

# Safety Element

---

<b>INTRODUCTION .....</b>	<b>1</b>
Achieving the Vision .....	1
Relationship to Other Documents.....	1
<b>GOALS AND POLICIES .....</b>	<b>3</b>
Geologic and Seismic Safety Considerations .....	3
Urban and Wildland Fire Hazards .....	16
Flood & Dam Inundation Hazards .....	21
Hazardous Materials and Waste .....	29
Disaster Preparedness, Response and Recovery.....	33

## List of Figures

Figure S-1	Regional Fault Location Map .....	5
Figure S-2	Generalized Geologic Map.....	7
Figure S-3	Seismic and Geologic Hazards.....	11
Figure S-4	Mining Activity and Oil and Gas Wells .....	13
Figure S-5	Fire Protection Areas .....	19
Figure S-6	Flood Hazard Areas.....	23
Figure S-7	Dam Inundation Map.....	25
Figure S-8	Emergency Facilities and Hazardous Areas Map.....	31



*This page intentionally left blank.*

## **INTRODUCTION**

---

**P**rotecting the health, safety and welfare of the community is a fundamental role of the City. Due to the occurrence of natural disasters such as flooding, earthquakes and fires in Southern California, it is increasingly important that Anaheim maintains programs that provide an effective response to public safety concerns. The Safety Element assesses natural and man-made hazards present in the community and includes policies to address those hazards.

## **ACHIEVING THE VISION**

The Safety Element is an important policy tool that will be used to implement and maintain the City's vision of Anaheim as a "safe place to live, work and play." The purpose of the Safety Element is to identify potential hazards that can significantly impact the City; provide policies to minimize potential dangers to residents, workers, and visitors, and to reduce the level of property loss due to a potential disaster; and, identify ways to respond to crisis situations.

This Element specifically addresses the way in which the City will respond to fire hazards, geologic and seismic hazards, flood hazards, and serves to address disaster preparedness. The Safety Element provides background information related to each issue and identifies risk-reduction strategies, hazard abatement measures, and potential hazard locations within the City that can ultimately be used while making future land use decisions. Included policies address ways to minimize any economic disruption and accelerate the City's recovery following a disaster.

## **RELATIONSHIP TO OTHER DOCUMENTS**

The General Plan provides a comprehensive overview of the City's policy approach to protecting public health, safety and welfare, while associated safety-related documents provide the regulatory mechanisms to address the social, economic and aesthetic factors that should be considered to respond to the community's safety needs. Understanding and facilitating an ongoing relationship between the Safety Element of the General Plan



and other safety-related documents such as Homeland Security Advisory System (HSAS) Guidelines, the Anaheim Fire Department's Hazardous Materials Area Plan, the City's Emergency Response Plan, the Anaheim Municipal Code, Federal Emergency Management Agency (FEMA) Flood Mapping, and Alquist Priolo mapping will be critical to ensure the safety of Anaheim's residents, businesses, and visitors.

## **Related General Plan Elements**

Critical relationships also exist between the Safety Element and other General Plan Elements. The types and locations of land uses identified in the Land Use Element are influenced and regulated by the locations of natural hazards, while emergency evacuation routes and locations of critical facilities can be influenced by the goals and policies identified in the Circulation Element. The Public Services and Facilities Element addresses the ability of the City's Police and Fire Departments to respond to hazards and disasters identified in this Element. In addition, the Land Use and Green Elements preserve natural resources that may be impacted by hazards.

## **Other Regulatory Documents**

Federal, State, and local regulations and policies such as the California Environmental Quality Act (CEQA), the California Government Code, the Uniform Building Code, and the Anaheim Municipal Code regulate and/or influence land use and development in Anaheim. Not only do they help to protect the health, safety, and welfare of Anaheim residents, visitors and businesses by ensuring that proper analyses are conducted, sound construction practices are implemented, and uses are appropriately sited within the City, they can also help to minimize the recovery time necessary after a disaster.

## GOALS AND POLICIES

This section contains a comprehensive overview and detailed policy direction related to safety provisions within the City. The safety items addressed in this element should be given careful consideration when new development, roads, parks, critical emergency facilities, infrastructure or other projects are designed.

