# City of Albany
## Local Hazard Mitigation Plan

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Part I: The Planning Process

Albany aims to be a resilient community that can survive, recover from, and thrive after a disaster, while maintaining its unique character and way of life. Albany envisions a community in which the people, buildings, and infrastructure, in and serving Albany, are resilient to disasters; City government provides critical services in the immediate aftermath of a devastating event of any kind; and basic government and commercial functions resume within soon after a significant event. For many years, the City has pursued initiatives to identify and mitigate Albany’s hazard vulnerabilities. This plan identifies three disaster mitigation approaches to increase Albany’s resilience:

1. The City will evaluate and strengthen all City-owned structures, particularly those needed for critical services, to ensure that the community can be served adequately after a disaster.
2. The City will establish and maintain incentive programs and standards to encourage local residents and businesses to upgrade the hazard-resistance of their own properties.
3. The City will actively engage other local and regional groups to collaboratively work towards mitigation actions that help maintain Albany’s way of life and its ability to be fully functional after a disaster event.

This plan has four objectives for reducing disaster risk in Albany:

1. Reduce the potential for loss of life, injury and economic damage to Albany residents and businesses from earthquakes, wildfires, landslides, floods, tsunamis, climate change, and their secondary impacts.
2. Increase the ability of the City government to serve the community during and after hazard events by mitigating risk to key city functions such as response, recovery and rebuilding.
3. Protect Albany’s unique character and values from being compromised by hazard events.
4. Encourage mitigation activities to increase the disaster resilience of institutions, private companies and lifeline systems that are essential to Albany’s functioning.

Why Prepare This Plan?
Hazard Mitigation is defined as a way to reduce or alleviate the loss of life, personal injury, and property damage that can result from a disaster through long and short-term strategies. It involves strategies such as planning, programs, projects, and other activities that can mitigate the impacts of hazards. The responsibility for hazard mitigation lies with many, including private property owners; business and industry; and local, state, and
federal government.

The federal Disaster Mitigation Act (DMA) of 2000 (Public Law 106-390) requires state and local governments to develop hazard mitigation plans as a condition for federal disaster grant assistance. Prior to 2000, federal disaster funding focused on disaster relief and recovery, with limited funding for hazard mitigation planning. However, the DMA has increased the emphasis on planning for disasters before they occur.

The DMA encourages state and local authorities to work together on pre-disaster planning, and promotes sustainable practices as a form of disaster resistance. “Sustainable hazard mitigation” includes the sound management of natural resources and the recognition that hazards and mitigation must be understood in the largest possible social and economic context.

**Bay Area Response to the DMA**

The Association of Bay Area Governments (ABAG) is the official comprehensive planning agency for the San Francisco region. ABAG’s mission is to strengthen coordination among local governments in order to address social, environmental, and economic issues that transcend local borders. The Bay Area is defined as nine counties: Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, and Sonoma. The 101 cities and nine counties in the Bay Area are voluntary members of ABAG, representing nearly all of the region’s population.

**Purposes for Planning**

The City of Albany has been successful in past endeavors when it comes to proactive planning and program implementation. This success is enhanced through the development of a hazard mitigation plan. Elements and strategies in this plan were selected because they fulfill a program requirement and because they best meet the needs of citizens living within the borders of Albany. This hazard mitigation plan identifies resources, information, and strategies for reducing risk from natural hazards and will help guide and coordinate mitigation activities throughout the city. The plan was developed to meet the following objectives:

1. Meet or exceed requirements of the DMA
2. Enable the city to continue using federal grant funding to reduce risk through mitigation
3. Meet the needs of all state and federal requirements
4. Create a risk assessment that focuses on hazards of concern for the City of Albany
Who Will Benefit from this Plan?
All citizens and businesses of the City of Albany are the ultimate beneficiaries of this hazard mitigation plan. The plan reduces risk for those who live in, work in, and visit the City. It provides viable planning frameworks for all foreseeable natural hazards that may impact the City of Albany. Participation in development of the plan by key stakeholders in the City helped ensure that outcomes will be mutually beneficial. The resources and background information in the plan are applicable countywide, and the plan’s goals and recommendations can lay groundwork for the development and implementation of local mitigation activities and partnerships.

How to Use This Plan
Different from the Emergency Operations Plan, this Hazard Mitigation Plan is essential for the city of Albany when planning for future uncertainties and events. Though the effect of hazardous events cannot be eliminated or anticipated fully, this Hazard Mitigation Plan lays out the ways in which the City of Albany can further understand and reduce extreme consequences of potential hazards and disasters.

Plan Creation
This plan has been prepared by the City’s Community Development Department. The Community Development Department works closely with staff from other City departments including the Police Department and Fire Department on hazard mitigation strategies in a variety of contexts, including high level planning, special event management, and response to hazardous incidents. In addition, City staff has utilized guidance from ABAG, Governor’s Office of Emergency Services (CalOES) and FEMA. Plan preparation has consisted of community outreach, hazard and risk assessments, and the development of hazard mitigation goals. We also have reviewed plans prepared by neighboring communities for consistency.

Public Involvement
Broad public participation in the planning process helps ensure that diverse points of view about the City’s needs are considered and addressed. 44CFR requires that the public have opportunities to comment on disaster mitigation plans during drafting stages and prior to plan approval (Section 201.6.b.1). The Community Rating System expands on these requirements by making CRS credits available for optional public involvement activities.

During the planning process, an online survey was distributed to determine the community’s level of emergency preparedness and concern for potential hazards. The City of Albany Sustainability Committee, an advisory body with open public meetings, assisted with the preparation of the Local Hazard Mitigation Plan. The Committee reviewed the
initial planning process, provided input on community survey design, and reviewed survey results. The Local Hazard Mitigation Plan was brought to a City Council Work Session on October 2, 2017 for public comment. City Council meetings are amount the most widely publicized and attended communique-wide meeting.

Neighboring communities, local and regional agencies involved in hazard mitigation, agencies with authority to regulate development, businesses, academia, and other private and nonprofit interests were provided the opportunity to be involved in the planning of this document including Sustainability Committee meetings and providing feedback through the community survey.

**Guiding Principles, Goals and Objectives**

**Background**
44CFR requires hazard mitigation plans to identify goals for reducing long-term vulnerabilities to identified hazards (Section 201.6.c(3i)). The City of Albany has identified the following short and long-term mitigation strategies:

- Potential damage to existing buildings
- New growth and development in identified hazard areas
- Environmental impacts
- Pooling resources
- Reduction of repetitive losses
- Economic impact of hazard events

The mission statement, goals, objectives, and actions that are in this plan all support each other. The goals selected support the mission statement and the objectives selected meet multiple goals. Actions were prioritized based on the number of objectives met, often multiple.

**Mission Statement**
A mission statement provides vision for a process. It is not a goal because it does not describe a hazard mitigation outcome, and it is broader than a hazard-specific objective. The mission statement for the City of Albany Hazard Mitigation Plan as follows:

To reduce the vulnerability from natural hazards within the operational area in a cost-effective manner and within the capabilities of the partnership.

**Goals**
The following are the mitigation goals for this plan’s creation:

- **Goal 1**: Save (or protect) lives and reduce injury
- **Goal 2**: Increase resilience of infrastructure and critical facilities
- **Goal 3:** Avoid (minimize, or reduce) damage to property
- **Goal 4:** Encourage the development and implementation of long-term, cost-effective and environmentally sound mitigation projects
- **Goal 5:** Build and support capacity to enable local government and the public to prepare for, respond to and recover from the impact of natural hazards.

Achievement of these goals defines the effectiveness of a mitigation strategy.

### Objectives

The selected objectives meet multiple goals, as listed in Table 5-1. Therefore, the objectives serve as a stand-alone measurement of the effectiveness of a mitigation action, rather than as a subset of a goal. The objectives also are used to help establish priorities.

<table>
<thead>
<tr>
<th>Objective Number</th>
<th>Objective Statement</th>
<th>Goals for which it can be applied for</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Increase resilience of (or protect and maintain) infrastructure and critical facilities</td>
<td>2,3,5</td>
</tr>
<tr>
<td>2</td>
<td>Sustain reliable local emergency operations and facilities during and after a disaster</td>
<td>1,5</td>
</tr>
<tr>
<td>3</td>
<td>Educate the public on the risk from natural hazards and increase awareness, preparation mitigation, response, and recovery activities</td>
<td>1,3,5</td>
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<tr>
<td>4</td>
<td>Minimize the impacts of natural hazards on current and future land uses by providing incentives for hazard mitigation</td>
<td>1,3,5</td>
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<tr>
<td>5</td>
<td>Prevent (or discourage) new development in hazardous areas or ensure that if building occurs in high-risk areas that is done in a such a way as to minimize risk</td>
<td>1,3,5</td>
</tr>
<tr>
<td>6</td>
<td>At the government level, continually improve understanding of the location and potential impacts of natural hazards, utilizing the best available data and science</td>
<td>1,2,3,4,5</td>
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<tr>
<td>7</td>
<td>Ensure all structures meet minimum standards for life safety</td>
<td></td>
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<td></td>
<td>Plan Adoption</td>
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<td>-----------------------------------------------------------------------------</td>
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<td></td>
<td>Plan Adoption 8. Monitor plan progress annually to integrate other local</td>
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<td>hazard mitigation plans and the results of disaster-and hazard-specific</td>
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<td>planning efforts</td>
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<td>9</td>
<td>Lower cost of flood insurance premiums through CRS program</td>
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<td>10</td>
<td>Provide/improve flood protection with flood control structures. And</td>
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<td></td>
<td>drainage maintenance plans</td>
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<td>11</td>
<td>Strengthen codes, and their enforcement, so that new construction can</td>
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<td>withstand the impacts of natural hazards and lessen the impact of that</td>
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<td>development on the environment’s ability to absorb the impact of natural</td>
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<td></td>
<td>hazards</td>
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<td>12</td>
<td>Consider the impacts of natural hazards in all planning mechanisms that</td>
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<td></td>
<td>address current and future land uses within the City</td>
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<td>13</td>
<td>Eliminate or minimize disruption of local government operations caused by</td>
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<td></td>
<td>natural hazards</td>
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<td>14</td>
<td>Consider open space land uses within identified high-hazard risk zones</td>
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<td>15</td>
<td>Retrofit, acquire or relocate identified high risk structures, including</td>
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<td>those known to experience repetitive losses</td>
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<td>16</td>
<td>Establish a partnership among all levels of government and the business</td>
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<td>community to improve and implement methods to protect property.</td>
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### Plan Adoption

Section 201.6.c.5 of 44CFR requires documentation that a hazard mitigation plan has been formally adopted by the governing body of the jurisdiction requesting federal approval of the plan. The City of Albany will submit the following Hazard Mitigation Plan to City Council for comprehensive review before implementing the plan formally and requesting state of California approval.
Part II: Background

City Profile
The City of Albany, California is a small city of 18,565 situated in the northwestern corner of Alameda County in the San Francisco Bay Area. It is bordered to the south and east by Berkeley, to the north by the Contra Costa cities of El Cerrito and Richmond, and to the west by the San Francisco Bay. The City has a total area of 5.5 square miles (14 km²), of which 1.8 square miles (4.7 km²) is land and 3.7 square miles (9.6 km²) (67.28%) is water.

