire - Very High	11	8.03%

Table F-5. County of Alameda (Unincorporated), Human and Technical Resources for Hazard Mitigation

Staff/Personnel Resources	Department or Agency	Principal Activities Related to Hazard Mitigation
Planner(s), engineer(s) and technical staff with knowledge of land development, land management practices, and human-caused and natural hazards. Geographic information systems (GIS) staff	Community Development Agency	Develops and maintains the General Plan, including the Safety Element. Develops area plans based on the General Plan, to provide more specific guidance for the development of more specific areas. Reviews private development projects and proposed capital improvements projects and other physical projects involving property for consistency and conformity with the General Plan. Anticipates and acts on the need for new plans, policies, and Code changes. Applies the approved plans, policies, code provisions, and other regulations to proposed land uses. GIS capabilities apply to data management, such as information on the location and nature of interested facilities and infrastructures, and hazards.
Project Manager(s), Planner(s)	General Services Agency	Lead for the Hazard Mitigation Plan. Assists with sustainability and climate adaptation projects.
Architects, Engineers, construction project managers, and supporting technical staff.	Public Works Agency and General Services Agency	Provides direct or contract civil, structural and mechanical engineering services, and architectural services, including contract, project, and construction management.
Planner(s)	Health Care Services Agency	Emergency management planning, communicable disease control and emergency medical services.
Director of Emergency Services	County Sherriff's Office – Office of Emergency Services (OES)	Maintains and updates the Emergency Operations Plan for the local jurisdiction. In addition, coordinates local response and relief activities within the Emergency Operation Center, and works closely with County, state, and federal partners to support planning and training and to provide information and coordinate assistance.

Table F-5. County of Alameda (Unincorporated), Human and Technical Resources for Hazard Mitigation

Staff/Personnel Resources	Department or Agency	Principal Activities Related to Hazard Mitigation
Procurement Services Manager	General Services Agency - Procurement	Provides a full range of municipal financial services, administers several licensing measures, and functions as the local jurisdiction's Procurement Services Manager.
Public Information Officers	County Sheriff's Office, County Fire, Health Care Services Agency and County Administrator's Office	The communications coordinators or spokesperson for the organization. Provides information to the media and public.

Table F-6. County of Alameda (Unincorporated), Financial Resources for Hazard Mitigation

Type	Subtype	Administrator	Purpose	Amount
Local	General Fund	To be determined	Program operations and specific projects.	Variable.
	General Obligation (GO) Bonds	To be determined	GO Bonds are appropriately used for the construction and/or acquisition of improvements to real property broadly available to residents and visitors. Such facilities include, but are not limited to, libraries, hospitals, parks, public safety facilities, and cultural and educational facilities.	Variable.
	Lease Revenue Bonds	To be determined	Lease revenue bonds are used to finance capital projects that (1) have an identified budgetary stream for repayment (e.g., specified fees, tax receipts, etc.), (2) generate project revenue but rely on a broader pledge of general fund revenues to reduce borrowing costs, or (3) finance the acquisition and installation of equipment for the local jurisdiction's general governmental purposes.	Variable.
	Public-Private Partnerships	To be determined	Includes the use of local professionals, business owners, residents, and civic groups and trade associations, generally for the study of issues and the development of guidance and recommendations.	Variable.
	Development Impact Fee	To be determined	Can be used for both on-site and off-site capital improvements, including seismic hazard repair and maintenance, drainage, and critical facilities. Impact fees must be used only for the purpose for which they were created.	Variable.

Table F-6. County of Alameda (Unincorporated), Financial Resources for Hazard Mitigation

Type	Subtype	Administrator	Purpose	Amount
Federal	Hazard Mitigation Grant Program (HMGP)	Federal Emergency Management Agency (FEMA)	Supports pre- and post-disaster mitigation plans and projects.	Available to California communities after a Presidentially declared disaster has occurred in California. Grant award based on specific projects as they are identified by eligible applicants.
	Pre-Disaster Mitigation (PDM) grant program	FEMA	Supports pre-disaster mitigation plans and projects.	Available on an annual basis as a nationally competitive grant. Grant award based on specific projects as they are identified (no more than $3M federal share for projects).
	Flood Mitigation Assistance (FMA) grant program	FEMA	Mitigates repetitively flooded structures and infrastructure.	Available on an annual basis, distributed to California communities by the California Governor's Office of Emergency Services (Cal OES). Grant award based on specific projects as they are identified.
	Assistance to Firefighters Grant (AFG) Program	FEMA/USFA (U.S. Fire Administration)	Provides equipment, protective gear, emergency vehicles, training, and other resources needed to protect the public and emergency personnel from fire and related hazards.	Available to fire departments and nonaffiliated emergency medical services providers. Grant awards based on specific projects as they are identified.
	Community Development Block Grant Program Entitlement Communities Grants	U.S. HUD (U.S. Department of Housing and Urban Development)	Acquisition of real property, relocation and demolition, rehabilitation of residential and non-residential structures, construction of public facilities and improvements, such as water and sewer facilities, streets, neighborhood centers, and the conversion of school buildings for eligible purposes.	Available to entitled cities. Grant award based on specific projects as they are identified.

Table F-6. County of Alameda (Unincorporated), Financial Resources for Hazard Mitigation

Type	Subtype	Administrator	Purpose	Amount
Federal (cont.)	Community Action for a Renewed Environment (CARE)	U.S. Environmental Protection Agency (EPA)	Through financial and technical assistance offers an innovative way for a community to organize and take action to reduce toxic pollution (i.e., stormwater) in its local environment. Through CARE, a community creates a partnership that implements solutions to reduce releases of toxic pollutants and minimize people's exposure to them.	Competitive grant program. Grant award based on specific projects as they are identified.
	Clean Water State Revolving Fund (CWSRF)	EPA	The CWSRF is a loan program that provides low-cost financing to eligible entities within state and tribal lands for water quality projects, including all types of non-point source, watershed protection or restoration, estuary management projects, and more traditional municipal wastewater treatment projects.	CWSRF programs provided more than $5 billion annually to fund water quality protection projects for wastewater treatment, non-point source pollution control, and watershed and estuary management.
	Public Health Emergency Preparedness (PHEP) Cooperative Agreement.	Department of Health and Human Services' (HHS') Centers for Disease Control and Prevention (CDC)	Funds are intended to upgrade state and local public health jurisdictions' preparedness and response to bioterrorism, outbreaks of infectious diseases, and other public health threats and emergencies.	Competitive grant program. Grant award based on specific projects as they are identified.
	Homeland Security Preparedness Technical Assistance Program (HSPTAP)	FEMA/DHS	Build and sustain preparedness technical assistance activities in support of the four homeland security mission areas (prevention, protection, response, recovery) and homeland security program management.	Technical assistance services developed and delivered to state and local homeland security personnel. Grant award based on specific projects as they are identified.

Table F-7. County of Alameda (Unincorporated), Legal and Regulatory Resources for Hazard Mitigation

Regulatory Tool	Name	Description (Effect on Hazard Mitigation)	Hazards Addressed	Mitigation, Preparedness, Response, or Recovery	Affects Development in Hazard Areas?
Plans	General Plan & Safety Element (2014)	Describes hazard areas and regulates current and future development based on known hazard areas. The Safety Element includes descriptive information, analysis and policies pertaining to geologic, seismic, flood and fire 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 sets 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.	Ground Shaking, Structural Failures, Surface Rupture, Liquefaction, Tsunamis or Seiches, Landslides/Slope Instability, Fire, Flood, Dam Inundation, Hazardous Materials, and Aviation Hazards.	Mitigation & Preparedness	Yes

Table F-7. County of Alameda (Unincorporated), Legal and Regulatory Resources for Hazard Mitigation

Regulatory Tool	Name	Description (Effect on Hazard Mitigation)	Hazards Addressed	Mitigation, Preparedness, Response, or Recovery	Affects Development in Hazard Areas?
Plans (cont.)	Emergency Operations Plan (2011)	Describes what the local jurisdiction's actions will be during a response to an emergency. Includes annexes that describe in more detail the actions required of the local jurisdiction's departments/agencies. Further, this plan describes the role of the Emergency Operation Center (EOC) and the coordination that occurs between the EOC and the local jurisdiction's departments and other response agencies. Finally, this plan describes how the EOC serves as the focal point among local, state, and federal governments in times of disaster.	Agriculture Infestation, Aircraft Incident, Civil Disturbance, Dam Failure, Drought, Earthquake, Energy Emergency, Epidemic/Infectious Disease, Flood/ Storm, Hazardous Materials, Landslide/ Mudslide, Liquefaction, Terrorism, Tornados and High Winds, Train Derailment, Tsunami and Seiche, and Wildland Fire	Response	No
	The Alameda County (Unincorporated Areas) Community Climate Action Plan (2014)	Addresses reduction of greenhouse gas emissions through a series of 37 local programs and policy measures related to transportation, land use, building energy, water, waste, and green infrastructure.	Climate Change	Mitigation & Preparedness	Yes

Table F-7. County of Alameda (Unincorporated), Legal and Regulatory Resources for Hazard Mitigation

Regulatory Tool	Name	Description (Effect on Hazard Mitigation)	Hazards Addressed	Mitigation, Preparedness, Response, or Recovery	Affects Development in Hazard Areas?
Plans (cont.)	The Alameda County Climate Action Plan for Government Services and Operations (2010)	Identifies and prioritizes actions to reduce GHG emissions from multiple action areas, such as building energy use, transportation and employee commutes, and waste disposal. Recommends that the County promote energy efficiency in our facilities and vehicle fleet, use clean alternative energy sources, reduce waste, make environmentally preferable purchases, and develop forward-thinking land use and transportation planning.	Climate Change	Mitigation & Preparedness	Yes
	Oakland International Airport Land Use Compatibility Plan (2010) Hayward Executive Airport Land Use Compatibility Plan (2012) Livermore Municipal Airport Land Use Compatibility Plan (2012)	Used by the Alameda County airport land use commission (ALUC) to help promote compatibility between the airports and their environs. More specifically, this airport land use compatibility plan (ALUCP) should act as a guide for the ALUC and local jurisdictions in safeguarding the general welfare of the public as Oakland International Airport, Hayward Executive Airport, and Livermore Municipal Airport, and the areas surrounding the Airports grow.	Wildlife hazards, smoke, flare, lighting, electrical interference, magnetic and radio interference, and thermal plumes	Mitigation & Preparedness	Yes
	Delta Islands and Levees Feasibility Study (Delta Study – 2014)	Describes the affected environment in the Big Break and Little Franks Tract area; evaluates the direct, indirect, and cumulative environmental effects and the benefits of the tentatively selected plan and two alternative plans; and recommends avoidance, minimization, and mitigation measures. The study area includes a portion of the Mountain House area of Alameda County.	Flood	Mitigation & Preparedness	Yes
	Stormwater Quality Management Program (SWQMP)	Describes measures that the local jurisdiction will take to minimize stormwater pollution. The SWQMP is required by the National Pollutant Discharge Elimination System Phase II regulations, which became effective in March 2003.	Stormwater	Mitigation & Preparedness	Yes

Table F-7. County of Alameda (Unincorporated), Legal and Regulatory Resources for Hazard Mitigation