### Geologic and Seismic Safety Considerations

The State regulates development in California through a variety of tools that reduce or mitigate potential hazards from earthquakes or other geologic hazards. The California Building Code (CBC), **Unreinforced Masonry Law**, Alquist-Priolo Earthquake Fault Zoning Act and the State of California Seismic Hazards Mapping Act govern development in potentially seismically active areas.

#### Unreinforced Masonry Law:

The Unreinforced Masonry Law requires cities and counties within Seismic Zone 4 to identify hazardous unreinforced masonry buildings and consider local regulations to abate potentially dangerous buildings through retrofitting or demolition as outlined in the State Office of Planning and Research Guidelines.

The CBC contains provisions to safeguard against major structural failures or loss of life caused by earthquakes or other geologic hazards. According to the CBC, the City of Anaheim is located in Seismic Zone 4, one of five zones (0-4) mapped in the CBC to identify areas subject to varying degrees of potential impact and frequency of large earthquakes. Seismic Zone 4 is potentially subject to the highest accelerations, or changes in speed or velocity due to seismic shaking, and has the greatest frequency of large earthquakes.

#### **Fault Zones**

Anaheim is located in an area considered to be seismically active, similar to most Southern California cities. Active and potentially active faults are located adjacent to Anaheim; however, there are no Alquist-Priolo Earthquake Fault Zones within the City limits. Figure S-1 shows known regional earthquake faults in relation to the City boundaries.



Anaheim is located between two major active fault zones: the Newport-Inglewood fault zone located to the southwest and the Whittier-Elsinore fault zone located to the northeast. Both the Newport-Inglewood and the Whittier-Elsinore faults are zoned under the **Alquist-Priolo Earthquake Fault Zoning Act**. The Newport-Inglewood fault zone passes within approximately seven miles of the western limits of the City. Although no onshore surface fault rupture has taken place since 1769, the Newport-Inglewood fault zone is considered capable of generating an earthquake with a magnitude of 6.9 on the Richter Scale.

#### Alquist-Priolo Earthquake Fault Zoning Act

The main purpose of the Alquist-Priolo Earthquake Fault Zoning Act is to prevent the construction of buildings used for human occupancy on the surface trace of active faults. The Act focuses on the hazards associated with surface fault rupture and does not address other earthquake hazards.

The Whittier-Elsinore fault zone is the closest major fault system to the City and one of the largest in Southern California. The Whittier-Elsinore fault zone does not extend inside the City boundaries, but approaches within less than one mile of the northeastern corner of the City. The Whittier-Elsinore fault is currently active and is capable of generating an earthquake of up to a magnitude of 6.8 on the Richter Scale, which could result in surface rupture along one or more of its fault **traces**.