The City's motto, “Urban Village by the Bay,” illustrates its dense urban environment and small town ambiance. Albany is the 6th most densely populated city in the Bay Area, with 10,905 residents per square mile. With its traditional urban street grid and mixed use neighborhoods, Albany is also the 6th most walkable city in California, with a Walk Score of 82.

Albany is a mature, built-out city, with much of its development completed before the 1950s. Much of its character comes from the estimated 1,500 modest single family bungalows from the ‘20s and ‘30s, known colloquially as “MacGregors” for their creator,
Each one unique. Much of the housing built after 1950 has been multi-family housing, including University Village, a large UC Berkeley student family housing development comprising 15% of the city’s total housing stock, as well as several large condominium complexes located by the I-80 freeway that comprise an additional 11%. A little over half of Albany residents are renters.

Albany also has three commercial districts, including the charming pedestrian-oriented Solano Avenue shopping district. Both Solano and San Pablo Avenues offer a variety of restaurants, retail stores, as well as financial, legal, dental, and medical services. San Pablo Avenue hosts more auto-oriented businesses, including car dealerships and automotive services. Cleveland Avenue and Eastshore Highway, both situated along the I-80 corridor, have a mix of light industrial businesses and larger retail establishments.

The city of Albany is a full service municipal government, providing:

- Full-service police department with patrol, investigation, and administrative services
- All-risk fire department, including fire/rescue response, paramedic ambulance services, and hazardous materials response;
- Public works department managing sanitary sewer, storm drain, and public park maintenance and upgrades;
- Recreation and community services including adult programs, senior center, and teen center program, and
- Community Development Department providing land use, transportation, and environmental planning, and building code and code enforcement services.

City facilities include the Civic Center complex with City Hall, the Fire Station and the Police Station, a Community Center and Library, the Senior Center, and several childcare centers, and a new Public Works Maintenance Center, and various city parks and open spaces.

Other agencies with public service responsibility within the City of Albany include East Bay Municipal Utility District (EBMUD), which provide delivery of potable water and sewage treatment. Pacific Gas & Electric provide electricity and natural gas utility services. AT&T and Comcast provide communications utility services.

The Albany Unified School District provides K-12 education for Albany youth. The District operates one preschool, three elementary schools, one middle school, and one high school.

In addition to the School District and City facilities, Albany has several large governmental facilities including the USDA Western Research Center, a State-operated Orientation Center.
for the Blind, and a large tract of land owned by UC Berkeley which includes student housing, a new senior housing and retail development, and 104 acres of farmland for research.

Demographic Information on Residents
It has 7,401 households, out of which 2,909 (39.3%) had children under the age of 18 living in them. Albany is diverse in age, with a median age of 37. Albany is becoming more racially diverse, and in 2010 was 55% White, 31% Asian, 4% African American, 7% multi-racial, 10% Hispanic (of any race), and 3% other. Residents are well-educated (71.5% or residents over 25 are college graduates), and the median income is $72,479.

The 2010 Census reported that Albany's population was 18,539. As illustrated in Chart 2-1, the city’s population grew very rapidly between 1910 and 1950 and then declined during the 1950s and 60s. Since 1970, Albany has seen modest growth, with the greatest increase occurring between 2000 and 2010. Some of that growth is attributable to the reconstruction of University Village student family housing between 1999 and 2008 and some is due to an increase in average household size. By 2035, Albany is projecting a 10% increase in the number of households and a 17% increase in the number of jobs.

The median household income in Albany is estimated at $72,479, which is lower than the regional median of $92,300. Approximately 18 percent of Albany's households earn less than $25,000 a year, and another 17 percent earn between $25,000 and $50,000 a year. About 36 percent of the City's households have incomes exceeding $100,000 a year. According to the American Community Survey, almost one-third of the City’s homeowners and almost 48 percent of its renters spend more than 35 percent of their incomes on housing.

The median age in Albany has been increasing over the last 20 years. It was 36.3 in 2000 and 37.0 in 2010. The fastest growing age cohort in the city consists of “baby boomers” (persons born between 1946 and 1964). The number of Albany residents between 55 and 64 increased by 88 percent during 2000-2010 alone, growing from 1,204 in 2000 to 2,265 in 2010. The number of persons over 65 has remained stable, but it is expected to nearly double in the next 20 years based on projections from the Association of Bay Area Governments.

Albany has become more diverse in the past two decades. The 2010 Census indicated the City was 55 percent White, 31 percent Asian, 7 percent multi-racial, 4 percent African-American, and 3 percent Other. About 10 percent of Albany's residents were Hispanic. The percentage of Asian residents increased from 19 percent of the City’s population in 1990 to
31 percent in 2010. In 2010, nearly 40 percent of Albany’s residents spoke a language other than English at home.

The 2000 Census indicated that 13.3 percent of Albany’s population was living with a disability. The American Community Survey indicates that percentage is 7.2 percent today based on 2008-2012 sample data. However, this may be due to changes in methodology and definitions rather than a decrease in the number of disabled persons.

**Economic Background**

According to the most recent estimates from the Association of Bay Area Governments (ABAG), Albany has approximately 5,070 jobs. This equates to a ratio of 0.69 jobs for every household in the city compared to a regional average of about 1.30. The data suggests that Albany is a housing “reservoir” for surrounding communities. Nearby cities, such as Berkeley and Emeryville, have more jobs than households, and rely on Albany to some extent to meet their housing needs.

Approximately 67 percent of the City’s residents age 16 and over (roughly 9,800 residents) are considered to be in the labor force, and 9,500 residents are employed. In March 2015, the State Employment Development Department indicated that Albany had a 3.1 percent unemployment rate. This was the second lowest rate in Alameda County, which had a 4.8 percent unemployment rate. Only about 15 percent of Albany’s employed residents work within Albany --- 47 percent commute to another city in Alameda County and 37 percent commute to another county.

According to the most recent estimates from the Association of Bay Area Governments (ABAG), Albany has approximately 5,070 jobs. This equates to a ratio of 0.69 jobs for every household in the city compared to a regional average of about 1.30. Albany is home to several major employers and many small retail and service businesses. The largest employers include the Albany Unified School District, Target, the USDA Western Regional Research Center, and Golden Gate Fields racetrack. The San Pablo and Solano Avenue corridors include restaurants, car dealerships, automotive service businesses, general merchandise stores, appliance stores, and other retailers. These areas also include banks and financial service companies, medical offices, dental offices, legal services, personal services, and other locally oriented office buildings and storefront offices. The auto-oriented uses tend to be located along San Pablo Avenue, while Solano Avenue includes smaller buildings in a pedestrian-oriented shopping environment. Another cluster of commercial uses exists along the Eastshore Highway south of Buchanan Street, including the Target department store, an auto dealership, and several construction suppliers. The city has a relatively small number of industrial uses, generally located along Cleveland Avenue west of Interstate 80.
Part III: Potential Hazards & Risk Assessment

Risk Assessment Methodology and General Concepts

Risk assessment is the process of measuring the potential loss of life, personal injury, economic injury, and property damage resulting from natural hazards. It allows emergency management personnel to establish early response priorities by identifying potential hazards and vulnerable assets. The process focuses on the following elements:

- **Hazard identification**—Use all available information to determine what types of disasters may affect a jurisdiction, how often they can occur, and their potential severity.
- **Vulnerability identification**—Determine the impact of natural hazard events on the people, property, environment, economy and lands of the region.
- **Cost evaluation**—Estimate the cost of potential damage or cost that can be avoided by mitigation. The risk assessment for this hazard mitigation plan evaluates the risk of natural hazards prevalent in the city of Albany and meets requirements of the DMA (44CFR, Section 201.6(c)(2)).

Methodology

The risks associated with each hazard of concern identified for the city of Albany are described below. Each section describes the hazard, the City’s vulnerabilities, and probable event scenarios. The following steps were used to define the risk of each hazard:

- **Identify and profile each hazard**—The following information is given for each hazard:
  - Geographic areas most affected by the hazard
  - Event frequency estimates
  - Severity estimates
  - Warning time likely to be available for response
- **Assess the vulnerability of exposed facilities**—Vulnerability of exposed structures and infrastructure was determined by interpreting the probability of occurrence of each event and assessing structures, facilities, and systems that are exposed to each hazard.

Identified Hazards of Concern

The City of Albany considered the full range of natural hazards that could impact the City and then ranked the hazards that present the greatest concern based on previous incidents, as well as Sustainability Committee discussions and results from the community survey. The process incorporated review of the California State Enhanced Hazard Mitigation Plan and the ABAG Hazard Mitigation Plan. Also considered were local, state and federal information on the frequency, magnitude and costs associated with hazards that have
impacted or could impact the City. Based on the review, this plan addresses the following natural hazards of concern:

- Earthquake
- Flooding
- Landslide
- Severe Weather
- Wildfire

While DMA regulations do not require consideration of human-caused hazards, the City staff chose to include the following hazards in the plan based on the risk assessment and community survey results:

- Infrastructure Failure
- Hazardous Materials Release
- Public Health Epidemic
- Terrorism

**Critical Facilities and Infrastructure**

Critical facilities and infrastructure are those that are essential to the health and welfare of the population. These become especially important after a hazard event. Critical facilities typically include police and fire stations, schools and emergency operations centers. Critical infrastructure can include the roads and bridges that provide ingress and egress and allow emergency vehicles access to those in need, and the utilities that provide water, electricity and communication services to the community. Also included are “Tier II” facilities and railroads, which hold or carry significant amounts of hazardous materials with a potential to impact public health and welfare in a hazard event. During this update process, the Steering Committee chose to enhance the definition of critical facilities for the updated plan as follows:

Any facility, whether publicly or privately owned, which includes infrastructure that is vital to the City’s ability to provide essential services and protect life and property. Damage to such infrastructure that may cause a short or long-term loss of a critical facility would likely result in a severe economic, health and welfare, life-sustainment or other catastrophic impact. “Critical Facilities” can be segregated into three categories:

- Facilities that are essential to the ability to respond to, mitigate and recover from the impacts of natural hazards
- Facilities that need early warning to enable them to prepare for and respond to the impacts of natural hazards
• Facilities that by the nature of their operations, produce, manufacture or store materials that create an exposure to secondary hazards of concern.