Regulatory Tool	Name	Description (Effect on Hazard Mitigation)	Hazards Addressed	Mitigation, Preparedness, Response, or Recovery	Affects Development in Hazard Areas?
Plans (cont.)	California Public Health and Medical Emergency Operations Manual (2011)	Builds a common operational framework that strengthens the ability of the Public Health and Medical System to rapidly and effectively respond to emergencies. A common operational framework supports effective information flow between local, regional, and State partners and supports efficient response when additional resources are needed during emergencies that exceed local response capabilities.	Public Health Hazards	Response	No
Programs	National Flood Insurance Program (NFIP)	Makes affordable flood insurance available to homeowners, business owners, and renters in participating communities. In exchange, those communities must adopt and enforce minimum floodplain management regulations to reduce the risk of damage from future floods. Alameda County joined the NFIP in 1981.	Flood	Mitigation, Preparedness & Recovery	Yes
	Community Rating System (CRS)	The NFIP's CRS is a voluntary incentive program that recognizes and encourages community floodplain management activities that exceed the minimum NFIP requirements.	Flood	Mitigation & Preparedness	Yes
Policies	**Alameda County Policies**				
	Title 2 – Administration, Chapter 2.46 – Public Works Department (Administrative Code)	Describes the authorized duties of the flood control and water district director.	Flood	Mitigation, Preparedness & Recovery	Yes
	Title 6 – Health and Safety, Chapter 6.04 – Alameda County Fire Code	Forms the basis of the County's fire prevention standards.	Fire	Mitigation & Preparedness	Yes
	Title 6 - Health and Safety, Chapter 6.36 – Flood Control and Water Conservation District Use Regulations	Regulations of the Flood Control and Water Conservation District	Flood	Mitigation & Preparedness	Yes

Table F-7. County of Alameda (Unincorporated), Legal and Regulatory Resources for Hazard Mitigation

Regulatory Tool	Name	Description (Effect on Hazard Mitigation)	Hazards Addressed	Mitigation, Preparedness, Response, or Recovery	Affects Development in Hazard Areas?
Policies (cont.)	Title 6 - Health and Safety, Chapter 6.53 – Alameda County Safe Drug Disposal Ordinance	Disposal of unwanted products – medical waste and hazardous waste	Hazardous materials	Mitigation & Preparedness	No
	Title 13 – Public Services, Chapter 13.08 – Stormwater Management and Discharge Control	Coordination with hazardous materials inventory and response program.	Hazardous materials	Mitigation & Preparedness	No
	Title 13 – Public Services, Chapter 13.12 - Watercourse Protection Ordinance	To safeguard and preserve watercourses, protect lives and property, prevent damage due to flooding, protect drainage facilities, control erosion and sedimentation, restrict discharge of polluted materials and enhance recreational and beneficial uses of watercourses.	Flood	Mitigation & Preparedness	Yes
	Title 15 – Buildings and Construction, Chapter 15.08 - Building Code, Article I – Amended Sections to 2013 California Building Code	The county has exercised its authority to establish more restrictive and reasonably necessary differences to the provisions contained in California Building Code.	Earthquake, Flood, Landslide, Liquefaction	Mitigation & Preparedness	Yes
	Title 15 – Buildings and Construction, Chapter 15.08 - Building Code, Section 460, Green Building Program	To enhance public health and welfare by encouraging green building measures in the design, construction, and maintenance of buildings.	Climate Change	Mitigation & Preparedness	Yes

Table F-7. County of Alameda (Unincorporated), Legal and Regulatory Resources for Hazard Mitigation

Regulatory Tool	Name	Description (Effect on Hazard Mitigation)	Hazards Addressed	Mitigation, Preparedness, Response, or Recovery	Affects Development in Hazard Areas?
Policies (cont.)	Title 15 – Buildings and Construction, Chapter 15.36 – Grading Erosion and Sediment Control	Regulating grading work on private property within the unincorporated area of the county in order to safeguard life, limb, health, property, and public welfare; to protect creeks, watercourses, and other drainage facilities from illicit discharges of surface runoff generated in or draining through the permit work area; and to ensure that the construction and eventual use of a graded site is in accordance with the county general plan, any applicable specific plan, and all applicable county ordinances, including the stormwater management and discharge ordinance.	Earthquake and Flood	Mitigation & Preparedness	Yes
	Title 15 – Buildings and Construction, Chapter 15.40 - Floodplain Management	To promote the public health, safety and general welfare, and to minimize public and private losses due to flood conditions in specific areas.	Flood	Mitigation & Preparedness	Yes
	Title 16 – Subdivisions, Chapter 16.16 – Design Requirements	Addresses design requirements where flood hazards exist.	Flood	Mitigation & Preparedness	Yes
	Hazardous Materials / Waste Program	Program for hazardous waste generation	Hazardous Materials	Mitigation & Preparedness	No
	Household Hazardous Waste Program	Helps to coordinate disposal of household hazardous materials. Three permanent facilities collect, identify, sort, store, pack, and recycle or dispose of all hazardous wastes (except radioactive waste and explosives).	Hazardous Materials	Mitigation & Preparedness	No
	City of Dublin Policies*				
	Dublin: Chapter 5.08 Fire Code	The promotion and preservation of the public health, safety and general welfare of the people of the city and the property situated therein have made necessary the adoption of the International Fire Code referred to in Section 5.08.030 in order to adequately safeguard life, health, property, and general welfare.	Fire	Mitigation & Preparedness	Yes

Table F-7. County of Alameda (Unincorporated), Legal and Regulatory Resources for Hazard Mitigation

Regulatory Tool	Name	Description (Effect on Hazard Mitigation)	Hazards Addressed	Mitigation, Preparedness, Response, or Recovery	Affects Development in Hazard Areas?
Policies (cont.)	Dublin: Chapter 7.24 Flood Control	To promote the public health, safety, and general welfare, and to minimize public and private losses due to flood conditions in specific areas	Flood	Mitigation & Preparedness	Yes
	Dublin: Chapter 8.60 Hazardous Waste Facilities Location Procedure	To establish uniform standards, land use regulations and a permit process for controlling the location, design, maintenance and safety of off-site hazardous waste facilities	Hazardous Materials	Mitigation & Preparedness	Yes
	City of Fremont Policies*				
	Fremont: Chapter 8.35 Hazardous Materials Management	The protection of health, life, the environment, resources, and property through control of the management, handling, use, storage and disposal of hazardous materials.	Hazardous Materials	Mitigation & Preparedness	No
	Fremont: Chapter 15.35 Fremont Fire Code	Adoption of the 2013 Edition of the California Fire Code as published by the International Code Council as the fire code of the city of Fremont.	Fire	Mitigation & Preparedness	Yes
	Fremont: Chapter 18.120 (F) Flood Combining District	The (f) flood combining district provides land use regulations to be applied on a uniform basis so as to prevent property damage, and to safeguard the health, safety and general welfare of the people in areas subject to flooding and inundation.	Flood	Mitigation & Preparedness	Yes
	Fremont: Chapter 18.125 (F-W) Floodway Combining District	The (F-W) floodway combining district provides land use regulations to be applied on a uniform basis, so as to prohibit any development which would reduce the watering capacities of watercourses which must be reserved, in order to discharge floodwaters in the event of a 100-year flood and to protect persons and property from the hazards of high-velocity floodwaters.	Flood	Mitigation & Preparedness	Yes

Table F-7. County of Alameda (Unincorporated), Legal and Regulatory Resources for Hazard Mitigation

Regulatory Tool	Name	Description (Effect on Hazard Mitigation)	Hazards Addressed	Mitigation, Preparedness, Response, or Recovery	Affects Development in Hazard Areas?
Policies (cont.)	Fremont: Chapter 18.200 Flood Damage Prevention	To promote the public health, safety and general welfare, and to minimize public and private losses due to flood conditions in specific areas.	Flood	Mitigation & Preparedness	Yes
	City of Hayward Policies*				
	Hayward: Article 1 – Fire Prevention	Addresses fire permit requirements and process.	Fire	Mitigation & Preparedness	No
	Hayward: Article 4 – Flood Plain Management	Adoption of flood plain management regulations	Flood	Mitigation & Preparedness	Yes
	Hayward: Article 8 – Hazardous Materials Storage	Describes the protection of health, life, resources, and property through prevention and control of unauthorized releases of hazardous materials.	Hazardous Materials	Mitigation & Preparedness	No
	Hayward: Section 10-1.2100 Flood Plain District	The Flood Plain District shall be subject to the following specific regulations in addition to the general regulations hereinafter contained in order to protect persons and property from the hazards of development in areas subject to tidal or flood water inundation, and to protect the community from the costs which may be incurred or premature development occurs in such area.	Flood	Mitigation & Preparedness	Yes
	City of Livermore Policies*				
	Livermore: Chapter 3-30 Hazardous Materials	Hazardous materials guidelines; The Uniform Fire Code and Uniform Building Code establish the minimum level of hazardous material regulation, City Council in certain situations has required more stringent safeguards.	Hazardous Materials	Mitigation & Preparedness	Yes
	Livermore: Chapter 8.08 Solid Waste Management	Discusses solid waste management including solid waste collection and disposal.	Hazardous Materials	Preparedness & Response	No
	Livermore: Chapter 15.06 Fire Code	Adoption and Amendments to the 2012 International Fire Code as the Livermore Fire Code.	Fire	Mitigation & Preparedness	Yes

Table F-7. County of Alameda (Unincorporated), Legal and Regulatory Resources for Hazard Mitigation

Regulatory Tool	Name	Description (Effect on Hazard Mitigation)	Hazards Addressed	Mitigation, Preparedness, Response, or Recovery	Affects Development in Hazard Areas?
Policies (cont.)	Livermore: Title 16 Environment Hazardous Materials Release and Response Plans	Addresses hazardous materials release and response plans, and underground storage tanks and hazardous waste.	Hazardous Materials	Response	No
	Livermore: Chapter 16.12 Flood Control Regulations	To promote the public health, safety and general welfare, and to minimize public and private losses due to flood conditions in specific areas.	Flood	Mitigation & Preparedness	Yes
	City of Oakland Policies*				
	Oakland: Chapter 8.12 – Hazardous Materials	The city of Oakland ("city") assumes the authority and responsibility for the implementation of Chapter 6.95 ("Chapter 6.95") of the California Health and Safety Code (Health and Safety Code Section 25500 et seq.), as to the handling of the hazardous materials in the city	Hazardous Materials	Mitigation, Preparedness & Response	No
	Oakland: Chapter 8.42 – Certified Unified Program Agency (CUPA)	The city of Oakland ("city"), pursuant to the state of California Environmental Protection Agency's ("Cal EPA") approval of the city's application to serve as the certified unified program agency ("CUPA") for the city, assumes authority and responsibility for the administration and enforcement within the city of the unified hazardous waste and hazardous materials management regulatory program ("unified program") established by Chapter 6.11 of the California Health and Safety Code (section 25404, et seq.), (hereinafter referred to as the "Act") to consolidate the administration and enforcement of the six following hazardous materials management programs and ensure the coordination and consistency of any regulations adopted.	Hazardous Materials	Mitigation, Preparedness & Response	No
	Oakland: Chapter 15.12 – Oakland Fire Code	Adoption and amendments to the 2013 California Fire Code	Fire	Mitigation & Preparedness	Yes

Table F-7. County of Alameda (Unincorporated), Legal and Regulatory Resources for Hazard Mitigation

Regulatory Tool	Name	Description (Effect on Hazard Mitigation)	Hazards Addressed	Mitigation, Preparedness, Response, or Recovery	Affects Development in Hazard Areas?
Policies (cont.)	Oakland: Chapter 15.18 – Fire Suppression, Prevention and Preparedness Districts	Implementation of a locally-funded mechanism to implement a program of fire suppression, prevention and preparedness in areas of the city specially in need of such services to supplement and augment the provisions of state law is a matter of special local interest and concern and is a proper subject for an ordinance adopted under the city's charter powers.	Fire	Mitigation, Preparedness & Response	Yes
	Oakland: Chapter 17.100A – S-19 Health and Safety Protection Combing Zone Regulations	To promote the public health, safety and welfare by ensuring that activities which use hazardous material substances or store hazardous materials, hazardous waste, or explosives locate in appropriate locations and develop in such a manner as not to be a serious threat to the environment, or to public health, particularly to residents living adjacent to industrial areas where these materials are commonly used, produced or found.	Hazardous Materials	Mitigation & Preparedness	No
	City of Pleasanton Policies*				
	Pleasanton: Chapter 9.16 Hazardous Materials Storage	To implement, within the city, all hazardous materials and hazardous waste programs covered under SB 1082, otherwise known as the Certified Unified Program Agency (CUPA) law.	Hazardous Materials	Mitigation & Preparedness	Yes
	Pleasanton: Chapter 17.08 Flood Damage Prevention	To promote the public health, safety and general welfare, and to minimize public and private losses due to flood conditions in specific area.	Flood	Mitigation & Preparedness	Yes
	Pleasanton: Chapter 20.24 Fire Code	Adoption of the International Fire Code, 2012 Edition, as amended by the California Code of Regulations.	Fire	Mitigation & Preparedness	Yes
	City of San Leandro Policies*				
	San Leandro: Chapter 3-17 Hazardous Materials	Discusses the use, handling, storage and disposal of hazardous materials and wastes in San Leandro and establishes an orderly system for the provision of such information.	Hazardous Materials	Mitigation & Preparedness	Yes