#### Surface trace:

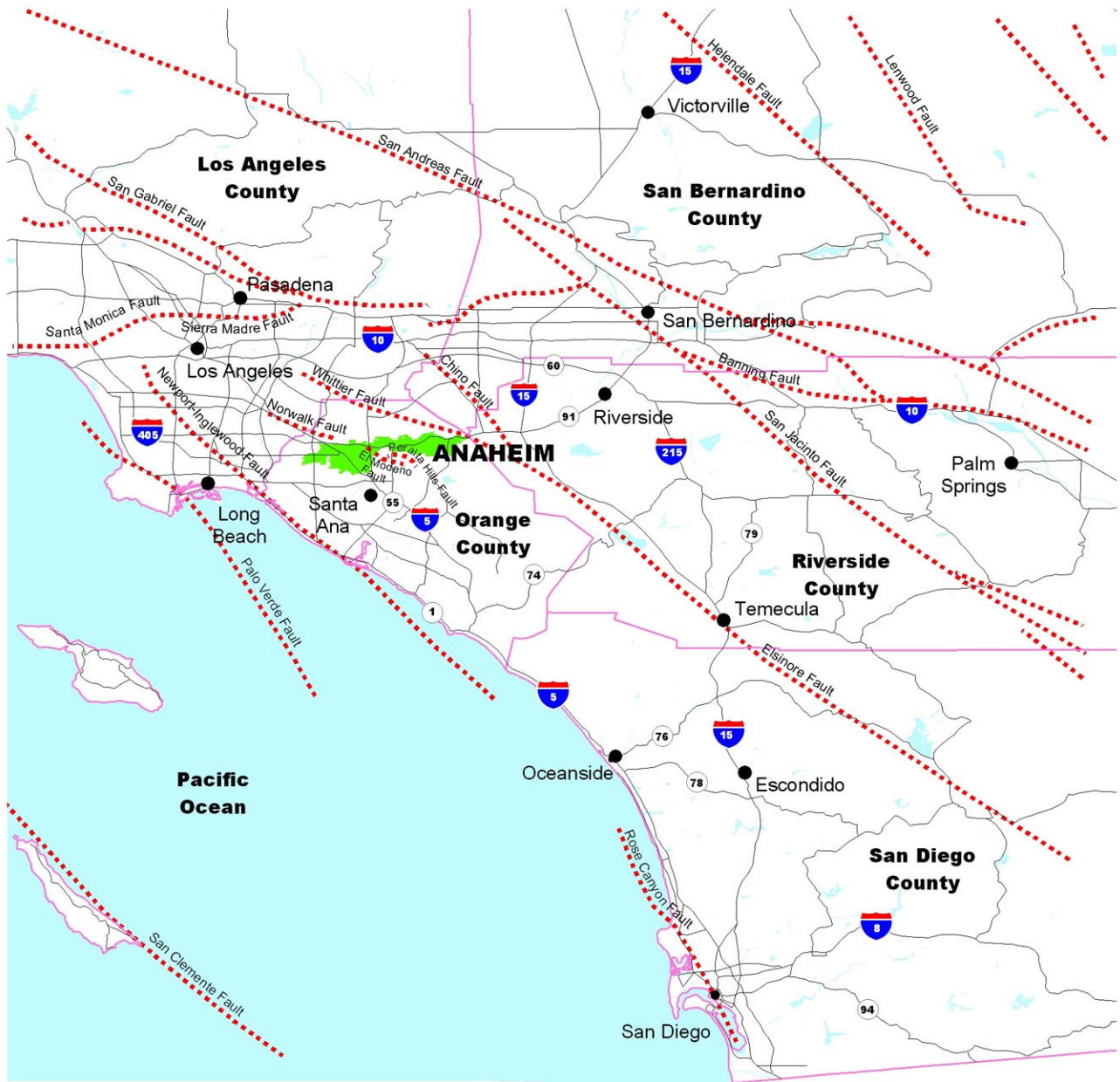
Commonly referred to as a "fault line," a surface trace is the intersection of a fault plane with the surface of the Earth. It is sometimes, but not always, visible at the surface because of geomorphic evidence such as ridges, valleys, etc.

The potential for ground **rupture** due to fault movement is commonly related to the seismic activity of known fault zones. Recognized active fault zones are located outside of the City of Anaheim. Potentially active faults in close proximity to the City are the El Modeno, Peralta Hills, and Norwalk faults (Figure S-2), which have a low possibility of ground rupture within the City. The majority of the El Modeno and Peralta Hills faults are located south of the Peralta Hills area and outside the boundaries of the City of Anaheim. The El Modeno fault zone is a concealed fault and the exact location of the fault is, therefore, uncertain. The California Department of Mines and Geology (CDMG) has determined that the El Modeno, Peralta Hills and Norwalk faults are not "sufficiently active" or "well defined" enough to be subject to the provisions of the Alquist-Priolo Earthquake Fault Zoning Act. Compared with the more active and recognized fault zones, the potential for ground rupture due to seismic activity in the City is considered low.

**Fault rupture** generally occurs along preexisting faults, which are areas of weakness.

**Surface rupture** occurs when movement on a fault deep within the earth breaks through to the surface.

# Regional Fault Location Map



Source: Modified from California Department of Mines and Geology, Preliminary fault activity map of California, dated 1994.

Note: All fault locations and dimensions are approximate and not all fault locations are shown.

- - - - - Fault Line
- County Boundaries
- City of Anaheim



0 5 10 20 Miles

## City of Anaheim

### General Plan Program

Figure S-1 Page S-5



*This page intentionally left blank*







*This page intentionally left blank*

### Landslides

Landslides result from the downward movement of earth or rock materials that have been influenced by gravity. In general, landslides occur due to various factors including steep slope conditions, erosion, rainfall, groundwater, adverse geologic structure, and grading impacts.