Primary Facilities:
• Fire Station
• Police Station
• City Hall
• Emergency Operations Center (EOC)

Secondary Facilities:
• Community Center
• Public Works Center
• Senior Center
• Teen Center (masonic)
• City Child Care Centers (Ocean View & Memorial Parks)
• Albany High School
• Albany Middle School
• AUSD District offices
• Ocean View Elementary
• Cornell Elementary
• Marin Elementary
• AUSD Children’s Center (aka Vista School)
• St. Mary’s College High School
• Medical offices at 500 San Pablo
• Safeway
• Target
• CVS Pharmacy
• YMCA
• Orientation Center for the Blind
• USDA Laboratory
• University Village
• Veterans Building
• Multi-Family on Kains
• Multi-family on Adams
• Multi-family on Brighton
• Multi-family on Pierce
• Single family homes on Albany Hill
• Businesses on Solano

Further explanation:
• Police stations, fire stations, city/county government facilities (including those that house critical information technology and communication infrastructure), vehicle and equipment storage facilities, and emergency operations centers needed for disaster response before, during, and after hazard events
• Public and private utilities and infrastructure vital to maintaining or restoring normal services to areas damaged by hazard events. These facilities include but are not limited to:
  o Public and private water supply infrastructure, water and wastewater treatment facilities and infrastructure, potable water pumping, flow regulation, distribution and storage facilities and infrastructure
  o Public and private power generation (electrical and non-electrical), regulation and distribution facilities and infrastructure
  o Data and server communication facilities
Structures that manage or limit the impacts of natural hazards such as regional flood conveyance systems, potable water trunk main interconnect systems and redundant pipes crossing fault lines and reservoirs

- Major road and rail systems including bridges, airports and marine terminal facilities
- Educational facilities, including K-12 and community college.
- Community gathering places, such as libraries, community centers, senior centers, veteran's halls, and commercial recreation areas
- Hospitals, nursing homes, and housing likely to contain occupants who may not be sufficiently mobile to avoid death or injury during a hazard event
- Structures or facilities that produce, use, or store highly volatile, flammable, explosive, toxic, and/or water-reactive materials.

Hazards of Concern

Earthquake

Albany is located in the seismically active San Francisco Bay Area. In a report published in 2008, the US Geological Survey estimated that there was a 63 percent probability that a magnitude 6.7 or greater earthquake will occur in the Bay Area between 2008 and 2038. The Association of Bay Area Governments (ABAG) estimates a potential loss of 159,000 housing units in Bay Area communities after a large earthquake. This would have disastrous effects on local and regional economies. It also means that recovery, repair, and rebuilding time for each household would be very lengthy, due to the number of homes that would need repairs or replacement.

The entire population of the City of Albany is potentially exposed to direct and indirect impacts from earthquakes. The degree of exposure is dependent on many factors, including the age and construction type of the structures people live in, the soil type their homes are constructed on, etc. Whether directly or indirectly impacted, the entire population will have to deal with the consequences of earthquakes to some degree. Business interruption could keep people from working, school closures could further limit the ability of people to return to work and impact school calendars for month. Roadway damage and loss of utilities could affect populations that suffered no direct damage from an event itself.
Although there are no major earthquake faults in Albany, there are major earthquake faults sufficiently close to cause major damage:

- The Hayward Fault is located 1.6 miles east of the city and is the closest active fault to Albany. The last major earthquake on this fault was a Magnitude 6.8 event in 1868. The California Division of Mines and Geology considers this fault capable of producing a 7.1 earthquake.
- The San Andreas Fault is located approximately 17 miles west of the city and extends from the Mendocino coast south to Baja California. This fault system produced the catastrophic San Francisco earthquake of 1906 (magnitude 8.2) and was also associated with the Loma Prieta earthquake of 1989 (magnitude 7.1).
- The Calaveras Fault is located 17 miles southeast of the city and the Concord-Green Valley Fault is located 15 miles to the east. Both of these faults are capable of producing earthquakes of magnitude 6.8-6.9.

The underlying soil on which a building is constructed is part of the structural system that supports the building. Geotechnical analysis of soils is a standard requirement as part of the design of all but the simplest and lightest-weight residential structures. Soil surveys from the U.S. Department of Agriculture (2013) indicate that there are four basic soil-mapping units in Albany.
- Near the Bay, soils are classified as Urban Land Tierra, with moderate to high shrink-swell and moderate corrosivity.
- East of this area is a band of Urban Land Clearlake soil. These soils are typically very deep and poorly drained.
- A third mapping unit, Millsholm silt loam, exists on Albany Hill and in the northwestern part of the City. These soils are very deep and well drained, with high shrink-swell potential.
- The northeastern part of the city is characterized by Tierra Loam soils. These soils are potentially productive but may be moderately corrosive. They also have high shrink swell potential.

The impact of an earthquake on structures and infrastructure is largely a function of weaknesses in the design of buildings, strength of ground shaking, and liquefaction, of soils in which the soils weaken, losing their ability to ground motion waves as a unit, thereby allowing structure elements of a building to move in different directions as the ground waves flow through.

Liquefaction generally occurs in soft, unconsolidated sedimentary soils. A program called the National Earthquake Hazard Reduction Program (NEHRP) creates maps based on soil
characteristics to help identify locations subject to liquefaction. NEHRP Soils B and C typically can sustain ground shaking without much effect, dependent on the earthquake magnitude. The areas that are commonly most affected by ground shaking have NEHRP Soils D, E and F. In general, these areas are also most susceptible to liquefaction.

With each major earthquake comes new understanding of the way in which buildings respond to them. Advances in the technology associated with testing systems, design and seismic modeling software, structural connections, structural forms, and seismic force resisting systems have accelerated dramatically. Structures can be constructed or
retrofitted to have the strength and redundancy to withstand expected ground shaking of severe earthquakes. In addition, structure can safely be built or retrofitted on soils vulnerable to liquefaction if the structural design.

Even in well-constructed building, casualties can result from falling objects and debris. Disruption of communications, electrical power supplies and gas, sewer and water lines should be expected.

There is currently no reliable way to predict when an earthquake will occur. Technology exists, however, that detects low energy waves at the beginning of a major earthquake. The low energy waves travel faster than the actual ground motion, giving brief advance alarm of imminent danger. The warning time is very short but it could allow people to move away from a hazardous location. These warning systems are operational, but funding has not been allocated to make them available to City facilities or the public.

Earthquakes can cause large and sometimes disastrous secondary effects. For example, unless properly secured, materials can fall from their storage location, at a minimum spreading broken glass and other hazards in exit corridors, and in worst-case scenarios, releasing hazardous materials to the environment and people.

**Flooding**

The primary water courses in the City of Albany have the potential to flood at irregular intervals, generally in response to a succession of intense winter rainstorms. Storm patterns of warm moist air usually occur between early November and late March. A series of such weather events can cause severe flooding in the City. The worst-case scenario is major regional roadways and highways could be blocked, preventing critical access for many residents and critical functions. Additionally, it is possible that blockage caused by floating debris along the stream course could push water outwards to neighboring streets and roads, and not within the projected flood plain.

Currently, relatively small areas of Albany, along local creeks and San Francisco Bay, are subject to periodic flooding. Due to the sequential pattern of meteorological conditions needed to cause serious flooding, it is unusual for a flood to occur without warning. In recent history, there have been isolated areas that have suffered property damage due to flooding:

- The 1000 block of Curtis and Neilson Streets reported to the City that drainage problems had become chronic during wet weather months. The City mitigated this situation in 2007-2008 with the construction of improved storm drains.
In extreme rain conditions, chronic flooding out of Codornices Creek has been reported along Eastshore Highway and the Union Pacific railroad tracks. The Union Pacific Railroad mitigated the situation with the construction of larger culverts underneath their tracks.

Climate change is expected to exacerbate flooding through storms and more intense periods of rainfall. Warning times for floods can be between 24 and 48 hours. Although flooding is possible in Albany, emergency assets in the city are located outside the floodplain. A significant flood will principally affect transportation networks, potentially limiting access to Golden Gate Fields, the local highway and railways, which would compromise the ability for residents to get around or leave the city, and for resources to be shipped into the area by rail or truck.

**FEMA National Flood Insurance Program**

The National Flood Insurance Program (NFIP) makes federally backed flood insurance available to homeowners, renters, and business owners in participating communities. For most participating communities, FEMA has prepared a detailed Flood Insurance Study (FIS). The study estimates water surface elevations for floods of various magnitudes, including the 1-percent annual chance flood and the 0.2-percent annual chance flood (the 500-year flood). Base flood elevations and the boundaries of the 100- and 500-year floodplains are shown on Flood Insurance Rate Maps (FIRMs), which are the principle tool for identifying the extent and location of the flood hazard.
Specific areas of the city have been designated by the Federal Emergency Management Agency (FEMA) as 100-year flood hazard areas, which means there is a one-percent chance of flooding in these areas in any given year. Based on current infrastructure, most of the flooding could occur in the City is expected on the San Francisco Bay shoreline and around Codornices Creek and Cerrito Creek:

- The shoreline areas west of Interstate 80 (I-80) are FEMA-designated 100-year flood hazard areas (i.e., areas with a 1 percent chance of flooding during any given year), susceptible to coastal flooding with velocity hazard (wave action) at an elevation of 9 feet. The westernmost region of the Albany Bulb has been designated Zone X, an area with 1-percent-chance-flood with average depths of less than 1 foot, with drainage areas less than 1 square mile, and/or an area protected by levees from 1 percent annual chance flood.
- The area along Codornices Creek is a FEMA-designated 100-year flood hazard zone (Zone AO - area of alluvial fan flooding to a depth of two feet). Flooding associated with the creek stretches from the City’s eastern border, approximately 1.4 miles, until the terminus at San Francisco Bay. The inundation zone includes the area 2 feet in elevation above the creek. Codornices Creek flows through a culvert under I-80
and is directed north adjacent to the highway. All of the area west of I-80 and east of Golden Gate Fields Race Track along the channel is also within the FEMA 100-year flood hazard zone. The area between approximately the Union Pacific Railroad and I-80 near the Cornices Creek is a FEMA-designated 500-year flood hazard zone (i.e., area with a 0.2 percent chance of flooding during any given year).

- The area along Cerrito Creek is a FEMA-designated 100-year flood hazard zone (Zone AE - area subject to inundation by the 1-percent-annual-chance flood event determined by detailed methods). This area encompasses the channel banks from Adams Street to approximately 0.5 miles to the east near the creek terminus at San Francisco Bay. This area is surrounded by a FEMA-designated 500-year flood hazard zone.

Individuals and families living along the projected flood-plain as well as businesses residing along the flood-plain projections are of extra concern for this hazard. The number of people residing along the projected flood plain is ___. Homes and businesses along the flood plain are at risk during a high-water event. It is estimated that ___ number of structures will be impacted during the event of a flood and/or high water.

The City has adopted flood damage prevention regulations to reduce potential risks. The Municipal Code identifies areas of flood hazard and requires that a Flood Zone Permit be obtained before any construction or other development occurs in these areas. Before issuing a permit to build in in the FEMA mapped 1% areas, the City currently requires new buildings and those undergoing substantial improvements to be elevated to protect against damage by the 100-year flood. In addition, new construction must demonstrate that new construction does not aggravate existing flood problems or increase damage to other properties. The Code identifies methods of flood proofing and minimizing the potential for flood damage when a permit is issued.

**Seismically-Related Flood Hazards**

A number of flood hazards are specifically associated with earthquakes. These include tsunamis, seiches, and dam or tank failure.