Table F-7. County of Alameda (Unincorporated), Legal and Regulatory Resources for Hazard Mitigation

Regulatory Tool	Name	Description (Effect on Hazard Mitigation)	Hazards Addressed	Mitigation, Preparedness, Response, or Recovery	Affects Development in Hazard Areas?
Policies (cont.)	San Leandro: Chapter 7-9 Floodplain Management	Promotes the public health, safety, and general welfare, and to minimize public and private losses due to flood conditions in specific areas.	Flood	Mitigation & Preparedness	Yes
	City of Union City Policies*				
	Union City: Chapter 15.20 Fire Code	Adoption of the 2013 California Fire Code by reference as the Fire Code of the City of Union City.	Fire	Mitigation & Preparedness	Yes
	Union City: Chapter 15.22 Unified Hazardous Waste and Hazardous Materials Management Regulatory Program	Implementation of the provisions of the California Unified Hazardous Waste and Hazardous Material Management Regulatory Program Act (the "Act"), Chapter 6.11, Division 20, California Health and Safety Code, commencing with Section 25404.	Hazardous Materials	Mitigation & Preparedness	Yes
	Union City: Chapter 18.98 Floodplain Combining District	To promote the public health, safety and general welfare, and to minimize public and private losses due to flood conditions in specific areas	Flood	Mitigation & Preparedness	Yes
	State Policies				
	California Code of Regulations: 17 CA ADC § 1276	Standards for State aid for local health administration.	Public Health	Preparedness	No
	Alquist-Priolo Earthquake Fault Zoning Act	Main purpose is to prevent 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.	Earthquake	Mitigation	Yes

Table F-7. County of Alameda (Unincorporated), Legal and Regulatory Resources for Hazard Mitigation

Regulatory Tool	Name	Description (Effect on Hazard Mitigation)	Hazards Addressed	Mitigation, Preparedness, Response, or Recovery	Affects Development in Hazard Areas?
Policies (cont.)	Seismic Hazards Mapping Act	Addresses non-surface fault rupture earthquake hazards, including liquefaction and seismically induced landslides. Requires the California Geological Survey (CGS) 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.	Earthquake	Mitigation	Yes
	California Environmental Quality Act (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"	All	Mitigation	Yes
	California Water Code – Division 3 – Dams and Reservoirs	Entrusts this regulatory power to the Department of Water Resources which delegates the program to the Division of Safety of Dams (DSOD); the DSOD's mission is to protect people against loss of life and property from dam failure. The DSOD, under the police power of the state, shall supervise the construction, enlargement, alteration, repair, maintenance, operation, and removal of dams and reservoirs for the protection of life and property as provided in this part.	Dam Failure	Mitigation, Preparedness, Response and Recovery	Yes

Table F-7. County of Alameda (Unincorporated), Legal and Regulatory Resources for Hazard Mitigation

Regulatory Tool	Name	Description (Effect on Hazard Mitigation)	Hazards Addressed	Mitigation, Preparedness, Response, or Recovery	Affects Development in Hazard Areas?
Policies (cont.)	**Federal Policies**				
	USACE Disaster Operations (Public Law 84-99) - Flood Control and Coastal Emergency Act	Chief of Engineers, acting for the Secretary of the Army, is authorized to undertake activities including disaster preparedness, Advance Measures, emergency operations (Flood Response and Post Flood Response), rehabilitation of flood control works threatened or destroyed by flood, protection or repair of federally authorized shore protective works threatened or damaged by coastal storm, and provisions of emergency water due to drought or contaminated source.	Flood	Preparedness, Response and Recovery	No

*Polices for the cities in which Alameda County owned and or maintained facilities are located in have been included.

Table F-8. County of Alameda (Unincorporated), Current and Completed Hazard Mitigation Projects and Programs

Status (Current or Complete)	Project / Program Name	Description	Year(s)
Current	Construct 4 new Replacement Fire Stations	Replace FS 22 (old #1), 23 (old #2), & 26 (old #5), and 8 per Seismic Study dated September 2000.	In Progress
Current	Pre-Disaster Planning	Develop pre-disaster plans such as COG / COOP Plans, Post-Disaster Recovery, Medical and Health Disaster Ops Plan, PH DOC Plan, Surge/Alternate Care Site (ACS) Plan. In addition, develop Pediatric Disaster and ACS Regional Planning, training conferences, resources, and communications.	In Progress
Complete	Community Emergency Response Teams (CERT) training	Conduct training for CERT through partnerships with local community groups.	Ongoing (AFCD conducts on average 6 classes/year within its jurisdiction)
Complete	Repair and reconstruction ordinance	Adopt and enforce a repair and reconstruction ordinance to ensure that damaged buildings are repaired in an appropriate and timely manner and retrofitted concurrently.	2011 (ordinance became effective on January 1, 2011)
Current	Alameda County Acute Care Hospital Tower	Per California State Assembly Bills 1953 and 306 - replace existing Acute Care tower with seismically safe facility.	In Progress (completion anticipated for 2017)
Complete	Peralta Oaks Seismic Retrofit and Reassignment to Sheriff and Healthcare	This project, when complete, will house the ACSO Coroner, Crime Lab, and Public Health Lab	2015

Table F-8. County of Alameda (Unincorporated), Current and Completed Hazard Mitigation Projects and Programs

Status (Current or Complete)	Project / Program Name	Description	Year(s)
Current	Update Alameda County Watercourse Protection Ordinance to include provisions to prevent erosion and bank failure caused by flooding to meet FEMA Guidelines	There is high sensitivity on the part of the public with regard to the updating of this ordinance. Implementation may significantly affect future development of properties along watercourses. We have received input from the community in the form of comments by the County Board of Supervisors appointed Creeks Task Force. The new Watercourse Protection Ordinance is currently being drafted and will be circulated for initial internal (ACPWA) review.	In Progress (Watercourse Protection Ordinance is being presents to different community groups for input)
Complete	Alameda Creek Federal Project, Old Alameda Creek levee improvements, and Lines B and C (Zone No. 6) Levees	This project is related to the ongoing South Bay Salt Pond Restoration Project. The flood control facilities will be hydraulically connected to the former salt production ponds. State acquisition of the Cargill Salt properties and restoration of the salt ponds provided a great opportunity to reduce flood hazard in the nearby urban areas by lowering or breaching the levee systems along the common borders between the salt ponds and flood control channels. Therefore, the District is seeking grants to help reduce flooding and also restore wetland habitat. PWA has contracted with a consultant who is initiating the evaluation of how best to integrate the flood control channels with the restored former salt ponds	Old Alameda Creek levees certified and approved 2012 Levee certification package for Zone 6 Lines B and C Levees submitted to FEMA in 2015, pending approval
Current	Cull Creek Dam Retrofit/Upgrade Project	District has identified a more cost effective design to address California Department of Water Resources Division of Safety of Dams' seismic stability concern. District staff has been in coordination with DSOD staff on design review and approval process. The project is in 90% PS&E phases waiting on environmental permits. Project is tentatively scheduled for construction Spring/Summer 2016.	In Progress

Table F-8. County of Alameda (Unincorporated), Current and Completed Hazard Mitigation Projects and Programs

Status (Current or Complete)	Project / Program Name	Description	Year(s)
Complete	Seismic retrofit projects	Seismically retrofit or replace County and local ramps and bridges that are categorized as structurally deficient by Caltrans, are located in an high ground shaking areas, and/or are necessary for first responders to use during and/or immediate after a disaster or emergency. Completed projects included the Elgin Street, High Street & Park Street Retrofit.	Unknown
Complete	Voluntary Flood Insurance public outreach	Develop a public outreach brochure program that informs property owners located in the dam failure inundation areas about voluntary flood insurance.	Unknown

Table F-9. County of Alameda (Unincorporated), Potential Mitigation Actions

No.	Description	Hazard	Mitigation Category	Floodplain Management Activity	New or Existing Construction
1	Develop and implement a methodology to systematically assess all hazards outlined in this Plan (including, but not limited to sea level rise, seismic risk, flood risk, protective design) and climate impacts (such as access to public transit) in considering building acquisitions and sales, portfolio planning, major retrofits, capital improvement planning, and master planning for County owned and leased facilities.	All	Local Plans and Regulations	Preventive	New/Existing
2	Continue the County's effort to enhance pre-disaster planning through development of plans such as Continuity of Government (COG) and Continuity of Operations (COOP) Plans, Department Operation Center Plans, and Emergency Public Information Plans.	All	Local Plans and Regulations	Preventive	Not Applicable
3	Educate Community Based Organizations and other agencies that support vulnerable populations about personal preparedness and Continuity of Operation Planning to ensure these organizations continue to serve their constituents in disasters. This will reduce the health impacts for vulnerable populations, such as seniors, those with physical and/or development disabilities, and the visual or hearing impaired.	All	Education and Awareness	Public Information	Not Applicable
4	Continue to support Medical Counter Measures operational and logistics plans for optimal use in Public Health Emergencies; includes strengthening the capability to respond to emerging infectious disease through detection and surveillance and disease containment, i.e. community mitigation strategies and post exposure prophylaxis.	All	Local Plans and Regulations	Preventive	Not Applicable
5	Develop a comprehensive energy policy for adoption by the County Board of Supervisors that sets energy efficiency and renewables as a priority, requires the development of design standards, and requires development of a strategic implementation plan for County owned, constructed and leased facilities.	Climate Change	Local Plans and Regulations	Preventive	New/Existing
6	Restore habitat and improve flood protection for low-lying areas by employing innovative techniques such as constructing levees coupled with gently sloping tidal marshes to help protect from storm wave action and tidal surge.	Climate Change	Natural Systems Protection	Natural Resource Protection	New/Existing

Table F-9. County of Alameda (Unincorporated), Potential Mitigation Actions

No.	Description	Hazard	Mitigation Category	Floodplain Management Activity	New or Existing Construction
7	Leverage the County's existing communication channels and Board of Supervisor policies across the agencies to educate the public, schools, other jurisdictions, professional associations, and businesses and industry about reducing global warming pollution and how to prepare for inevitable climate changes.	Climate Change	Education and Awareness	Public Information	Not Applicable
8	Update the County's green building policies and practices to ensure the use of the latest environmental standards for materials and systems as well as prioritizing energy efficiency and renewable in all owned and leased facilities, new construction, and renovations.	Climate Change	Local Plans and Regulations	Preventive and Structural Projects	New/Existing
9	Update the County's green building policies to ensure the use of the latest environmental standards for materials and systems as well as prioritizing energy efficiency and renewable in new construction, and renovations of private facilities.	Climate Change	Local Plans and Regulations	Preventive and Structural Projects	New/Existing
10	Restore and protect the ability of natural ecosystems to capture and store carbon.	Climate Change	Natural Systems Protection	Preventive and Natural Resource Protection	New/Existing
11	Develop and implement a system to monitor and analyze building usage of utilities (electricity, natural gas, water) to provide timely and actionable information for operations staff to reduce the County's use of resources and operational costs.	Climate Change	Structure and Infrastructure Projects	Preventive	New/Existing
12	Develop an outreach program to educate property owners about the adjustments in flood zones due to levees, many property owners may be removed from a flood zone due to a levee. Continue the public outreach program that informs property owners located in the dam failure inundation areas about voluntary flood insurance.	Dam and Levee Failure Inundation	Education and Awareness	Public Information	Existing
13	Look into potentially vulnerable public and private utility systems including sanitation/sewer, and fuel pumping stations. Set up a lifelines council to discuss and address the importance of ensuring the operation and timely restoration of essential systems to reasonable levels of service after a disaster.	Earthquake	Education and Awareness	Emergency Services and Public Information	New/Existing

Table F-9. County of Alameda (Unincorporated), Potential Mitigation Actions

No.	Description	Hazard	Mitigation Category	Floodplain Management Activity	New or Existing Construction
14	Identify, retrofit, upgrade, or replace deficient or vulnerable government facilities.	Earthquake	Structure and Infrastructure Projects	Property Protection and Structural Projects	Existing
15	Seismically retrofit or replace County and local ramps and bridges that are categorized as structurally deficient by Caltrans, are located in an high ground shaking areas, and/or are necessary for first responders to use during and/or immediate after a disaster or emergency.	Earthquake	Structure and Infrastructure Projects	Emergency Services and Structural Projects	Existing
16	Develop and implement plans to increase the building owner's general knowledge of and appreciation for the value of seismic upgrading of the building's structural and nonstructural elements.	Earthquake	Local Plans and Regulations & Awareness and Education	Public Information	Existing
17	Increase participation in the NFIP by maintaining the Community Rating System program which through enhanced floodplain management activities would allow property owners to receive a discount on their flood insurance.	Flood	All	Public Information and Property Protection	New/Existing (structures located within the 100-year floodplain)
18	Reinforce roads/bridges from flooding through protection activities, including elevating the roads/bridges and installing/widening culverts beneath the roads/bridges or upgrading storm drains.	Flood	Structure and Infrastructure Projects	Structural Projects	Existing
19	Continue to repair and make structural improvements to storm drains, pipelines and/or channels to enable them to perform to their design capacity in handling water flows.	Flood	Structure and Infrastructure Projects, Natural Systems Protection	Structural Projects	Existing
20	Implement landslide stabilization and/or protection measures. Stabilization measures include grading the unstable portion of the slope to a lower gradient, construction of rock buttresses and retaining walls, and drainage improvements. Protection measures include containment and/or diversion of the moving debris, such as walls, berms, ditches and catchment basins.	Landslide	Structure and Infrastructure Projects, Natural Systems Protection	Natural Resource Protection and Structural Projects	New/Existing

Table F-9. County of Alameda (Unincorporated), Potential Mitigation Actions

No.	Description	Hazard	Mitigation Category	Floodplain Management Activity	New or Existing Construction
21	Look into becoming a National Weather Service TsunamiReady community.	Tsunami	Awareness and Education	Emergency Services and Public Information	Not Applicable
22	County staff in conjunction with State Agencies will continue to support vegetation management strategies and programs to address the changing vegetation management needs within the County.	Wildfire	Natural Systems Protection	Preventive and Natural Resource Protection	New/Existing
23	Encourage farmers to cultivate and maintain a variety of crops in rural areas to increase agricultural diversity and crop-resiliency.	Climate Change	Natural Systems Protection	Natural Resource Protection	Not Applicable
24	Establish and implement 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.	Flood	Natural Systems Protection	Preventive and Natural Resource Protection	New/Existing

Table F-10. County of Alameda (Unincorporated), Analysis of Potential Mitigation Actions

No.	Description	Review: Pros/Cons (to complete the pros and cons the following topics are suggested for consideration: political support for the project, is there an agency that can/will lead the project, what type of funding options exist, what is the likelihood of the project occurring within the next five years?)
1	Develop and implement a methodology to systematically assess all hazards outlined in this Plan (including, but not limited to sea level rise, seismic risk, flood risk, protective design) and climate impacts (such as access to public transit) in considering building acquisitions and sales, portfolio planning, major retrofits, capital improvement planning, and master planning for County owned and leased facilities.	**Pros:** Not adding more critical facilities to the Hazard Mitigation process, reducing County risk, improving County's operation continuity, reducing risk of future cost impacts to the taxpayer (owning high-risk facilities), bringing to light hazards for fact-based decision making, prioritizing climate considerations in the County's portfolio strategies. **Cons:** Concern for liability exposure.
2	Continue the County's effort to enhance pre-disaster planning through development of plans such as Continuity of Government (COG) and Continuity of Operations (COOP) Plans, Department Operation Center Plans, and Emergency Public Information Plans.	**Pros:** Enhances resilience for a common standard across all departments. COG and COOP plans establish priorities and procedures to sustain County operations by provide for alternate methods and locations of operations following a disaster. **Cons**: Staffing resources/time needed to prepare and maintain plans. Staff training may be required to execute plans.
3	Educate Community Based Organizations and other agencies that support vulnerable populations about personal preparedness and Continuity of Operation Planning to ensure these organizations continue to serve their constituents in disasters. This will reduce the health impacts for vulnerable populations, such as seniors, those with physical and/or development disabilities, and the visual or hearing impaired.	**Pros:** Political support exists for funding projects supporting vulnerable populations. State Emergency Preparedness funding passed from the CDC has been used for the past 4 years on this initiative. PH will be the project lead for this effort. COOP and personnel preparedness was a mitigation strategy from a previous HVA developed in 2011. In Los Angeles and Oakland a lawsuit was filed because of the failure to adequately plan to meet the needs of PWD in an emergency. **Cons:** None identified
4	Continue to support Medical Counter Measures operational and logistics plans for optimal use in Public Health Emergencies; includes strengthening the capability to respond to emerging infectious disease through detection and surveillance and disease containment, i.e. community mitigation strategies and post exposure prophylaxis.	**Pros:** Biological attacks and infectious disease transmission can begin silently and spread quickly. Improving capabilities for mitigating consequences are essential for saving live and reducing morbidity. State Emergency Preparedness funding passed from the CDC has been used for the past 14 years on this initiative. PH will be the project lead for this effort. **Cons:** Key stakeholder engagement is low due staff turnover.

Table F-10. County of Alameda (Unincorporated), Analysis of Potential Mitigation Actions

No.	Description	Review: Pros/Cons (to complete the pros and cons the following topics are suggested for consideration: political support for the project, is there an agency that can/will lead the project, what type of funding options exist, what is the likelihood of the project occurring within the next five years?)
5	Develop a comprehensive energy policy for adoption by the County Board of Supervisors that sets energy efficiency and renewables as a priority, requires the development of design standards, and requires development of a strategic implementation plan for County owned, constructed and leased facilities.	**Pros:** Cost savings, political and organizational support, operational efficiencies, established GSA energy program with relevant project experience. Political and organizational support, supports existing commitments to climate action through BOS policies, help focus project efforts and existing program with clear guidelines. **Cons:** Funding for projects, adequate staffing may not be available.
6	Restore habitat and improve flood protection for low-lying areas by employing innovative techniques such as constructing levees coupled with gently sloping tidal marshes to help protect from storm wave action and tidal surge.	**Pros:** Improved flood protection for low-lying areas. Will help mitigate the effects of climate change. **Cons:** None identified
7	Leverage the County's existing communication channels and Board of Supervisor policies across the agencies to educate the public, schools, other jurisdictions, professional associations, and businesses and industry about reducing global warming pollution and how to prepare for inevitable climate changes.	**Pros:** Engages broad communities and individuals to act, leverages already existing BOS policies and communication channels, County demonstrates its leadership and forward thinking policies. **Cons:** Can be labor intensive effort if not scoped well, communications campaigns may not produce tangible changes in behavior.
8	Update the County's green building policies and practices to ensure the use of the latest environmental standards for materials and systems as well as prioritizing energy efficiency and renewable in all owned and leased facilities, new construction, and renovations.	**Pros:** Targets building which is a key contributor to climate change, operational efficiencies and cost savings, healthier building for occupants, lowers regional and global environmental impact, political support. Improved operational efficiency and cost savings, improved building comfort, Energy Program exists, Building Maintenance Department are in-house, political support. Commissioning already incorporated into County's existing building ordinance. **Cons:** Need consistent implementation of practices. May require extensive training of staff, staffing resources limited.
9	Update the County's green building policies to ensure the use of the latest environmental standards for materials and systems as well as prioritizing energy efficiency and renewable in new construction, and renovations of private facilities.	**Pros:** Targets building which is a key contributor to climate change, operational efficiencies and cost savings, healthier building for occupants, lowers regional and global environmental impact, political support. **Cons:** Need consistent with State Building Codes. May require staff training.

Table F-10. County of Alameda (Unincorporated), Analysis of Potential Mitigation Actions

No.	Description	Review: Pros/Cons (to complete the pros and cons the following topics are suggested for consideration: political support for the project, is there an agency that can/will lead the project, what type of funding options exist, what is the likelihood of the project occurring within the next five years?)
10	Restore and protect the ability of natural ecosystems to capture and store carbon.	**Pro:** County already has a program in place that involves tree-scaping improvements including planting trees along flood control channels. This action has also been identified in the County's current community climate action plan. Likely that this action will continue to move forward, but it is an incremental/ongoing effort. **Cons:** Grant sources for maintenance of current/previous efforts are rare.
11	Develop and implement a system to monitor and analyze building usage of utilities (electricity, natural gas, water) to provide timely and actionable information for operations staff to reduce the County's use of resources and operational costs.	**Pros:** Improved operational efficiency and cost savings, improved building comfort, Energy Program exists, Building Maintenance Department are in-house, political support, currently exists in some buildings. **Cons:** May require extensive training of staff, staffing resources limited.
12	Develop an outreach program to educate property owners about the adjustments in flood zones due to levees, many property owners may be removed from a flood zone due to a levee. Continue the public outreach program that informs property owners located in the dam failure inundation areas about voluntary flood insurance.	**Pro:** Increases public awareness of the changes in flood risks due to levees and can eliminate the need for some residents to continuing paying for flood insurance. A program is already in place to inform property owners in dam failure inundation areas about voluntary flood insurance - can utilize and build upon the program that is already in place. **Con:** TBD
13	Look into potentially vulnerable public and private utility systems including sanitation/sewer, and fuel pumping stations. Set up a lifelines council to discuss and address the importance of ensuring the operation and timely restoration of essential systems to reasonable levels of service after a disaster.	**Pros:** Improved operational efficiency community and political support. **Cons:** Limited resources and commitment from County agencies as well as private utility systems.
14	Identify, retrofit, upgrade, or replace deficient or vulnerable government facilities.	**Pros:** Provides mechanism to prioritize improvements in life safety of government buildings. Improve life safety of government buildings. Ensures critical emergency response facilities are available after a disaster for response and recovery. Ensures that the county can fulfill its presidential directive responsibilities under NRF, NIMS and SEMS. For ACFD fire stations, it ensures we can provide uninterrupted life sustaining/protecting services. **Cons:** Limited resources and time. Projects will require coordination and agreement on facility prioritization and funding.