**Tsunamis** could be created by underwater seismic events in the Pacific Ocean. A tsunami entering the Bay through the Golden Gate would dissipate quickly as the Bay becomes wider and shallower. Nonetheless, low-lying areas along the shoreline, including tidal flats, marshlands, and landfilled areas, would be vulnerable. The California Geological Survey has designated the entire area west of Interstate 80 as being at risk of inundation.

**Seiches** are standing waves in enclosed or partially enclosed bodies of water, such as lakes and bays. They may be caused by earthquakes, high winds, or tides. Due to the geometry and dimensions of San Francisco Bay, they are considered a negligible hazard to Albany.
While Albany would not be prone to flooding from dam failure, the city could be impacted by the failure of East Bay Municipal Utility District’s (EBMUD) Berryman Reservoir. The Reservoir is a large underground tank located near Codornices Park in the North Berkeley Hills. Tank failure would cause water to flow west in the area between Cedar and Virginia Streets through Berkeley, and then north along the Eastshore Highway through the western part of Albany to the Codornices Creek channel. The risk has been reduced by the replacement of the former reservoir with a steel tank as part of EBMUD’s seismic improvement program.

**Sea Level Rise**

Sea levels are rising because of higher atmospheric and oceanic temperatures across the globe. The sea level rise is expected to continue throughout the century, threatening coastal resources, but projections are complicated by the potential for a substantial acceleration of glacial ice melt resulting in rapid sea level rise, which is not currently accounted for in many global scenarios.¹ The Bay Area is especially exposed to the impacts of sea level rise because of the large number of assets located on the coast. In Albany, the area most exposed to sea level rise is located along the shoreline; however, sea level rise alone is not projected to impact important emergency assets throughout the 21st century.

Considered the best available science, the National Research Council (NRC) identified likely sea level rise estimates for the west coast of the United States.² These values are accompanied by ranges of possible sea levels based on low and high emissions scenarios and ice melt scenarios. Figure 5 summarizes the projections applicable to Alameda County: six inches of sea level rise by 2030 (range: 2-12 in), 11 inches by 2050 (range: 5-24 in), and 36 inches by 2100 (range: 17-66 in) relative to the year 2000.

**Sea Level Rise Estimates Relative to the Year 2000**

<table>
<thead>
<tr>
<th>Year</th>
<th>Projections</th>
<th>Ranges</th>
</tr>
</thead>
<tbody>
<tr>
<td>2030</td>
<td>6 ± 2 in</td>
<td>2 to 12 in</td>
</tr>
<tr>
<td>2050</td>
<td>11 ± 4 in</td>
<td>5 to 24 in</td>
</tr>
<tr>
<td>2100</td>
<td>36 ± 10 in</td>
<td>17 to 66 in</td>
</tr>
</tbody>
</table>

*Source: NRC³*

These projections characterize the estimated timeline for permanent increases in water levels. However, these water levels may occur sooner on a temporary basis under a number of different circumstances given the combination of permanent sea level rise and temporary extreme tides resulting from the additive impact of high tides and storm surge. For example, water levels could reach the equivalent of 49 inches of inundation by 2050 in the event of a 50-year storm - a storm that has a two percent chance of occurring in a given year - even though that level of sea level rise is not projected to occur by the end of the century.4

Albany’s emergency assets are not affected by foreseeable sea level rise or extreme tides throughout the 21st century, but other important city assets are affected. Thirty-six inches of sea level rise is likely by the end of the century and at this level, waters flood the perimeter of Albany Bulb and the Golden Gate Fields parking facilities and road access. See Figure 6 for a map of areas inundated by 36 inches of sea level rise, and Figure 7 for a list of assets exposed to sea level rise. Even in the worst-case scenario of water levels reaching 72 inches in the event of likely sea level rise combined with a 50-year storm, water levels only inundate Buchanan Street along the water and the parking for Golden Gate Fields and Tom Bates Regional Sports Complex, although some small areas of the eastbound I-580 freeway north of Buchanan Street may experience flooding.

Due to the climate action impacts and projections regarding flooding, wave action, and increased sea levels, the city of Albany has developed several strategies and policies to address issues along the city waterfront.

Over the next century, the Albany waterfront will be impacted by the effects of climate change, particularly rising sea levels. Future waterfront trails and other shoreline improvements are being designed to anticipate the possible effects of rising sea levels. At the same time, engineered revetments (armored stone) and other measures are being considered to make the shoreline more resilient. These improvements provide the added benefit of stabilizing landfill and protecting water quality.

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Projected Sea Level Rise in Albany by the End of the Century (36 Inches)

Notes: The area shaded in blue indicates the area inundated by 36 inches of sea level rise. Source: OpenStreet Maps and AECOM \(^5\) as represented on Vizonomy.

List of Assets Exposed to Sea Level Rise Flooding

<table>
<thead>
<tr>
<th>Asset Type</th>
<th>Area</th>
<th>Impact</th>
<th>12 in.</th>
<th>24 in.</th>
<th>36 in.</th>
<th>48 in.</th>
<th>72 in.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Highway I-80</td>
<td>Albany Shoreline</td>
<td>H</td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Wastewater Treatment Plant</td>
<td>Oakland</td>
<td>H</td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Bay Bridge Access</td>
<td>Oakland</td>
<td>H</td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Albany Bulb &amp; Waterfront</td>
<td>Northwest</td>
<td>M</td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Golden Gate Fields</td>
<td>Albany Shoreline</td>
<td>M</td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Buchanan Street</td>
<td>Albany Shoreline</td>
<td>M</td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>I-580E offramp to I-80W</td>
<td>Northwest</td>
<td>M</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Highway I-580</td>
<td>Oakland</td>
<td>M</td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Highway I-880</td>
<td>Oakland</td>
<td>M</td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

Source of asset count: Albany Local Asset Data, OpenStreet Maps, Open Data and AECOM \(^6\) as represented on Vizonomy.


Given the unlikely direct impact to Albany’s emergency assets from sea level rise, the greater threat may be regional risks from sea level rise. With 48 inches of inundation, which is likely by the end of the century when combined with average yearly storm surge, water begins to threaten westbound access to the Bay Bridge. In the worst-case scenario, with predicted end-of-century sea level rise compounded by glacial melting and/or King Tides and storm surge, there is the possibility that parts of the Bay Area may experience sea level rise related flooding of up to 72 inches or more. At this level, numerous important regional assets are in the projected impact area, including the East Bay Municipal Utility District (EBMUD) wastewater treatment plant, access to the Bay Bridge and the Union Pacific railroad, which would threaten water quality, sewer service, transportation and cargo shipment throughout the area. Flooded areas will also include the I-880 freeway at intervals from Oakland to Milpitas, with the most significant inundation occurring in Oakland and San Leandro. This includes projected flooding of the I-880/I-580 interchange. These conditions may likely result by the end of the century from a combination of sea level rise and storm surge, such as 36 inches of sea level rise combined with a 50-year storm surge, or 48 inches of sea level rise combined with a 5-year storm surge. It will be important for Albany to consider the local implications of regional climate impacts, such as delivery of food, water, and resources, access to transportation infrastructure and consequences for public health.

**Hazardous Material Release**

A hazardous material (HAZMAT) is any element or compound that, because of handling, storing, processing, or packaging, may have detrimental effects upon the public (especially emergency personnel) and/or the environment. Hazardous materials are routinely used and stored in homes and businesses and are also shipped daily on highways, railroads, waterways, and pipelines in or near Albany. History has shown that when accidents and emergencies involve hazardous materials, they are extremely complex to mitigate. A hazardous materials release could expose the community to toxic vapors, causing irritation, burns, or suffocation.

A release of hazardous materials in the City of Albany could occur by: accident on a City street or on Interstate 80/580; train derailment; a ruptured natural gas or petroleum pipeline; illegal dumping into the sewer or storm-drain system or into the creeks; a spill from a vessel in San Francisco Bay; or a fire in a nearby industrial facility.

The risk of a transportation related accident is mitigated by the many federal and state safety precautions and regulations, and by the fact that accidents on freeways or railroad is likely to be detected and reported quickly. In the event of a spill, or other accidental release
on Interstate 80/580, the Albany Fire Department would be the first responders, while Caltrans would assume responsibility for the subsequent cleanup.

Hazardous materials incidents from spills from commercial or recreational vessels in the Bay have impacted the San Francisco Bay Area in the past. On November 7, 2007, the container ship Cosco Busan struck the Delta Tower of the San Francisco Bay Bridge during a thick fog. Over 53,569 gallons of heavy fuel oil spilled into the San Francisco Bay affecting birds, marine mammals, fish and humans. Oil from this spill turned up on the Albany shoreline. More recently, staff has arranged for the disposal of small amount of hazardous materials that have washed up on the Albany waterfront.

While hazardous materials could be released anywhere in the City, the most vulnerable areas are by the train tracks and I-80 and I-580 freeways on the western edge of the city.

The severity of a hazardous materials depends on the nature and amount of the hazardous material and the time and location of the incident. Explosions and accidents can cause physical damage, while releases in the air can affect human health and safety. Hazardous material incidents can be caused by or exacerbated by other hazards, such as earthquakes, floods, windstorms, and winter storms.

Hazardous materials can threaten the viability of wildlife in Albany’s open spaces, creeks, and the bay. This includes potential damage to plants, animals, wildlife habitat, air and water quality, and loss of biodiversity.

**Infrastructure Failure**

Critical infrastructure generally refers to infrastructure that is necessary to providing vital government services and and individual functions. It can include both buildings and physical facilities such as power and communications lines, roads, transit lines, storm drains, potable waterlines, and sanitary sewer collection system.

Key infrastructure assets are owned, operated, and maintained by other public agencies and utility companies.

**Electrical Grid Failure**

An electrical grid is an interconnected network for delivering electricity from producers to consumers. It consists of generating stations that produce electrical power, high voltage transmission lines that carry power from distant sources to demand centers, and distribution lines that connect individual customers. When any of these components fails, all or a portion of Albany can be without power for hours, days, or sometimes even weeks. A loss of electrical power can interfere with communication, sanitation, lighting, cooking,
refrigeration, and transportation systems. An electrical grid failure for a longer period can cause fuel shortages and compromise other necessary supplies such as food and medication.

The potential for a loss of power means that emergency and critical uses should have dedicated emergency power sources. The electrical system is vulnerable to many different hazards. In storm events downed trees can damage overhead lines. In earthquakes, overhead lines are not typically damaged, but electrical substations components can be destroyed by strong shaking, often requiring more extensive, and time intensive repairs to return service.

Pacific Gas and Electric (PG&E) provides electricity and natural gas to 15 million people in northern and central California. They have a staff of 20,000 prepared to respond to restore electrical service after disasters and storms. They also have a well-established priority system for restoring power to emergency services before other community needs.

PG&E has assessed the seismic vulnerability of many elements of its system and has taken steps to improve its functionality after an earthquake, such as replacing bushings on high voltage lines, anchoring substation equipment and replacing old gas lines with more flexible alternatives.