Table F-10. County of Alameda (Unincorporated), Analysis of Potential Mitigation Actions

No.	Description	Review: Pros/Cons (to complete the pros and cons the following topics are suggested for consideration: political support for the project, is there an agency that can/will lead the project, what type of funding options exist, what is the likelihood of the project occurring within the next five years?)
15	Seismically retrofit or replace County and local ramps and bridges that are categorized as structurally deficient by Caltrans, are located in an high ground shaking areas, and/or are necessary for first responders to use during and/or immediate after a disaster or emergency.	**Pros:** Improved Transportation network to address local ramps and bridges classified as structurally deficient by Caltrans. **Cons:** Funding for projects may be limited.
16	Develop and implement plans to increase the building owner's general knowledge of and appreciation for the value of seismic upgrading of the building's structural and nonstructural elements.	**Pros:** Potential increase in seismic retrofits, and general preparedness for seismic/geologic hazards. PWA has previously developed a brochure that can be used in this effort. **Cons:** PWA does not have the staff to implement additional outreach, CDA would need to lead the effort (PWA can support).
17	Increase participation in the NFIP by maintaining the Community Rating System program which through enhanced floodplain management activities would allow property owners to receive a discount on their flood insurance.	**Pros:** Increases public awareness of the flood hazard risks within the Unincorporated Alameda County. It increases community resiliency from flooding impacts through floodplain management and safer building construction. It also reduces flood insurance premiums on an annual bases to the insured. **Cons:** None.
18	Reinforce roads/bridges from flooding through protection activities, including elevating the roads/bridges and installing/widening culverts beneath the roads/bridges or upgrading storm drains.	**Pros:** Improves flood control drainage facilities to current FEMA design standards. Existing FEMA floodplain could be removed with constructed improvements by filing Letter of Map Revisions (LOMR) to FEMA. Once FEMA approves the LOMR, affected property owners would not be required to purchase expensive flood insurance. **Cons:** Improvements are costly. Some of the Flood Control Zones do not have sufficient revenue to construct improvements. State and Federal funding sources are very limited, and often competitive with funding cap.
19	Continue to repair and make structural improvements to storm drains, pipelines and/or channels to enable them to perform to their design capacity in handling water flows.	**Pros:** Maintains functionalities of the flood control facilities as originally designed. **Cons:** Repair and structural improvements are costly and often require environmental permits and mitigations.

Table F-10. County of Alameda (Unincorporated), Analysis of Potential Mitigation Actions

No.	Description	Review: Pros/Cons (to complete the pros and cons the following topics are suggested for consideration: political support for the project, is there an agency that can/will lead the project, what type of funding options exist, what is the likelihood of the project occurring within the next five years?)
20	Implement landslide stabilization and/or protection measures. Stabilization measures include grading the unstable portion of the slope to a lower gradient, construction of rock buttresses and retaining walls, and drainage improvements. Protection measures include containment and/or diversion of the moving debris, such as walls, berms, ditches and catchment basins.	**Pros:** The stabilization of landslides in developed and underdeveloped areas will mitigation the potential for damming drainages that may result from downstream flooding and mitigation the hazard posed by the displacement of the slide mass and the loss of support for upslope properties. **Cons:** TBD
21	Look into becoming a National Weather Service TsunamiReady community.	**Pros:** Engages broad communities and individuals to act, leverages already existing Tsunami plan in EOP, County demonstrates its leadership and forward thinking policies. **Cons:** Limited resources and funding.
22	County staff in conjunction with State Agencies will continue to support vegetation management strategies and programs to address the changing vegetation management needs within the County.	**Pros:** Support and reduce hazards fuels and vegetation that lead to fires, cause injuries, and destroy property. Can build upon work already being completed for vegetation management. Ensures that coordination occurs with necessary State agency stakeholders. **Cons:** Potentially limited resources and funding
23	Encourage farmers to cultivate and maintain a variety of crops in rural areas to increase agricultural diversity and crop-resiliency.	**Pros:** Biological diversity is critical to mitigating the effects of climate change. **Cons:** Funding source for this is unclear
24	Establish and implement 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.	**Pros:** Minimize flood risks. **Cons:** Politically contentious; project has been going on for quite some time.

Table F-11. County of Alameda (Unincorporated), Mitigation Action Plan

No.	Description	Facility to be Mitigated (if Known and/or Applicable)	Funding Source	Department or Agency	Timeframe (0-5 Years)
1	Develop and implement a methodology to systematically assess all hazards outlined in this Plan (including, but not limited to sea level rise, seismic risk, flood risk, protective design) and climate impacts (such as access to public transit) in considering building acquisitions and sales, portfolio planning, major retrofits, capital improvement planning, and master planning for County owned and leased facilities.	N/A	Internal Funding , HSPTAP	General Services Agency (Technical Services Department, Portfolio Management, Real Property Management, Building Maintenance Department)	1-2 years
2	Continue the County's effort to enhance pre-disaster planning through development of plans such as Continuity of Government (COG) and Continuity of Operations (COOP) Plans, Department Operation Center Plans, and Emergency Public Information Plans.	Not Applicable	General Fund	Community Development Agency, and Emergency Medical Services	1 year; Ongoing
3	Educate Community Based Organizations and other agencies that support vulnerable populations about personal preparedness and Continuity of Operation Planning to ensure these organizations continue to serve their constituents in disasters. This will reduce the health impacts for vulnerable populations, such as seniors, those with physical and/or development disabilities, and the visual or hearing impaired.	Not Applicable	PHEP Cooperative Agreement, Bay Area Urban Areas Security Initiative, State Homeland Security Grant Program	Public Health, Emergency Preparedness, and Emergency Medical Services	5 years
4	Continue to support Medical Counter Measures operational and logistics plans for optimal use in Public Health Emergencies; includes strengthening the capability to respond to emerging infectious disease through detection and surveillance and disease containment, i.e. community mitigation strategies and post exposure prophylaxis.	Not Applicable	PHEP Cooperative Agreement, Bay Area Urban Areas Security Initiative, State Homeland Security Grant Program	Public Health, Emergency Preparedness, and Emergency Medical Services	5 years

Table F-11. County of Alameda (Unincorporated), Mitigation Action Plan

No.	Description	Facility to be Mitigated (if Known and/or Applicable)	Funding Source	Department or Agency	Timeframe (0-5 Years)
5	Develop a comprehensive energy policy for adoption by the County Board of Supervisors that sets energy efficiency and renewables as a priority, requires the development of design standards, and requires development of a strategic implementation plan for County owned, constructed and leased facilities.	Not Applicable	Internal Funding	General Services Agency	1-2 years
8	Conduct comprehensive building performance evaluations and implement projects that ensure consistency with County's green building and energy policies and that demonstrate technologies that ensure energy effectiveness and independence.	Not Applicable	Internal Funding	General Services Agency	2-3 years
9	Update the County's green building policies to ensure the use of the latest environmental standards for materials and systems as well as prioritizing energy efficiency and renewable in new construction, and renovations of private facilities.	Not Applicable	Building Fees	Public Works Agency	0-5 years (as updated by the State Building Code)
14	Identify, retrofit, upgrade, or replace deficient or vulnerable government facilities.	Retrofit Fire Stations 6, 7, 25; Replace Fire Stations 8, 22, 23, 26; ALCO Parking Facility,	PDM, Assistance to Fire Fighters	General Services Agency –Technical Services Department (with ACFD as client agency), and Office of Homeland Security and Emergency Services	Fire Station 23: 1 year Other Stations: ongoing (as funding becomes available)
15	Seismically retrofit or replace County and local ramps and bridges that are categorized as structurally deficient by Caltrans, are located in an high ground shaking areas, and/or are necessary for first responders to use during and/or immediate after a disaster or emergency. (Projects include Fruitvale Avenue Bridge Lifeline Project)	Estuary Bridges between Cities of Oakland and Alameda	State Funding, HMGP, PDM	Public Works Agency	Projects will be untaken as funding becomes available

Table F-11. County of Alameda (Unincorporated), Mitigation Action Plan

No.	Description	Facility to be Mitigated (if Known and/or Applicable)	Funding Source	Department or Agency	Timeframe (0-5 Years)
16	Develop and implement plans to increase the building owner's general knowledge of and appreciation for the value of seismic upgrading of the building's structural and nonstructural elements.	Not Applicable	General Fund	Community Development Agency - Planning, and Office of Homeland Security and Emergency Services	1-3 years
20	Implement landslide stabilization and/or protection measures. Stabilization measures include grading the unstable portion of the slope to a lower gradient, construction of rock buttresses and retaining walls, and drainage improvements. Protection measures include containment and/or diversion of the moving debris, such as walls, berms, ditches and catchment basins.	Numerous locations along Palomares Road, Redwood Road, Crow Canyon, Mines Road and Tesla Road	State Funding, HMGP, PDM	Public Works Agency	Projects will be untaken as funding becomes available
23	Encourage farmers to cultivate and maintain a variety of crops in rural areas to increase agricultural diversity and crop-resiliency.	Not Applicable	Internal Funding	Community Development Agency – Agriculture, Weights and Measures	1-3 years; Ongoing
24	Establish and implement 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.	New developments and modifications to existing facilities.	General Fund	Community Development Agency - Planning	1-3 years; Ongoing

HMGP = Hazard Mitigation Grant Program

PDM = Pre-Disaster Mitigation grant program

PHEP = Public Health Emergency Preparedness

The Hazard Mitigation Assistance (HMA) Program requirements were used to guide choice of mitigation actions:

- Mitigation Planning
- Technical Feasibility and Effectiveness
- Floodplain Management and Protection of Wetlands
- Environmental Planning and Historic Review and Compliance
- Cost Effectiveness
- Cost Review
- General Program Requirements

Appendix G

Alameda County Fire Department (ACFD) – Risk Assessment Tables

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Table G-1. ACFD, Total Critical Facilities and Infrastructure, is not included in this redacted version of the plan.

If you are interested in these tables, please contact Michael Cadrecha, Alameda County GSA-TSD (michael.cadrecha@acgov.org or (510) 208-9589).

Table G-2. ACFD, Summary of Impacts for Critical Facilities and Infrastructure

Hazard	No. of Critical Facilities and Infrastructure	% of Critical Facilities and Infrastructure
Dam Failure Inundation	12	35.29%
Earthquake Ground Shaking - Strong	0	0.00%
Earthquake Ground Shaking - Very Strong	15	44.12%
Earthquake Ground Shaking - Violent	18	52.94%
Flood - 100 Year	3	8.82%
Flood - 500 Year	1	2.94%
Sea Level Rise - 3ft.	0	0.00%
Sea Level Rise - 6ft.	2	5.88%
Landslide Susceptibility - Flatland	28	82.35%
Landslide Susceptibility - Few Landslides	5	14.71%
Landslide Susceptibility - Mostly Landslides	0	0.00%
Liquefaction - Moderate	23	67.65%
Liquefaction - High	2	5.88%
Liquefaction - Very High	1	2.94%
Tsunami Inundation	1	2.94%
Wildfire - Moderate	4	11.76%
Wildfire - High	2	5.88%
Wildfire - Very High	1	2.94%

Table G-3. ACFD, Human and Technical Resources for Hazard Mitigation

Staff/Personnel Resources	Department or Agency	Principal Activities Related to Hazard Mitigation
Fire Marshal, Deputy Fire Marshal(s), Inspectors	Fire Prevention Branch	Enforces all applicable State and local fire codes and standards, and fire investigations. Code enforcement is accomplished through the review and approval of building and facility plans, inspection of completed work, and certification of occupancy.
Fire mechanics and an administrative secretary	Fleet Management Division	Maintains the operational readiness of the Department's fleet of apparatus and support vehicles. Performing routine and emergency repairs, safety inspections, preventative maintenance, communications equipment installation, and emergency apparatus outfitting are among a few of the countless duties.
General Services Manager	Facilities Division	Responsible for the general maintenance of all the Department's fire stations and division offices, the project management of the building processes for new Department facilities and restoration of existing facilities.
Division Chief for Training and Staff Captain	Training Division	Provides support, oversight and coordination of training plans, exercises, curriculum and delivery methods that are in accordance with the National Fire Protection Association (NFPA), Occupational Safety and Health Administration (OSHA), National Institute for Occupational Safety and Health (NIOSH), the California State Fire Marshal's Office, the California Code of Regulations, FIRESCOPE and National Wildfire Coordinating Group (NWCG) standards and recommendations.
Division Chief for Special Operations and Staff Captain	Special Operations Division	Trains personnel and maintains equipment to provide hazardous material and water rescue response capabilities.
Division Chief for Services and Staff Captain	Information Technology Division	Maintains, develops, monitors and supports several information systems and providing network infrastructure and technical support for the Department.
Administrator, Business Manager, Analysts	Financial Services Division	Responsible for the financial and budget reporting, payroll, accounts and contracts payable, procurement and revenue and cash accounting for the entire agency.