**Energy Shortage**

Although California has one of the lowest rates of per capita energy consumption in the country (mainly because of our mild climates and energy efficiency initiatives), we still have the second highest total energy demand in the country due to our large population. As such, California imports more electricity than any other state. Over half of electricity consumption in California is fueled by natural gas, 14% comes from hydroelectric power, 11% comes from renewable resources and a small percentage is generated using nuclear power. A glitch in any one of these systems, i.e. a failure of a transmission line of natural gas or a drought that decreases the amount of electricity available from a hydroelectric plant could result in an energy shortage.

The State has periodically experienced energy shortages that resulted in a disruption of services and/or rolling blackouts. For example, in 2000 and 2001, the state suffered a series of rolling blackouts because of several factors, deregulation of electric utilities, and a drought in the Pacific Northwest. In 2005, approximately 500,000 customers were left without power when a transmission line failed. In September 2011, a minor short circuit during a repair of a substation in Arizona, left 1.4 million people in the San Diego area without power. As recently as the summer of 2016, Southern California residents were being asked to conserve electricity because without conservation, power plants could run out natural gas fuel and trigger rolling blackouts.
The City remains susceptible to energy supply disruptions that can occur as rolling blackouts where customers temporarily lose power. However, the threat of such disruptions has lessened since the State of California implemented emergency technology and energy conservation programs, and adopted measures to mitigate energy market manipulation and reduce distribution bottlenecks. However, as the City relies on energy as a critical infrastructure for its activities, any unplanned or rolling blackout could have a significant impact on the City’s operations and its level of productivity.

**Fuel and Natural Gas Pipelines**

A natural gas transmission line, runs north-south through the middle of the City underneath several city streets. As a consequence of the San Bruno natural gas pipeline rupture, the National Transportation Safety Board (NTSB) has issued a number of recommendations to State and federal administrations and institutions to improve the safety of pipeline networks as well as to upgrade the integrity management program and emergency response system. As a result, PG&E has begun improving its network by automating shutoff valves, with automatic shutoff valves; updating its emergency response plan to reflect industry best practices; and implementing data management systems intended to ensure its pipeline records are traceable, verifiable and complete.

Additionally, PG&E has created a First Responders Safety website, which provides secure access to maps and information on their natural gas transmission lines, natural gas storage facilities, valve and regulator locations and current size and pressure within the pipes as well as access to an electronic version of their Gas Emergency Response Plan.

Smaller natural gas lines are subject to damage and disruption in areas with soil failure, for example landslide or liquefaction. Broken lines can create fires if ignited until the fuel supply is exhausted. The repair of damaged underground lines will take time. Following the Loma Prieta earthquake it took about 30 days to repair damaged lines in the San Francisco Marina.

In addition, there is an aviation fuel pipeline that runs along the railroad tracks from Richmond to the Oakland Airport. These pipes are made of high-pressure welded steel, installed primarily in the 1960s, although a few segments were installed in the 1950s. Each pipeline has automatic, remote control and other manual valves along its length and the flow can be shut down within minutes.

**Water System Failure**

The East Bay Municipal Utility District (EBMUD) has the responsibility of providing potable water treatment and delivery to individual properties. EBMUD also maintains the City’s network of fire hydrants. EBMUD draws its water from the Sierra Nevada mountains, using a series of reservoirs and pipelines. If there is an interruption to this imported water
source, EBMUD would rely on local storage until repairs were made to restore the transmission supply. EBMUD has studied the impacts of earthquake shaking, liquefaction, landslides and fault rupture on most of its infrastructure and is upgrading its infrastructure region-wide. A large earthquake, however, could severely impact the quality or volume of water service to the City.

In addition EBMUD conveys City’s sanitary sewage outflow from a large “Interceptor” pipe running parallel to I-80 to their treatment plant at the base of the Bay Bridge. The City of Albany maintains lower sewer laterals from individual properties and sewer mains that ultimately connect to the EBMUD line. Unlike many cities, the City’s sewer system is entirely gravity flow, not requiring pump stations.

**Economic Impact**

Economic impact will be largely associated with businesses unable to operate during a widespread infrastructure failure.

**Landslides**

Landslides are caused by one or a combination of the following factors: change in slope of the terrain, increased load on the land, shocks and vibrations, change in water content, groundwater movement, frost action, weathering of rocks, and removing or changing the type of vegetation covering slopes. In general, landslide hazard areas are where the land has characteristics that contribute to the risk of the downhill movement of material, such as the following:

- A slope greater than 33 percent
- A history of landslide activity or movement during the last 10,000 years
- Stream or wave activity, which has caused erosion, undercut a bank or cut into a bank to cause the surrounding land to be unstable
- The presence or potential for snow avalanches
- The presence of an alluvial fan, indicating vulnerability to the flow of debris or sediments
- The presence of impermeable soils, such as silt or clay, which are mixed with granular soils such as sand and gravel

Given the geography of the City of Albany, there is only one specific area of concern related to the hazard of landslides and mass movement events.
Image courtesy of California Department of Conservation and California Geologic Survey

MAP EXPLANATION

Zones of Required Investigation:

Liquefaction
Areas where historical occurrence of liquefaction, or local geological, geotechnical and ground-water conditions indicate a potential for permanent ground displacements such that mitigation as defined in Public Resources Code Section 2693(c) would be required.

Earthquake-induced Landslides
Areas where previous occurrence of landslide movement, or local topographic, geological, geotechnical and subsurface water conditions indicate a potential for permanent ground displacements such that mitigation as defined in Public Resources Code Section 2693(c) would be required.

NOTE: Seismic Hazard Zones identified on this map may include developed land where delineated hazards have already been mitigated to city or county standards. Check with your local building/planning department for information regarding the location of such mitigated areas.
The area in blue highlights land vulnerable to mass movements and potential landslides (See the Earthquake Section in reference to secondary hazards resulting from earthquake events).

Assessing the geology, vegetation, and amount of predicted precipitation for an area can help predict landslides. However, there is no practical warning system for individual landslides. The current standard operating procedure is to monitor situations on a case-by-case basis. Generally accepted warning signs for landslide activity include:

- Springs, seeps, or saturated ground in areas that have not typically been wet before
- New cracks or unusual bulges in the ground, street pavements or sidewalks
- Soil moving away from foundations
- Ancillary structures such as decks and patios tilting and/or moving relative to the main house
- Tilting or cracking of concrete floors and foundations
- Broken water lines and other underground utilities
- Leaning telephone poles, trees, retaining walls or fences
- Offset fence lines
- Sunken or down-dropped road beds
- Rapid increase in creek water levels, possibly accompanied by increased turbidity (soil content)
- Sudden decrease in creek water levels though rain is still falling or just recently stopped
- Sticking doors and windows, and visible open spaces indicating jambs and frames out of plumb

Landslides can cause several types of secondary effects, such as blocking access to roads, which can isolate residents and businesses and delay commercial, public and private transportation. This could result in economic losses for businesses. Other potential problems resulting from landslides are power and communication failures. Vegetation or poles on slopes can be knocked over, resulting in possible losses to power and communication lines. Landslides also have the potential of destabilizing the foundation of structures, which may result in monetary loss for residents.

Environmental problems because of mass movements can be numerous. Landslides that fall into streams may significantly impact fish and wildlife habitat, as well as affecting water quality. Hillsides that provide wildlife habitat can be lost for prolong periods of time due to landslides.
Future Trends in Development
For private properties on Albany Hill, site-specific geotechnical analysis and mitigation measures will continue to be required when construction is proposed.

Public Health Epidemic

Biological threats can range from widespread pandemic and regional outbreaks, to purposefully targeted bioterrorism. Viruses, bacteria, and toxins all pose as threats to our health safety; the number of outbreaks per year has more than tripled, with the number of new diseases per decade nearly quadrupling over the past 60 years.

Globalization, more efficient modes of traveling, and climate change are all factors contributing to a growing number of disease vectors carrying pathogens around the world. Having more extensive traveling methods mean that disease vectors are easily transported from one part of the world to another. This rapid spread of disease can affect humans and other species.

The World Health Organization (WHO) defines pandemic as the worldwide spread of a new disease. Misinformation about vaccines, the absence of a clear plan for coordination among federal agencies such as the U.S. Agency for International Development and the Defense Department, and a need to improve public awareness about the threat posed by a biologic outbreak are among the factors that make the possibility of large and deadly pandemics increasingly likely. In addition, the risk of pandemic continues to be pushed forward as the anti-vaccine movement encourages parents to refuse vaccination of their children, resulting in higher risks of infection and dispersal of diseases.

While Albany has not directly experienced any pandemics or viral outbreaks, the City recognizes that the risk evidently exists. Key naturally occurring biological hazards of concern include Ebola, Zika Virus, Bird Influenza (H7N9), Middle East Respiratory Syndrome (MERS), Enterovirus D68 (EV-D68), and West Nile Virus (WNV).

Past Events
Cholera Outbreak - October 2010
Cholera is an acute, diarrheal illness caused by the infection of the intestine with the bacterium Vibrio cholerae. Infection is most likely to occur and spread in less developed countries where there is inadequate water treatment and poor sanitary conditions. The 2010 Cholera outbreak in Haiti occurred shortly after the country experienced a 7.0 magnitude earthquake which further impeded the nation’s already struggling water, sanitation, and hygiene infrastructure.
About one in 10 infected individuals will experience severe disease characterized by profuse watery diarrhea, vomiting, and leg cramps. The rapid loss of body fluids leads to dehydration and shock and without treatment, death can occur within hours.

**Swine Flu (H1N1) - April 2009**
Swine Flu, or also known as H1N1 in accordance to the specific strain of the influenza virus, is a pig respiratory disease caused by type A influenza viruses that regularly cause influenza outbreaks in swine herds. Although the virus rarely infects humans, exposure to infected pigs can lead to transmission of variant viruses. People infected with such variant viruses experience symptoms similar to seasonal human influenza such as fever, lethargy, lack of appetite and coughing. The pandemic H1N1 virus was spread from person to person, being easily transmitted by coughing or sneezing.

The emergence of this new virus had a significant health impact on the human population due to the fact that most people had no or little immunity, since a vaccine had not been created for it. According to the CDC, the 2009 H1N1 pandemic resulted in a total of 60.8 million cases, 274,304 hospitalizations, and 12,469 deaths in the US. Within those deaths, 657 were Californians. Currently, the Swine flu circulates as a seasonal flu, which can be combated by a vaccine.

**Measles – 2008 to 2015**
Measles is a highly contagious virus that lives in the nose and throat mucus of an infected individual. Because of its ability to survive for up to two hours in an airspace after an infected individual sneezes or coughs, measles is highly contagious. Symptoms associated with measles includes fever, runny nose, coughing, red eyes, and a sore throat, followed by a rash that spreads all over the body.

While the virus has been declared eliminated from the US in 2000, there is still risk for sporadic importations of measles into the county from travelers. Measles outbreaks can also occur in communities with high number of unvaccinated individuals. During January to July 2008, a total of 131 measles cases were reported to CDC, with 14 cases from California.

In 2014, the United States experienced a record number of measles cases, with 667 cases from 27 states reported to CDC’s National Center for Immunization and Respiratory Diseases (NCIRD); this was the greatest number of cases since measles elimination was documented in the U.S. in 2000. In 2015, 188 people from 24 states and the District of Columbia were reported to have measles. The outbreak likely started from a traveler who
became infected overseas with measles, then visited an amusement park in California while infectious; however, no source was ever identified.