Table G-3. ACFD, Human and Technical Resources for Hazard Mitigation

Staff/Personnel Resources	Department or Agency	Principal Activities Related to Hazard Mitigation
Shared HR Officer	Human Resources	Responsible for facilitating, hiring, recruit, retaining personnel to assist department.

Table G-4. ACFD, Financial Resources for Hazard Mitigation

Type	Subtype	Administrator	Purpose	Amount
Federal	Hazard Mitigation Grant Program (HMGP)	Federal Emergency Management Agency (FEMA)	Supports pre- and post-disaster mitigation plans and projects.	Available to California communities after a Presidentially declared disaster has occurred in California. Grant award based on specific projects as they are identified by eligible applicants.
	Pre-Disaster Mitigation (PDM) grant program	FEMA	Supports pre-disaster mitigation plans and projects.	Available on an annual basis as a nationally competitive grant. Grant award based on specific projects as they are identified (no more than $3M federal share for projects).
	Flood Mitigation Assistance (FMA) grant program	FEMA	Mitigates repetitively flooded structures and infrastructure.	Available on an annual basis, distributed to California communities by the California Governor's Office of Emergency Services (Cal OES). Grant award based on specific projects as they are identified.
	Assistance to Firefighters Grant (AFG) Program	FEMA/USFA (U.S. Fire Administration)	Provides equipment, protective gear, emergency vehicles, training, and other resources needed to protect the public and emergency personnel from fire and related hazards.	Available to fire departments and nonaffiliated emergency medical services providers. Grant awards based on specific projects as they are identified.
	Community Block Grant Program Entitlement Communities Grants	U.S. HUD (U.S. Department of Housing and Urban Development)	Acquisition of real property, relocation and demolition, rehabilitation of residential and non-residential structures, construction of public facilities and improvements, such as water and sewer facilities, streets, neighborhood centers, and the conversion of school buildings for eligible purposes.	Available to entitled cities. Grant award based on specific projects as they are identified.

Table G-4. ACFD, Financial Resources for Hazard Mitigation

Type	Subtype	Administrator	Purpose	Amount
	Community Action for a Renewed Environment (CARE)	U.S. Environmental Protection Agency (EPA)	Through financial and technical assistance offers an innovative way for a community to organize and take action to reduce toxic pollution (i.e., stormwater) in its local environment. Through CARE, a community creates a partnership that implements solutions to reduce releases of toxic pollutants and minimize people's exposure to them.	Competitive grant program. Grant award based on specific projects as they are identified.
	Homeland Security Preparedness Technical Assistance Program (HSPTAP)	FEMA/DHS	Build and sustain preparedness technical assistance activities in support of the four homeland security mission areas (prevention, protection, response, recovery) and homeland security program management.	Technical assistance services developed and delivered to state and local homeland security personnel. Grant award based on specific projects as they are identified.

Table G-5. ACFD, Legal and Regulatory Resources for Hazard Mitigation

Regulatory Tool	Name	Description (Effect on Hazard Mitigation)	Hazards Addressed	Mitigation, Preparedness, Response, or Recovery	Affects Development in Hazard Areas?
Plans	Department Operations Guide	Describes what the special district's actions will be during a response to an emergency. Includes annexes that describe in more detail the actions required of the local jurisdiction's departments/agencies. Further, this plan describes the role of the Emergency Operation Center (EOC) and the coordination that occurs between the EOC and the local jurisdiction's departments and other response agencies.	All-Hazard	Preparedness Response	No
Policies	**Alameda County Policies**				
	Title 6 – Health and Safety, Chapter 6.04 – Alameda County Fire Code	Forms the basis of the County's fire prevention standards.	Fire	Mitigation & Preparedness	Yes
	State and Policies				
	Alquist-Priolo Earthquake Fault Zoning Act	Main purpose is to prevent 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.	Earthquake	Mitigation	Yes
	Seismic Hazards Mapping Act	Addresses non-surface fault rupture earthquake hazards, including liquefaction and seismically induced landslides. Requires the California Geological Survey (CGS) 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.	Earthquake	Mitigation	Yes

Table G-5. ACFD, Legal and Regulatory Resources for Hazard Mitigation

Regulatory Tool	Name	Description (Effect on Hazard Mitigation)	Hazards Addressed	Mitigation, Preparedness, Response, or Recovery	Affects Development in Hazard Areas?
Policies (cont.)	California Environmental Quality Act (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"	All	Mitigation	Yes

Table G-6. ACFD, Current and Completed Hazard Mitigation Projects and Programs

Status (Current or Complete)	Project / Program Name	Description	Year(s)
Ongoing study of conditions and long-term plan development for 7 fire stations.	Study of Station 6, 7, 8, 23, 24, and 25.	County Capital Improvement Plan (CIP) anticipates replacement or renovation based on criteria under development.	FY 2015-2016
Replacement of one fire station is underway	Fire Station #22	New construction project started in September 2015 and due to be complete approximately early 2017.	FY 2015-2016 FY 2016-2017
Ongoing (Citizen Emergency Response Teams (CERT) training has been recently expanded and offered in English and Spanish. Get Ready 5th Grade – elementary school preparedness training via 5th grade as a way to reach students / families in Alameda County. It is currently offered in English, Spanish, and Cantonese. Personal Emergency Preparedness – This has recently been expanded and is offered in English and Spanish.)	Conduct training for Community Emergency Response Teams (CERT) through partnerships with local community groups.	CERT program established in 2007, additional funding needed for on-going training.	Ongoing

Table G-7. ACFD, Potential Mitigation Actions

No.	Description	Hazard	Mitigation Category	Floodplain Management Activity	New or Existing Construction
1	Develop and implement a methodology to systematically assess all hazards outlined in this Plan (including, but not limited to sea level rise, seismic risk, flood risk, protective design) and climate impacts (such as access to public transit) in considering building acquisitions and sales, portfolio planning, major retrofits, capital improvement planning, and master planning for County owned and leased facilities.	All	Local Plans and Regulations	Preventive	New/Existing
2	Continue the County's effort to enhance pre-disaster planning through development of plans such as Continuity of Government (COG) and Continuity of Operations (COOP) Plans, Department Operation Center Plans, and Emergency Public Information Plans.	All	Local Plans and Regulations	Preventive	Not Applicable
3	Educate Community Based Organizations and other agencies that support vulnerable populations about personal preparedness and Continuity of Operation Planning to ensure these organizations continue to serve their constituents in disasters. This will reduce the health impacts for vulnerable populations, such as seniors, those with physical and/or development disabilities, and the visual or hearing impaired.	All	Education and Awareness	Public Information	Not Applicable
4	Continue to support Medical Counter Measures operational and logistics plans for optimal use in Public Health Emergencies; includes strengthening the capability to respond to emerging infectious disease through detection and surveillance and disease containment, i.e. community mitigation strategies and post exposure prophylaxis.	All	Local Plans and Regulations	Preventive	Not Applicable
5	Develop a comprehensive energy policy for adoption by the County Board of Supervisors that sets energy efficiency and renewables as a priority, requires the development of design standards, and requires development of a strategic implementation plan for County owned, constructed and leased facilities.	Climate Change	Local Plans and Regulations	Preventive	New/Existing
6	Restore habitat and improve flood protection for low-lying areas by employing innovative techniques such as constructing levees coupled with gently sloping tidal marshes to help protect from storm wave action and tidal surge.	Climate Change	Natural Systems Protection	Natural Resource Protection	New/Existing

Table G-7. ACFD, Potential Mitigation Actions

No.	Description	Hazard	Mitigation Category	Floodplain Management Activity	New or Existing Construction
7	Leverage the County's existing communication channels and Board of Supervisor policies across the agencies to educate the public, schools, other jurisdictions, professional associations, and businesses and industry about reducing global warming pollution and how to prepare for inevitable climate changes.	Climate Change	Education and Awareness	Public Information	Not Applicable
8	Update the County's green building policies and practices to ensure the use of the latest environmental standards for materials and systems as well as prioritizing energy efficiency and renewable in all owned and leased facilities, new construction, and renovations.	Climate Change	Local Plans and Regulations	Preventive and Structural Projects	New/Existing
9	Update the County's green building policies to ensure the use of the latest environmental standards for materials and systems as well as prioritizing energy efficiency and renewable in new construction, and renovations of private facilities.	Climate Change	Local Plans and Regulations	Preventive and Structural Projects	New/Existing
10	Restore and protect the ability of natural ecosystems to capture and store carbon.	Climate Change	Natural Systems Protection	Preventive and Natural Resource Protection	New/Existing
11	Develop and implement a system to monitor and analyze building usage of utilities (electricity, natural gas, water) to provide timely and actionable information for operations staff to reduce the County's use of resources and operational costs.	Climate Change	Structure and Infrastructure Projects	Preventive	New/Existing
12	Develop an outreach program to educate property owners about the adjustments in flood zones due to levees, many property owners may be removed from a flood zone due to a levee. Continue the public outreach program that informs property owners located in the dam failure inundation areas about voluntary flood insurance.	Dam and Levee Failure Inundation	Education and Awareness	Public Information	Existing
13	Look into potentially vulnerable public and private utility systems including sanitation/sewer, and fuel pumping stations. Set up a lifelines council to discuss and address the importance of ensuring the operation and timely restoration of essential systems to reasonable levels of service after a disaster.	Earthquake	Education and Awareness	Emergency Services and Public Information	New/Existing

Table G-7. ACFD, Potential Mitigation Actions

No.	Description	Hazard	Mitigation Category	Floodplain Management Activity	New or Existing Construction
14	Identify, retrofit, upgrade, or replace deficient or vulnerable government facilities.	Earthquake	Structure and Infrastructure Projects	Property Protection and Structural Projects	Existing
15	Seismically retrofit or replace County and local ramps and bridges that are categorized as structurally deficient by Caltrans, are located in an high ground shaking areas, and/or are necessary for first responders to use during and/or immediate after a disaster or emergency.	Earthquake	Structure and Infrastructure Projects	Emergency Services and Structural Projects	Existing
16	Develop and implement plans to increase the building owner's general knowledge of and appreciation for the value of seismic upgrading of the building's structural and nonstructural elements.	Earthquake	Local Plans and Regulations & Awareness and Education	Public Information	Existing
17	Increase participation in the NFIP by maintaining the Community Rating System program which through enhanced floodplain management activities would allow property owners to receive a discount on their flood insurance.	Flood	All	Public Information and Property Protection	New/Existing (structures located within the 100-year floodplain)
18	Reinforce roads/bridges from flooding through protection activities, including elevating the roads/bridges and installing/widening culverts beneath the roads/bridges or upgrading storm drains.	Flood	Structure and Infrastructure Projects	Structural Projects	Existing
19	Continue to repair and make structural improvements to storm drains, pipelines and/or channels to enable them to perform to their design capacity in handling water flows.	Flood	Structure and Infrastructure Projects, Natural Systems Protection	Structural Projects	Existing
20	Implement landslide stabilization and/or protection measures. Stabilization measures include grading the unstable portion of the slope to a lower gradient, construction of rock buttresses and retaining walls, and drainage improvements. Protection measures include containment and/or diversion of the moving debris, such as walls, berms, ditches and catchment basins.	Landslide	Structure and Infrastructure Projects, Natural Systems Protection	Natural Resource Protection and Structural Projects	New/Existing