**Severe Weather**

Severe weather can be categorized into two groups: those that form over wide geographic areas are classified as general severe weather; those with a more limited geographic area are classified as localized severe weather.

Three types of severe weather events typically impact the City of Albany: damaging winds, hail storms, and extreme heat. There have been two recorded tornado/funnel cloud events with the city since 1950. However, these were F0-rated events that caused no damages, and tornados are not considered a high risk for the city. Flooding issues associated with severe weather are discussed in the Flooding Section. The other three types of severe weather common to the City of Albany are described in the following sections. Extreme temperatures are also outlined in this section.

**Damaging Winds**
Damaging winds are classified as those exceeding 60 mph. Damage from such winds accounts for half of all severe weather reports in the lower 48 states and is more common than damage from tornadoes. Wind speeds can reach up to 100 mph and can produce a damage path extending for hundreds of miles.

**Hail Storms**
Hail occurs when updrafts in thunderstorms carry raindrops upward into extremely cold areas of the atmosphere where they freeze into ice. Recent studies suggest that super-cooled water may accumulate on frozen particles near the back-side of a storm as they are pushed forward across and above the updraft by the prevailing winds near the top of the storm. Eventually, the hailstones encounter downdraft air and fall to the ground.

**Extreme Heat**
The U.S. Environmental Protection Agency (EPA) defines extreme heat events as “periods of summertime weather that are substantially hotter and/or more humid than typical for a given location at that time of year.” From 1970-2000, Albany experienced a daily average temperature of about 58.3 °F, an average maximum temperature of 66.8 °F and an average minimum temperature of 49.7 °F. According to Climate Change models, temperatures in the Bay Area are tending toward warmer average temperatures, which translate to more extreme temperatures. In the Bay Area temperatures are expected to increase between
three degrees (in a low emission scenario) and six degrees Fahrenheit (in a high emission scenario). By 2100, average temperatures in the San Francisco Bay Area will increase by 11°F. Additional heat waves will disproportionally impact the elderly, children under five and the low-income members of our community.

Historically, Albany averaged less than one day per year exceeding 90° F. This number could climb exponentially after mid-century. As most homes in the communities by the Bay do not have air conditioning, this increase in number of extreme heat days would impact a larger number of households in the area. Under this scenario, the City would need to plan to open more cooling centers in order to accommodate more people.

**Frequency**
The severe weather events for the City of Albany are often related to high winds associated with winter storms and thunderstorms. The City can expect to experience exposure to some type of severe weather event at least annually. The frequency of storms and extreme heat will increase with climate change.

The most common problems associated with severe storms are immobility and loss of utilities. Fatalities are uncommon, but can occur. Roads may become impassable due to flooding, downed trees, ice or snow, or a landslide. Power lines may be downed due to high winds, and services such as water or phone may not be able to operate without power.

Windstorms can be a problem in the City and have been known to cause damage to utilities. The predicted wind speed given in wind warnings issued by the National Weather Service is for a one-minute average; gusts may be 25 to 30 percent higher. Tornadoes are potentially the most dangerous storm, but they are not common in the City. If a major tornado were to strike within the City, damage could be widespread. Businesses could be forced to close for an extended period or permanently, fatalities could be high, many people could be homeless for an extended period, and routine services such as telephone or power could be disrupted. Buildings may be damaged or destroyed.

California ranks 32nd among states for frequency of tornadoes, 44th for the frequency of tornados per square mile, 36th for injuries, and 31st for cost of damage. The state has no reported deaths from tornadoes.

Extreme heat, which will become more common with climate change, can be potentially fatal for vulnerable populations.

**Warning Time**
Meteorologists can often predict the likelihood of a severe storm and other changes in weather. This can give several days of warning time. However, meteorologists cannot predict the exact time of onset or severity of the storm. Some storms may come on more quickly and have only a few hours of warning time.
Secondary Hazards
The most significant secondary hazards associated with severe local storms are floods, falling and downed trees, landslides and downed power lines. Rapidly melting snow combined with heavy rain can overwhelm both natural and man-made drainage systems, causing overflow and property destruction. Landslides occur when the soil on slopes becomes oversaturated and fails.

Climate Change Impacts
Climate change presents a significant challenge for risk management associated with severe weather. The frequency of severe weather events has increased steadily over the last century. The number of weather related disasters during the 1990s was four times that of the 1950s, and cost 14 times as much in economic losses. Historical data shows that the probability for severe weather events increases in a warmer climate (see Figure below). The changing hydrograph caused by climate change could have a significant impact on the intensity, duration and frequency of storm events. All of these impacts could have significant economic consequences.

As greenhouse gas emissions increase, temperatures are expected to increase globally, placing growing stress on human health, water resources, energy systems and other citywide assets. Albany’s climate is no exception and temperatures are projected to increase throughout the city with daily maximum temperatures increasing by about 8 °F by the end of the century under the high emissions scenario. The impact of climate change on precipitation events is less clear, but the pattern of precipitation is expected to become more variable with extreme events increasing in intensity while projections of annual totals show no clear signal of significant directional change.

Population
A lack of data separating severe weather damage from flooding and landslide damage prevented a detailed analysis for exposure and vulnerability. However, it can be assumed that the entire city is exposed to some extent to severe weather events. Certain areas are more exposed due to geographic location and local weather patterns. Populations living at higher elevations with large stands of trees or power lines may be more susceptible to
wind damage, while populations close to creeks are at risk for possible flooding. Power outages can be life threatening to those dependent on electricity for life support. Isolation of these populations is a significant concern. These populations face isolation and exposure during severe weather events and could suffer more secondary effects of the hazard.

**Environment**
The environment is exposed to severe weather events. Natural habitats such as streams and trees are exposed to the elements during a severe storm and risk major damage and destruction. Prolonged rains can saturate soils and lead to slope failure. Flooding events caused by severe weather or snowmelt can produce creek channel erosion. Storm surges can erode waterfront areas and redistribute sediment loads.

**Critical Facilities**
Incapacity and loss of roads are the primary transportation failures resulting from severe weather, mostly associated with secondary hazards. High winds can cause significant damage to trees and power lines, blocking roads with debris, incapacitating transportation, and disrupting ingress and egress.

Loss of electricity and land-line phone connection would leave certain populations isolated because residents would be unable to call for assistance.

All future development will be affected by severe storms. The ability to withstand impacts lies in consistent enforcement of codes and regulations for new construction.

**Terrorism**

Terrorism is the use of fear for intimidation, usually for political goals. Terrorism is a crime where the threat of violence is often as effective as the commission of the violent act itself. Terrorism affects us through fear, physical injuries, economic losses, psychological trauma, and erosion of faith in governments. It can manifest itself through bombings, hijackings, kidnappings, arson, assassinations, threats only, disruption of “lifeline systems” and other critical infrastructure.

The federal government plays a significant role in terrorism response on a national level, but local governments along with counties and the state, have primary responsibility for first response and protecting the health and safety of its citizens. The nature of terrorism, and all the forms it can take makes mitigation, response and recovery issues difficult.

Although most likely not a high profile target, the City of Albany, given its geographic proximity to Oakland and San Francisco, could be affected by a terrorist attack.
Cyberterrorism, the use of computer network tools to shut down critical government infrastructures, is an ongoing threat to the City's infrastructure.

**Wildfire**

The highly urbanized portions of the City have relatively low wildfire risk exposure. There is, however, the potential for fire hazard throughout Albany Hill and the Albany Waterfront.

There are no recorded incidents of loss of life from wildfires in the city of Albany. However, the most destructive fire in the region to date—the October 1991 Oakland/Berkeley Hills “Tunnel Fire”—occurred close to Albany and resulted in 25 lives lost, and approximately 3,000 residential units destroyed. The estimated private property loss was $1.7 billion at the time, according to the Insurance Information Institute. City of Albany fire fighters were among first responders. In the past decade, City fire fighters have deployed to dozens of large wildland fires over the past decade.

In addition, smoke and air pollution from nearby wildfires can be a health hazard, especially for sensitive populations, including children, the elderly and those with respiratory and cardiovascular diseases. Public health impacts associated with wildfire include difficulty in breathing, odor, and reduction in visibility.

**Planning Area Risk Ranking**

**Probability of Occurrence**
The probability of occurrence of a hazard is indicated by a probability factor based on likelihood of annual occurrence:

- **High**—Hazard event is likely to occur within 25 years (Probability Factor = 3)
- **Medium**—Hazard event is likely to occur within 100 years (Probability Factor =2)
- **Low**—Hazard event is not likely to occur within 100 years (Probability Factor =1)
- **No exposure**—There is no probability of occurrence (Probability Factor = 0)

**Impact**
Hazard impacts were assessed in three categories: impacts on people, impacts on property and impacts on the local economy. Numerical impact factors were assigned as follows:

- **People**—Values were assigned based on the percentage of the total population exposed to the hazard event. The degree of impact on individuals will vary and is not measurable, so the calculation assumes for simplicity and consistency that all people exposed to a hazard because they live in a hazard zone will be equally
impacted when a hazard event occurs. It should be noted that planners can use an element of subjectivity when assigning values for impacts on people. Impact factors were assigned as follows:

- **High**—50 percent or more of the population is exposed to a hazard (Impact Factor = 3)
- **Medium**—25 percent to 49 percent of the population is exposed to a hazard (Impact Factor = 2)
- **Low**—25 percent or less of the population is exposed to the hazard (Impact Factor = 1)
- **No impact**—None of the population is exposed to a hazard (Impact Factor = 0)

**Property**—Values were assigned based on the percentage of the total property value exposed to the hazard event:

- **High**—30 percent or more of the total assessed property value is exposed to a hazard (Impact Factor = 3)
- **Medium**—15 percent to 29 percent of the total assessed property value is exposed to a hazard (Impact Factor = 2)
- **Low**—14 percent or less of the total assessed property value is exposed to the hazard (Impact Factor = 1)
- **No impact**—None of the total assessed property value is exposed to a hazard (Impact Factor = 0)

**Economy**—Values were assigned based on the percentage of the total property value vulnerable to the hazard event. Values represent estimates of the loss from a major event of each hazard in comparison to the total assessed value of the property exposed to the hazard. For some hazards, such as wildfire, landslide and severe weather, vulnerability was considered to be the same as exposure due to the lack of loss estimation tools specific to those hazards. Loss estimates separate from the exposure estimates were generated for the earthquake and flood hazards using HAZUS-MH.

- **High**—Estimated loss from the hazard is 20 percent or more of the total assessed property value (Impact Factor = 3)
- **Medium**—Estimated loss from the hazard is 10 percent to 19 percent of the total assessed property value (Impact Factor = 2)
- **Low**—Estimated loss from the hazard is 9 percent or less of the total assessed property value (Impact Factor = 1)
- **No impact**—No loss is estimated from the hazard (Impact Factor = 0)

The impacts of each hazard category were assigned a weighting factor to reflect the significance of the impact. These weighting factors are consistent with those typically used for measuring the benefits of hazard mitigation actions: impact on people was given a
weighting factor of 3; impact on property was given a weighting factor of 2; and impact on the operations was given a weighting factor of 1.