Table G-7. ACFD, Potential Mitigation Actions

No.	Description	Hazard	Mitigation Category	Floodplain Management Activity	New or Existing Construction
21	Look into becoming a National Weather Service TsunamiReady community.	Tsunami	Awareness and Education	Emergency Services and Public Information	Not Applicable
22	County staff in conjunction with State Agencies will continue to support vegetation management strategies and programs to address the changing vegetation management needs within the County	Wildfire	Natural Systems Protection	Preventive and Natural Resource Protection	New/Existing
23	Encourage farmers to cultivate and maintain a variety of crops in rural areas to increase agricultural diversity and crop-resiliency.	Climate Change	Natural Systems Protection	Natural Resource Protection	Not Applicable
24	Establish and implement 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.	Flood	Natural Systems Protection	Preventive and Natural Resource Protection	New/Existing

Table G-8. ACFD, Mitigation Action Plan

No.	Description	Facility to be Mitigated (if Known and/or Applicable)	Funding Source	Department or Agency	Timeframe (0-5 Years)
16	Develop and implement plans to increase the building owner's general knowledge of and appreciation for the value of seismic upgrading of the building's structural and nonstructural elements.	Retrofit FS 6, 7, 25; Replace FS 8, 22, 23, 26;	PDM, Assistance to Fire Fighters	GSA-TSD, with ACFD as client agency	FS 23 replacement to be complete by Fall 2016. Other projects will be untaken as funding becomes available.
22	County staff in conjunction with State Agencies will continue to support vegetation management strategies and programs to address the changing vegetation management needs within the County	Not Applicable	HMGP, PDM, Assistance to Fire Fighters	ACFD	Ongoing

HMGP = Hazard Mitigation Grant Program

PDM = Pre-Disaster Mitigation grant program

The Hazard Mitigation Assistance (HMA) Program requirements were used to guide choice of mitigation actions:

- Mitigation Planning
- Technical Feasibility and Effectiveness
- Floodplain Management and Protection of Wetlands
- Environmental Planning and Historic Review and Compliance
- Cost Effectiveness
- Cost Review
- General Program Requirements

Appendix H

Alameda County Flood Control & Water Conservation District (ACFC&WCD) – Risk Assessment Tables

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Table H-1. ACFC&WCD, Total Critical Facilities and Infrastructure, is not included in this redacted version of the plan.

If you are interested in these tables, please contact Michael Cadrecha, Alameda County GSA-TSD (michael.cadrecha@acgov.org or (510) 208-9589).

Table H-2. ACFC&WCD, Summary of Impacts for Critical Facilities and Infrastructure

Hazard	No. of Critical Facilities and Infrastructure*	% of Critical Facilities and Infrastructure*
Dam Failure Inundation	38	62.30%
Earthquake Ground Shaking - Strong	0	0.00%
Earthquake Ground Shaking - Very Strong	19	31.15%
Earthquake Ground Shaking - Violent	52	85.25%
Flood - 100 Year	37	60.66%
Flood - 500 Year	27	44.26%
Sea Level Rise - 3ft.	25	40.98%
Sea Level Rise - 6ft.	41	67.21%
Landslide Susceptibility - Flatland	58	95.08%
Landslide Susceptibility - Few Landslides	10	16.39%
Landslide Susceptibility - Mostly Landslides	0	0.00%
Liquefaction - Moderate	45	73.77%
Liquefaction - High	7	11.48%
Liquefaction - Very High	27	44.26%
Tsunami Inundation	22	36.07%
Wildfire - Moderate	10	16.39%
Wildfire - High	21	34.43%
Wildfire - Very High	0	0.00%

*The ACFC&WCD's list of Critical Facilities and Infrastructure includes flood control channels, which are not a single location. Therefore, many of the flood control channels cross more than one category of a hazard (i.e. a part of a flood control channel can be in very strong shaking and another part can be in violent shaking). In those cases the flood control channel was counted in both categories.

Table H-3. ACFC&WCD, Human and Technical Resources for Hazard Mitigation

Staff/Personnel Resources	Department or Agency	Principal Activities Related to Hazard Mitigation
Engineer(s), Building Inspectors/Code Enforcement Officers or other professional(s) and technical staff trained in construction requirements and practices related to existing and new buildings. Engineer(s), project manager(s), technical staff, equipment operators, and maintenance. Floodplain Administrator Geographic information systems (GIS) staff	Public Works Agency/Alameda County Flood Control District	Oversees the effective, efficient, fair, and safe enforcement of the California Building Code. Maintains and operates of a wide range of local equipment and facilities as well as providing assistance to members of the public. These include providing sufficient clean fresh water, reliable sewer services, street maintenance, storm drainage systems, street cleaning, street lights and traffic signals. Reviews and ensures that new development proposals do not increase flood risk, and that new developments are not located below the 100 year flood level. In addition, the Floodplain Administrator is responsible for planning and managing flood risk reduction projects throughout the local jurisdiction or tribal area. GIS capabilities apply to data management, such as information on the location and nature of interested facilities and infrastructures, and hazards.

Table H-4. ACFC&WCD, Financial Resources for Hazard Mitigation

Type	Subtype	Administrator	Purpose	Amount
Local	General Fund WPD/Property Tax, Land Development fees	WPD Director	Program operations and specific projects. IWPP/CIP	Variable.
Federal	Hazard Mitigation Grant Program (HMGP)	Federal Emergency Management Agency (FEMA)	Supports pre- and post-disaster mitigation plans and projects.	Available to California communities after a Presidentially declared disaster has occurred in California. Grant award based on specific projects as they are identified by eligible applicants.
	Pre-Disaster Mitigation (PDM) grant program	FEMA	Supports pre-disaster mitigation plans and projects.	Available on an annual basis as a nationally competitive grant. Grant award based on specific projects as they are identified (no more than $3M federal share for projects).
	Flood Mitigation Assistance (FMA) grant program	FEMA	Mitigates repetitively flooded structures and infrastructure.	Available on an annual basis, distributed to California communities by the California Governor's Office of Emergency Services (Cal OES). Grant award based on specific projects as they are identified.
	Clean Water State Revolving Fund (CWSRF)	EPA	The CWSRF is a loan program that provides low-cost financing to eligible entities within state and tribal lands for water quality projects, including all types of non-point source, watershed protection or restoration, estuary management projects, and more traditional municipal wastewater treatment projects.	CWSRF programs provided more than $5 billion annually to fund water quality protection projects for wastewater treatment, non-point source pollution control, and watershed and estuary management.
	Homeland Security Preparedness Technical Assistance Program (HSPTAP)	FEMA/DHS	Build and sustain preparedness technical assistance activities in support of the four homeland security mission areas (prevention, protection, response, recovery) and homeland security program management.	Technical assistance services developed and delivered to state and local homeland security personnel. Grant award based on specific projects as they are identified.

Table H-5. ACFC&WCD, Legal and Regulatory Resources for Hazard Mitigation

Regulatory Tool	Name	Description (Effect on Hazard Mitigation)	Hazards Addressed	Mitigation, Preparedness, Response, or Recovery	Affects Development in Hazard Areas?
	Alameda County Policies				
Policies	Title 2 – Administration, Chapter 2.46 – Public Works Department (Administrative Code)	Describes the authorized duties of the flood control and water district director.	Flood	Mitigation, Preparedness & Recovery	Yes
	Title 6 - Health and Safety, Chapter 6.36 – Flood Control and Water Conservation District Use Regulations	Regulations of the Flood Control and Water Conservation District	Flood	Mitigation & Preparedness	Yes
	Title 13 – Public Services, Chapter 13.12 - Watercourse Protection Ordinance	To safeguard and preserve watercourses, protect lives and property, prevent damage due to flooding, protect drainage facilities, control erosion and sedimentation, restrict discharge of polluted materials and enhance recreational and beneficial uses of watercourses.	Flood	Mitigation & Preparedness	Yes
	Title 15 – Buildings and Construction, Chapter 15.36 – Grading Erosion and Sediment Control	Regulating grading work on private property within the unincorporated area of the county in order to safeguard life, limb, health, property, and public welfare; to protect creeks, watercourses, and other drainage facilities from illicit discharges of surface runoff generated in or draining through the permit work area; and to ensure that the construction and eventual use of a graded site is in accordance with the county general plan, any applicable specific plan, and all applicable county ordinances, including the stormwater management and discharge ordinance.	Earthquake and Flood	Mitigation & Preparedness	Yes
	State and Federal Policies				
	California Code of Regulations: 17 CA ADC § 1276	Standards for State aid for local health administration.	Public Health	Preparedness	No

Table H-5. ACFC&WCD, Legal and Regulatory Resources for Hazard Mitigation

Regulatory Tool	Name	Description (Effect on Hazard Mitigation)	Hazards Addressed	Mitigation, Preparedness, Response, or Recovery	Affects Development in Hazard Areas?
Policies (cont.)	Alquist-Priolo Earthquake Fault Zoning Act	Main purpose is to prevent 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.	Earthquake	Mitigation	Yes
	Seismic Hazards Mapping Act	Addresses non-surface fault rupture earthquake hazards, including liquefaction and seismically induced landslides. Requires the California Geological Survey (CGS) 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.	Earthquake	Mitigation	Yes
	California Environmental Quality Act (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"	All	Mitigation	Yes
	California Water Code – Division 3 – Dams and Reservoirs	Entrusts this regulatory power to the Department of Water Resources which delegates the program to the Division of Safety of Dams (DSOD); the DSOD's mission is to protect people against loss of life and property from dam failure. The DSOD, under the police power of the state, shall supervise the construction, enlargement, alteration, repair, maintenance, operation, and removal of dams and reservoirs for the protection of life and property as provided in this part.	Dam Failure	Mitigation, Preparedness, Response and Recovery	Yes

Table H-5. ACFC&WCD, Legal and Regulatory Resources for Hazard Mitigation

Regulatory Tool	Name	Description (Effect on Hazard Mitigation)	Hazards Addressed	Mitigation, Preparedness, Response, or Recovery	Affects Development in Hazard Areas?
Policies (cont.)	USACE Disaster Operations (Public Law 84-99) - Flood Control and Coastal Emergency Act	Chief of Engineers, acting for the Secretary of the Army, is authorized to undertake activities including disaster preparedness, Advance Measures, emergency operations (Flood Response and Post Flood Response), rehabilitation of flood control works threatened or destroyed by flood, protection or repair of federally authorized shore protective works threatened or damaged by coastal storm, and provisions of emergency water due to drought or contaminated source.	Flood	Preparedness, Response and Recovery	No

Table H-6. ACFC&WCD, Current and Completed Hazard Mitigation Projects and Programs

Status (Current or Complete)	Project / Program Name	Description	Year(s)
Not Completed – Due to lack of funding	Don Castro reservoir dam & outlet modification.	Preliminary studies indicate that the modifications will help reduce sedimentation of the reservoir and reduce peak flows to areas downstream of the dam.	NA
Not Completed – Due to lack of funding (preliminary floodwall limits have been identified, but no further progress to do lack of funding)	San Lorenzo Creek floodwall.	A detailed engineering study is underway to determine the locations and extent of proposed floodwalls to contain the 1% chance flows in San Lorenzo Creek.	NA
Current District has identified a more cost effective design to address California Department of Water Resources Division of Safety of Dams' seismic stability concern. The project is in 90% PS&E phases waiting on environmental permits. Project is tentatively scheduled for construction Spring/Summer 2016.	Cull Creek Dam Retrofit/Upgrade Project	Seismic study has concluded that Cull Creek Dam is seismically unstable. In addition, the flood storage capacity of the reservoir behind the dam is significantly reduced due to sedimentation. PWA-FCD is exploring options to address both seismic and siltation problems.	NA