<table>
<thead>
<tr>
<th>Hazard</th>
<th>Probability</th>
<th>Probability</th>
<th>Probability</th>
<th>Probability</th>
<th>Total</th>
<th>Ranking</th>
</tr>
</thead>
<tbody>
<tr>
<td>Earthquake</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>12</td>
<td>1</td>
</tr>
<tr>
<td>Flooding</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>7</td>
<td>4</td>
</tr>
<tr>
<td>Hazardous Materials Release</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Infrastructure Failure</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>10</td>
<td>2</td>
</tr>
<tr>
<td>Landslide</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>Public Health Epidemic</td>
<td>1</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>9</td>
</tr>
<tr>
<td>Severe Weather</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td>8</td>
<td>3</td>
</tr>
<tr>
<td>Terrorism</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>Wildfire</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>7</td>
<td>5</td>
</tr>
</tbody>
</table>

**Part IV: Mitigation Strategy**

**Mitigation Strategies**

Hazard mitigation strategies were developed that present a broad range of alternatives to be considered for use in the City of Albany, in compliance with 44CFR (Section 201.6.c.3.ii).
The following table identifies mitigation strategies for each hazard or for multiple hazards, and establishes the responsible agency for each measure.
<table>
<thead>
<tr>
<th>HAZARD</th>
<th>RECOMMENDED MITIGATION ACTION</th>
<th>AGENCY RESPONSIBLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Hazards</td>
<td>Maintain an active and effective City of Albany emergency response and recovery program that provides direction and identifies responsibilities following a disaster</td>
<td>City of Albany</td>
</tr>
<tr>
<td></td>
<td>Develop and expand local efforts to organize and train area residents and employees so they can assist themselves and others during the first 72 hours following a major disaster</td>
<td>City of Albany</td>
</tr>
<tr>
<td></td>
<td>Work with local gas, electric, cable, water, sewer, and other utility providers to maintain and retrofit their facilities and ensure their ability to function or be quickly restored following a disaster</td>
<td>City of Albany, PG&amp;E, EBMUD</td>
</tr>
<tr>
<td></td>
<td>Ensure that future development is sited, designed, and constructed to minimize risks associated with all hazards</td>
<td>City of Albany</td>
</tr>
<tr>
<td></td>
<td>Advocate to keep Alta Bates Summit Medical Center open for active and emergency care</td>
<td>City of Albany</td>
</tr>
<tr>
<td>Earthquake</td>
<td>Ensure that critical public facilities such as City Hall, schools, the police station, and the fire station are designed and maintained in a manner that guarantees their resilience to earthquakes</td>
<td>City of Albany</td>
</tr>
<tr>
<td></td>
<td>As appropriate, require seismic upgrading of structures when they are substantially rehabilitated or remodeled</td>
<td>City of Albany</td>
</tr>
<tr>
<td></td>
<td>Continue to provide fee waivers for earthquake retrofit projects on single-family homes</td>
<td>City of Albany</td>
</tr>
<tr>
<td></td>
<td>Increase City-wide earthquake awareness and preparedness</td>
<td>City of Albany</td>
</tr>
<tr>
<td>Electrical Grid</td>
<td>Encourage residents and businesses to purchase and maintain necessary supplies</td>
<td>PG&amp;E</td>
</tr>
<tr>
<td>Failure</td>
<td>Encourage energy resilience via the installation/use of alternative power sources such as microgrids or battery storage</td>
<td>PG&amp;E, CCE</td>
</tr>
<tr>
<td>Flooding</td>
<td>Ensure storm drain inlets and culverts are maintained and cleaned regularly</td>
<td>City of Albany</td>
</tr>
<tr>
<td></td>
<td>Implement FEMA regulations that restrict development in floodplains</td>
<td>City of Albany</td>
</tr>
<tr>
<td></td>
<td>Encourage green infrastructure for natural management of stormwater and storm-induced flooding and preserve/restore natural features of the watershed for both new and existing development</td>
<td>City of Albany</td>
</tr>
<tr>
<td>Hazardous Materials Release</td>
<td>Adopt a shelter in place procedure as a public protective action for chemical emergencies</td>
<td>City of Albany</td>
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<td>-----------------------------</td>
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</tr>
<tr>
<td></td>
<td>Continue to work with Stopwaste.org, the Alameda County Waste Management Authority, the Alameda County Environmental Health Department, and state and federal agencies to ensure the safe storage, handling, and disposal of hazardous materials</td>
<td>City of Albany, Stopwaste.org, Alameda County Waste Management Authority, Alameda County Environmental Health Department</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Landslide</th>
<th>Monitor Albany Hill for evidence of vulnerability to landslides</th>
<th>City of Albany</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natural Gas Explosion</td>
<td>Perform frequent and rigorous natural gas/aviation fuel pipeline inspections and testing to protect system integrity</td>
<td>PG&amp;E, Kinder Morgan</td>
</tr>
<tr>
<td>Public Health Epidemic</td>
<td>Perform periodic emergency preparedness exercises to improve readiness for disasters</td>
<td>City of Albany</td>
</tr>
<tr>
<td>Severe Weather (Extreme Temperatures)</td>
<td>Develop targeted outreach materials to raise awareness about heat risks and ensure that heat preparedness and response information is available in the primary non-English languages spoken in the community</td>
<td>City of Albany</td>
</tr>
<tr>
<td></td>
<td>Continue to provide services to people that are homeless in Albany</td>
<td>City of Albany</td>
</tr>
<tr>
<td></td>
<td>Continue to provide access to public cooling centers during periods of extreme heat</td>
<td>City of Albany</td>
</tr>
<tr>
<td>Terrorism</td>
<td>Adopt best practices for public areas and events</td>
<td>City of Albany</td>
</tr>
<tr>
<td>Water System Failure</td>
<td>Continue to perform outreach regarding water conservation, including the promotion/incentivization of rainwater for landscaping</td>
<td>EBMUD</td>
</tr>
<tr>
<td>Wildfire</td>
<td>Implement vegetation management and fuel reduction programs in the highest hazard areas on Albany Hill, including areas adjacent to homes and areas of heavy recreational use</td>
<td>City of Albany</td>
</tr>
<tr>
<td></td>
<td>Ensure that private property owners in areas such as Albany Hill control weeds and other flammable vegetation in a manner that minimizes the risk of structure fires and threats to nearby properties</td>
<td>City of Albany</td>
</tr>
<tr>
<td></td>
<td>Work with EBMUD to ensure that peak load water supply and water pressure is sufficient to respond to local fire emergencies</td>
<td>City of Albany, EBMUD</td>
</tr>
</tbody>
</table>
Part V: Plan Maintenance Strategy

This chapter details the formal process that will ensure that the City of Albany Hazard Mitigation Plan remains an active and relevant document and that the City maintains its eligibility for applicable funding sources. The Plan maintenance process includes a schedule for monitoring and evaluating the plan annually and producing an updated plan every five years.

44CFR requires a hazard mitigation plan to present a plan maintenance process that includes the following (Section 201.6.c.4):

- A section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan over a 5-year cycle
- A process by which local governments incorporate the requirements of the mitigation plan into other planning mechanisms, such as comprehensive or capital improvement plans, when appropriate
- A discussion on how the community will continue public participation in the plan maintenance process.

Plan Implementation

The effectiveness of the hazard mitigation plan depends on its implementation and incorporation of its action items into partner jurisdictions’ existing plans, policies and programs. Together, the action items in the plan provide a framework for activities that the Partnership can implement over the next 5 years.

The City of Albany Department of Community Development will take lead responsibility for monitoring progress. Plan implementation and evaluation will be a shared responsibility among all the City and other agencies identified as lead agencies in the mitigation action plans.

Plan Update

The City of Albany Hazard Mitigation plan will be reviewed and updated as circumstances change and as required by Federal and State agencies. When relevant, a progress report will be produced to allow for a comprehensive description of updates.

This review will include the following:

- Summary of any hazard events that occurred during the performance period and the impact these events had on the City
• Review of mitigation success stories
• Brief discussion about why targeted strategies were not completed
• Re-evaluation of the action plan to determine if the timeline for identified projects needs to be amended (such as changing a long-term project to a short-term one because of new funding)
• Recommendations for new projects
• Changes in or potential for new funding options (grant opportunities)
• Impact of any other planning programs or initiatives that involve hazard mitigation.

This plan maintenance strategy recommends that this report be used as follows:
• Posted on the City website page dedicated to the hazard mitigation plan (or city plans/preparedness plans)
• Provided to the local media through a press release
• Presented to planning partner governing bodies to inform them of the progress of actions implemented during the reporting period

**Incorporation into Other Planning Mechanisms**
The information on hazard, risk, vulnerability, and mitigation contained in this plan is based on the best science and technology available at the time this update was prepared. The City of Albany General Plan is considered to be an integral part of this plan.

All municipal staff are committed to maintaining compliance with the provisions of California Assembly Bill 2140 (AB 2140) by creating a linkage between the hazard mitigation plan and individual general plans by identifying a mitigation initiative as such and giving that initiative a high priority. Other planning processes and programs to be coordinated with the recommendations of the hazard mitigation plan includes the following:

• Emergency response plan
• Capital improvement programs
• Municipal codes
• Community design guidelines
• Water-efficient landscape design guidelines
• Storm water management programs
• Water system vulnerability assessments
• Master fire protection plans.
Some action items do not need to be implemented through regulation. Instead, these items can be implemented through the creation of new educational programs, continued interagency coordination, or improved public participation. As information becomes available from other planning mechanisms that can enhance this plan, that information will be incorporated via the update process.
Part VI: Background Information

Regulatory Context
Laws and Ordinances

Existing laws, ordinances and plans at the federal, state and local level can support or impact hazard mitigation initiatives identified in this plan. Hazard mitigation plans are required by 44CFR to include a review and incorporation, if appropriate, of existing plans, studies, reports, and technical information as part of the planning process (Section 201.6.b(3)). Pertinent federal and state laws are described below.

Federal

The Disaster Mitigation Act (DMA) is the current federal legislation addressing hazard mitigation planning. It emphasizes planning for disasters before they occur. It specifically addresses planning at the local level, requiring plans to be in place before Hazard Mitigation Grant Program funds are available to communities. This Plan is designed to meet the requirements of DMA, improving the City’s eligibility for future hazard mitigation funds. The Federal Endangered Species Act (ESA) was enacted in 1973 to conserve species facing depletion or extinction and the ecosystems that support them. The act sets forth a process for determining which species are threatened and endangered and requires the conservation of the critical habitat in which those species live. The ESA provides broad protection for species of fish, wildlife and plants that are listed as threatened or endangered. Provisions are made for listing species, as well as for recovery plans and the designation of critical habitat for listed species. The ESA outlines procedures for federal agencies to follow when taking actions that may jeopardize listed species and contains exceptions and exemptions. It is the enabling legislation for the Convention on International Trade in Endangered Species of Wild Fauna and Flora. Criminal and civil penalties are provided for violations of the ESA and the Convention.

Federal agencies must seek to conserve endangered and threatened species and use their authorities in furtherance of the ESA’s purposes. The ESA defines three fundamental terms:

- **Endangered** means that a species of fish, animal or plant is “in danger of extinction throughout all or a significant portion of its range.” (For salmon and other vertebrate species, this may include subspecies and distinct population segments.)
- **Threatened** means that a species “is likely to become endangered within the foreseeable future.” Regulations may be less restrictive for threatened species than for endangered species.
- **Critical habitat** means “specific geographical areas that are...essential for the conservation and management of a listed species, whether occupied by the species or not.”
Five sections of the ESA are of critical importance to understanding it:

- **Section 4: Listing of a Species**—The National Oceanic and Atmospheric Administration Fisheries Service (NOAA Fisheries) is responsible for listing marine species; the U.S. Fish and Wildlife Service is responsible for listing terrestrial and freshwater aquatic species. The agencies may initiate reviews for listings, or citizens may petition for them. A listing must be made “solely on the basis of the best scientific and commercial data available.” After a listing has been proposed, agencies receive comment and conduct further scientific reviews for 12 to 18 months, after which they must decide if the listing is warranted. Economic impacts cannot be considered in this decision, but it may include an evaluation of the adequacy of local and state protections. Critical habitat for the species may be designated at the time of listing.

- **Section 7: Consultation**—Federal agencies must ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of a listed or proposed species or adversely modify its critical habitat. This includes private and public actions that require a federal permit. Once a final listing is made, non-federal actions are subject to the same review, termed a “consultation.” If the listing agency finds that an action will “take” a species, it must propose mitigations or “reasonable and prudent” alternatives to the action; if the proponent rejects these, the action cannot proceed.

- **Section 9: Prohibition of Take**—It is unlawful to “take” an endangered species, including killing or injuring it or modifying its habitat in a way that interferes with essential behavioral patterns, including breeding, feeding or sheltering.

- **Section 10: Permitted Take**—Through voluntary agreements with the federal government that provide protections to an endangered species, a non-federal applicant may commit a take that would otherwise be prohibited as long as it is incidental to an otherwise lawful activity (such as developing land or building a road). These agreements often take the form of a “Habitat Conservation Plan.”

- **Section 11: Citizen Lawsuits**—Civil actions initiated by any citizen can require the listing agency to enforce the ESA’s prohibition of taking or to meet the requirements of the consultation process.

With the listing of salmon and trout species as threatened or endangered, the ESA has impacted most of the Pacific Coast states. Although some of these areas have been more impacted by the ESA than others due to the known presence of listed species, the entire region has been impacted by mandates, programs and policies based on the presumption of the presence of listed species. Most West Coast jurisdictions must now take into account the impact of their programs on habitat.
The Clean Water Act
The federal Clean Water Act (CWA) employs regulatory and non-regulatory tools to reduce direct pollutant discharges into waterways, finance municipal wastewater treatment facilities, and manage polluted runoff. These tools are employed to achieve the broader goal of restoring and maintaining the chemical, physical, and biological integrity of the nation’s surface waters so that they can support “the protection and propagation of fish, shellfish, and wildlife and recreation in and on the water.”

Evolution of CWA programs over the last decade has included a shift from a program-by-program, source-by-source, pollutant-by-pollutant approach to more holistic watershed-based strategies. Under the watershed approach, equal emphasis is placed on protecting healthy waters and restoring impaired ones. A full array of issues is addressed, not just those subject to CWA regulatory authority. Involvement of stakeholder groups in the development and implementation of strategies for achieving and maintaining water quality and other environmental goals is a hallmark of this approach.

National Flood Insurance Program
The National Flood Insurance Program (NFIP) provides federally backed flood insurance in exchange for communities enacting floodplain regulations. Participation and good standing under NFIP are prerequisites to grant funding eligibility under the Robert T. Stafford Act. The city and most of the partner cities for this update participate in the NFIP and have adopted regulations that meet the NFIP requirements. At the time of the preparation of this update, all participating jurisdictions in the partnership were in good standing with NFIP requirements.

California General Planning Law
California state law (Cal. Gov. Code §65300 et seq.) requires that every county and city prepare and adopt a comprehensive long-range plan to serve as a guide for community development. The general plan expresses the community’s goals, visions, and policies relative to future public and private land uses. The general plan forms the basis for most local government land use decision-making. It must consist of an integrated and internally consistent set of goals, policies, and implementation measures. In 2016, the City Council adopted an undated General Plan.

California Environmental Quality Act
The California Environmental Quality Act (CEQA) was passed in 1970 to institute a statewide policy of environmental protection. CEQA requires state and local agencies in California to follow a protocol of analysis and public disclosure of the potential environmental impacts of public and private projects that result in a physical change to the environment. CEQA makes environmental protection a mandatory part of every California
state and local agency’s decision-making process.

Assembly Bill 162: Flood Planning
This California State Assembly Bill passed in 2007 requires cities and counties to address flood-related matters in the land use, conservation, and safety and housing elements of their general plans. The land use element must identify and annually review the areas covered by the general plan that are subject to flooding as identified in floodplain mapping by either FEMA or the California Department of Water Resources (DWR). Upon the next revision of the housing element, the conservation element of the general plan must identify rivers, creeks, streams, flood corridors, riparian habitat, and land that may accommodate floodwater for the purposes of groundwater recharge and storm water management. The safety element must identify information regarding flood hazards including:

- Flood hazard zones
- Maps published by FEMA, DWR, the U.S. Army Corps of Engineers, the Central Valley Flood Protection Board, Cal EMA, etc.
- Historical data on flooding
- Existing and planned development in flood hazard zones. The general plan must establish goals, policies and objectives to protect from unreasonable flooding risks including:
  - Avoiding or minimizing the risks of flooding new development
  - Evaluating whether new development should be located in flood hazard zones
  - Identifying construction methods to minimize damage.

Assembly Bill 162 establishes procedures for the determination of available land suitable for urban development, which may exclude lands where FEMA or DWR has determined that the flood management infrastructure is not adequate to avoid the risk of flooding.

Assembly Bill 2140: General Plans: Safety Element
This bill provides that the state may allow for more than 75 percent of public assistance funding under the California Disaster Assistance Act only if the local agency is in a jurisdiction that has adopted a local hazard mitigation plan as part of the safety element of its general plan. The local hazard mitigation plan needs to include elements specified in the legislation. In addition, this bill requires Cal EMA to give federal mitigation funding preference to cities and counties that have adopted such plans. The intent of the bill is to encourage cities and counties to create and adopt hazard mitigation plans.

Assembly Bill 70: Flood Liability
This bill provides that a city or county may be required to contribute a fair and reasonable share to compensate for property damage caused by a flood to the extent that it has
increased the state’s exposure to liability for property damage by unreasonably approving new development in a previously undeveloped area that is protected by a state flood control project, unless the city or county meets specified requirements.

Assembly Bill 32: The California Global Warming Solutions Act
Assembly Bill 32 establishes a state goal of reducing greenhouse gas emissions to 1990 levels by 2020 (a reduction of approximately 25 percent from forecast emission levels) with further reductions to follow. The law requires the state Air Resources Board to do the following:

- Establish a program to track and report greenhouse gas emissions.
- Approve a scoping plan for achieving the maximum technologically feasible and cost-effective reductions from sources of greenhouse gas emissions.
- Adopt early reduction measures to begin moving forward.
- Adopt, implement and enforce regulations—including market mechanisms such as “cap and trade” programs—to ensure that the required reductions occur.

The Air Resources Board recently adopted a statewide greenhouse gas emissions limit and an emissions inventory, along with requirements to measure, track, and report greenhouse gas emissions by the industries it determined to be significant sources of greenhouse gas emissions.

Senate Bill 97: Guidelines for Greenhouse Gas Emissions
Senate Bill 97, enacted in 2007, amends the CEQA to clearly establish that greenhouse gas emissions and their effects are appropriate subjects for CEQA analysis. It directs the Governor’s Office of Planning and Research to develop draft CEQA guidelines for the mitigation of greenhouse gas emissions or their effects and directs the California Natural Resources Agency to certify and adopt the CEQA guidelines.

California State Building Code
California Code of Regulations Title 24 (CCR Title 24), also known as the California Building Standards Code, is a compilation of building standards from three sources:

- Building standards that have been adopted by state agencies without change from building standards contained in national model codes
- Building standards that have been adopted and adapted from national model code standards to meet California conditions
- Building standards authorized by the California legislature that constitute extensive additions not covered by the model codes, adopted to address particular California concerns.
The state Building Standards Commission is authorized by California Building Standards Law (Health and Safety Code Sections 18901 through 18949.6) to administer the processes related to the adoption, approval, publication, and implementation of California’s building codes. These building codes serve as the basis for the design and construction of buildings in California. The national model code standards adopted into Title 24 apply to all occupancies in California except for modifications adopted by state agencies and local governing bodies. Since 1989, the Building Standards Commission has published new editions of Title 24 every three years.

**Standardized Emergency Management System**
CCR Title 19 establishes the Standardized Emergency Management System (SEMS) to standardize the response to emergencies involving multiple jurisdictions. SEMS is intended to be flexible and adaptable to the needs of all emergency responders in California. It requires emergency response agencies to use basic principles and components of emergency management. Local governments must use SEMS in order to be eligible for state funding of response-related personnel costs under CCR Title 19 (Sections 2920, 2925 and 2930). Individual agencies’ roles and responsibilities contained in existing laws or the state emergency plan are not superseded by these regulations.

**California State Hazard Mitigation Plan**
Under the DMA, California must adopt a federally approved state multi-hazard mitigation plan in order to be eligible for certain disaster assistance and mitigation funding. The intent of the California State Hazard Mitigation Plan is to reduce or prevent injury and damage from hazards through the following:

- Documenting statewide hazard mitigation planning in California
- Describing strategies and priorities for future mitigation activities
- Facilitating the integration of local and tribal hazard mitigation planning activities into statewide efforts
- Meeting state and federal statutory and regulatory requirements.

The plan is an annex to the State Emergency Plan, and it identifies past and present mitigation activities, current policies and programs, and future mitigation strategies. The plan will be updated annually to reflect changing conditions and new information, especially information on local planning activities.

**Governor’s Executive Order S-13-08**
Governor’s Executive Order S-13-08 enhances the state’s management of climate impacts from sea level rise, increased temperatures, shifting precipitation and extreme weather events. There are four key actions in the executive order:
• Initiate California’s first statewide climate change adaptation strategy to assess expected climate change impacts, identify where California is most vulnerable, and recommend adaptation policies by early 2009. This effort will improve coordination within state government so that better planning can more effectively address climate impacts on human health, the environment, the state’s water supply and the economy.
• Request that the National Academy of Science establish an expert panel to report on sea level rise impacts in California, to inform state planning and development efforts.
• Issue interim guidance to state agencies for how to plan for sea level rise in designated coastal and floodplain areas for new projects.
• Initiate a report on critical infrastructure projects vulnerable to sea level rise.
Appendix

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