Table H-7. ACFC&WCD, Potential Mitigation Actions

No.	Description	Hazard	Mitigation Category	Floodplain Management Activity	New or Existing Construction
1	Develop and implement a methodology to systematically assess all hazards outlined in this Plan (including, but not limited to sea level rise, seismic risk, flood risk, protective design) and climate impacts (such as access to public transit) in considering building acquisitions and sales, portfolio planning, major retrofits, capital improvement planning, and master planning for County owned and leased facilities.	All	Local Plans and Regulations	Preventive	New/Existing
2	Continue the County's effort to enhance pre-disaster planning through development of plans such as Continuity of Government (COG) and Continuity of Operations (COOP) Plans, Department Operation Center Plans, and Emergency Public Information Plans.	All	Local Plans and Regulations	Preventive	Not Applicable
3	Educate Community Based Organizations and other agencies that support vulnerable populations about personal preparedness and Continuity of Operation Planning to ensure these organizations continue to serve their constituents in disasters. This will reduce the health impacts for vulnerable populations, such as seniors, those with physical and/or development disabilities, and the visual or hearing impaired.	All	Education and Awareness	Public Information	Not Applicable
4	Continue to support Medical Counter Measures operational and logistics plans for optimal use in Public Health Emergencies; includes strengthening the capability to respond to emerging infectious disease through detection and surveillance and disease containment, i.e. community mitigation strategies and post exposure prophylaxis.	All	Local Plans and Regulations	Preventive	Not Applicable
5	Develop a comprehensive energy policy for adoption by the County Board of Supervisors that sets energy efficiency and renewables as a priority, requires the development of design standards, and requires development of a strategic implementation plan for County owned, constructed and leased facilities.	Climate Change	Local Plans and Regulations	Preventive	New/Existing
6	Restore habitat and improve flood protection for low-lying areas by employing innovative techniques such as constructing levees coupled with gently sloping tidal marshes to help protect from storm wave action and tidal surge.	Climate Change	Natural Systems Protection	Natural Resource Protection	New/Existing

Table H-7. ACFC&WCD, Potential Mitigation Actions

No.	Description	Hazard	Mitigation Category	Floodplain Management Activity	New or Existing Construction
7	Leverage the County's existing communication channels and Board of Supervisor policies across the agencies to educate the public, schools, other jurisdictions, professional associations, and businesses and industry about reducing global warming pollution and how to prepare for inevitable climate changes.	Climate Change	Education and Awareness	Public Information	Not Applicable
8	Update the County's green building policies and practices to ensure the use of the latest environmental standards for materials and systems as well as prioritizing energy efficiency and renewable in all owned and leased facilities, new construction, and renovations.	Climate Change	Local Plans and Regulations	Preventive and Structural Projects	New/Existing
9	Update the County's green building policies to ensure the use of the latest environmental standards for materials and systems as well as prioritizing energy efficiency and renewable in new construction, and renovations of private facilities.	Climate Change	Local Plans and Regulations	Preventive and Structural Projects	New/Existing
10	Restore and protect the ability of natural ecosystems to capture and store carbon.	Climate Change	Natural Systems Protection	Preventive and Natural Resource Protection	New/Existing
11	Develop and implement a system to monitor and analyze building usage of utilities (electricity, natural gas, water) to provide timely and actionable information for operations staff to reduce the County's use of resources and operational costs.	Climate Change	Structure and Infrastructure Projects	Preventive	New/Existing
12	Develop an outreach program to educate property owners about the adjustments in flood zones due to levees, many property owners may be removed from a flood zone due to a levee. Continue the public outreach program that informs property owners located in the dam failure inundation areas about voluntary flood insurance.	Dam and Levee Failure Inundation	Education and Awareness	Public Information	Existing
13	Look into potentially vulnerable public and private utility systems including sanitation/sewer, and fuel pumping stations. Set up a lifelines council to discuss and address the importance of ensuring the operation and timely restoration of essential systems to reasonable levels of service after a disaster.	Earthquake	Education and Awareness	Emergency Services and Public Information	New/Existing

Table H-7. ACFC&WCD, Potential Mitigation Actions

No.	Description	Hazard	Mitigation Category	Floodplain Management Activity	New or Existing Construction
14	Identify, retrofit, upgrade, or replace deficient or vulnerable government facilities.	Earthquake	Structure and Infrastructure Projects	Property Protection and Structural Projects	Existing
15	Seismically retrofit or replace County and local ramps and bridges that are categorized as structurally deficient by Caltrans, are located in an high ground shaking areas, and/or are necessary for first responders to use during and/or immediate after a disaster or emergency.	Earthquake	Structure and Infrastructure Projects	Emergency Services and Structural Projects	Existing
16	Develop and implement plans to increase the building owner's general knowledge of and appreciation for the value of seismic upgrading of the building's structural and nonstructural elements.	Earthquake	Local Plans and Regulations & Awareness and Education	Public Information	Existing
17	Increase participation in the NFIP by maintaining the Community Rating System program which through enhanced floodplain management activities would allow property owners to receive a discount on their flood insurance.	Flood	All	Public Information and Property Protection	New/Existing (structures located within the 100-year floodplain)
18	Reinforce roads/bridges from flooding through protection activities, including elevating the roads/bridges and installing/widening culverts beneath the roads/bridges or upgrading storm drains.	Flood	Structure and Infrastructure Projects	Structural Projects	Existing
19	Continue to repair and make structural improvements to storm drains, pipelines and/or channels to enable them to perform to their design capacity in handling water flows.	Flood	Structure and Infrastructure Projects, Natural Systems Protection	Structural Projects	Existing
20	Implement landslide stabilization and/or protection measures. Stabilization measures include grading the unstable portion of the slope to a lower gradient, construction of rock buttresses and retaining walls, and drainage improvements. Protection measures include containment and/or diversion of the moving debris, such as walls, berms, ditches and catchment basins.	Landslide	Structure and Infrastructure Projects, Natural Systems Protection	Natural Resource Protection and Structural Projects	New/Existing

Table H-7. ACFC&WCD, Potential Mitigation Actions

No.	Description	Hazard	Mitigation Category	Floodplain Management Activity	New or Existing Construction
21	Look into becoming a National Weather Service TsunamiReady community.	Tsunami	Awareness and Education	Emergency Services and Public Information	Not Applicable
22	County staff in conjunction with State Agencies will continue to support vegetation management strategies and programs to address the changing vegetation management needs within the County	Wildfire	Natural Systems Protection	Preventive and Natural Resource Protection	New/Existing
23	Encourage farmers to cultivate and maintain a variety of crops in rural areas to increase agricultural diversity and crop-resiliency.	Climate Change	Natural Systems Protection	Natural Resource Protection	Not Applicable
24	Establish and implement 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.	Flood	Natural Systems Protection	Preventive and Natural Resource Protection	New/Existing
25	Zone 12 Drainage Study to identify potential deficiencies in various open channels and underground flood control drainage facilities	Flood	Structure and Infrastructure Projects	Structural Projects	Existing
26	Zone 5 Drainage Study to identify potential deficiencies in various flood control open channels	Flood	Structure and Infrastructure Projects	Structural Projects	Existing
27	Zone 6 Capacity Improvements	Flood	Structure and Infrastructure Projects	Structural Projects	Existing
28	Estudillo Canal Tidegate Structure Upgrade	Flood	Structure and Infrastructure Projects	Structural Projects	Existing
29	Estudillo Canal South Levee Lowering	Flood	Structure and Infrastructure Projects	Structural Projects	Existing

Table H-8. ACFC&WCD, Mitigation Action Plan

No.	Description	Facility to be Mitigated (if Known and/or Applicable)	Funding Source	Department or Agency	Timeframe (0-5 Years)
25	Zone 12 Drainage Study to identify potential deficiencies in various open channels and underground flood control drainage facilities	To be determined based on drainage study results	Zone 12	Flood Control District	4 years
26	Zone 5 Drainage Study to identify potential deficiencies in various flood control open channels	To be determined based on drainage study results	Zone 5/PDM	Flood Control District	5 years
27	Zone 6 Capacity Improvements	Phase 1A, Line E at I-880 Freeway crossing	Zone 6	Flood Control District	2 years
		Phase 1A, Line E between Grimmer Blvd. and Auto Mall Parkway	Zone 6/PDM	Flood Control District	3 years
		Phase 1A, Line E at Auto Mall Parkway crossing	Zone 6/PDM	Flood Control District	4 years
		Phase 1A, Line E at Fremont Blvd. crossing	Zone 6/PDM	Flood Control District	5 years
		Phase 1B, Line E at Cushing Parkway crossing	Zone 6	Flood Control District	2 years
		Phase 1B, Line E between I-880 Freeway and 850' upstream of 850'	Zone 6/PDM	Flood Control District	4 years
28	Estudillo Canal Tidegate Structure Upgrade	Tidegate Structure near San Francisco Bay	Zone 2A/State Department of Water Resources	Flood Control District	2 Years

Table H-8. ACFC&WCD, Mitigation Action Plan

No.	Description	Facility to be Mitigated (if Known and/or Applicable)	Funding Source	Department or Agency	Timeframe (0-5 Years)
29	Estudillo Canal South Levee Lowering	South Levee downstream of UPRR	Zone 2/State Department of Water Resources	Flood Control District	3 Years

PDM = Pre-Disaster Mitigation grant program

The Hazard Mitigation Assistance (HMA) Program requirements were used to guide choice of mitigation actions:

- Mitigation Planning
- Technical Feasibility and Effectiveness
- Floodplain Management and Protection of Wetlands
- Environmental Planning and Historic Review and Compliance
- Cost Effectiveness
- Cost Review
- General Program Requirements

Appendix I

Plan Maintenance

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2016 Alameda County LHMP - Annual Review Questionnaire				
LHMP Section	**Questions**	**Yes**	**No**	**Comments**
PLANNING PROCESS	Are there internal or external organizations and agencies that have been invaluable to the plan update process or to implementing a mitigation project?			
	Are there procedures (e.g., meeting announcements, plan updates) that can be done differently or more efficiently?			
	Has the LHMP Planning Team undertaken any public outreach activities regarding the LHMP or a mitigation project?			
HAZARD ANALYSIS	Has any natural and/or human-caused disaster occurred in this reporting period?			
	Are there any natural and/or human-caused hazards that have not been addressed in this LHMP and should be?			
	Are new maps, reports, or studies available? If so, what are they and what have they revealed?			
VULNERABILITY ANALYSIS	Do any new assets need to be included?			
	Have there been changes in development trends that could create additional risks?			
CAPABILITY ASSESSMENT	Are there different or additional resources (financial, technical, and human) that are now available for mitigation planning?			
MITIGATION STRATEGY	Should new mitigation actions be added? Should any existing mitigation actions be deleted?			

2016 Alameda County LHMP - Mitigation Project Progress Report (Page 1)			
Progress Report Period From (date):		**To (date):**	
Project Title:			
Project ID:			
Description of Project:			
Implementing Agency:			
Supporting Agencies:			
Contact Name:			
Contact E-mail:			
Contact Number:			
Grant/Finance Administrator:			
Total Project Cost:			
Anticipated Cost Overun/Underrun:			
Date of Project Approval:			
Project Start Date:			
Anticipated Completion Date:			
Summary of Progress of Project for this Reporting Period			
1. What was accomplished during this reporting period?			
2. What obstacles, problems, or delays did the project encounter, if any?			
3. How were the problems resolved?			

2016 Alameda County LHMP - Mitigation Project Progress Report (Page 2)		
Milestones	**Complete**	**Project Date of Completion**

Plan Goal(s) Addressed:	
Goal:	
Indicator of Success:	

Project Status		**Project Cost Status**	
☐	Project on Schedule	☐	Cost Unchanged
☐	Project Completed	☐	Cost Overrun*
☐	Project Delayed*	*explain:	
*explain:		☐	Cost Underrun*
☐	Project Canceled	*explain:	

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