#### Soil slumps:

Loose, partly to completely saturated sand or silt; poorly compacted manmade fill composed of sand, silt, or clay; preexisting soil slump.

*Source: USGS Website*

Landslide deposits include relatively shallow surficial **soil slumps**, mudflows, and debris flows, which develop within the near surface topsoils, colluvium, and weathered formational materials. Faulting and stream erosion are also common factors in the development of planes of weakness that contribute to landslide potential. In Anaheim, landslides have occurred in the steep slopes of the Hill and Canyon Area.

Areas of landslide potential are shown in Figure S-2. In areas of existing land development, the mapped landslides may have been removed, mitigated, or altered during the grading for land development.

The Santiago Landslide includes an area of land deformation encompassing approximately 25 acres of land, which became active in 1993. The Santiago Landslide is located south of Walnut Canyon Reservoir along the southern limits of the City. Mitigation efforts to stabilize this area include groundwater withdrawal from numerous wells scattered throughout the area. The City established a Geologic Hazard Abatement District to maintain, monitor, and manage the dewatering system.

#### California Seismic Hazards Mapping Act:

The California Seismic Hazards Mapping Act, passed in 1990, addresses non-surface fault rupture earthquake hazards including liquefaction and seismically induced landslides. Cities, counties, or other permitting authorities are required to regulate certain development within seismic zones. Agencies must withhold development permits for a site within a zone until the geologic conditions have been investigated and appropriate mitigation measures are incorporated into development plans.

### Earthquake-Induced Landslides

Earthquake-induced landslides have the potential to occur in the Hill and Canyon Area. Generally, these types of failures consist of rock falls, landslides, and debris flows. Areas having the potential for earthquake-induced landsliding generally occur in areas of previous landslide movement, or where topographic, geological, geotechnical, and subsurface water conditions indicate a potential for permanent ground displacements. Areas considered to have potential for earthquake-induced landsliding are shown in Figure S-3. It should be noted that much of the potential for earthquake-induced landslides has been mitigated as development has stabilized much of the Hill and Canyon Area.



### **Liquefaction**

Liquefaction takes place when granular materials that are saturated by water lose strength and transform from a solid to a liquid state. Liquefaction generally occurs during significant earthquake activity, and structures located on soils such as silt or sand may experience significant damage during an earthquake due to the instability of structural foundations and the moving earth.

Soil liquefaction is a seismically induced form of ground failure, which has been a major cause of earthquake damage in Southern California. During the 1971 San Fernando and 1994 Northridge earthquakes, significant damage to roads, utility pipelines, buildings and other structures was caused by liquefaction. Research and historical data indicate that loose, granular materials situated at depths of less than 50 feet with silt and clay contents of less than 30% that are saturated by a relatively shallow groundwater table are most susceptible to liquefaction. These geological and groundwater conditions exist in parts of Southern California and Anaheim, typically in valley regions and alluviated floodplains.

Liquefaction has the potential to impact properties within the City that are located along the Santa Ana River as well as western portions of the City (Figure S-3). Mapped liquefaction zones are intended to prompt more detailed, site specific, geotechnical studies as required by the California Seismic Hazard Mapping Act. In addition, the City's building codes require structures in these areas to be designed to withstand the potential impacts that could be caused by liquefaction.

### **Mining Activity and Oil and Gas Wells**

Historically, mining activities and petroleum exploration have resulted in the creation of open pits and wells. The approximate location of known active and abandoned mines and quarries, as well as oil and gas wells within the City, is represented in Figure S-4. In some cases, pits and wells may have been abandoned and backfilled with undocumented fill materials. Existing pits and wells backfilled with undocumented materials may be subject to differential settlement, which causes structures to shift, and often become damaged, due to the uneven lowering of the earth. Differential settlement is closely related to subsidence, which is the sudden sinking or gradual downward settling of the earth's surface with little or no horizontal movement. Subsidence can be caused by natural geologic processes or by human activity such as subsurface mining or pumping of oil or groundwater.





*This page intentionally left blank*





*This page intentionally left blank*



**GOAL 1.1:**

**Minimize the risk to public health and safety and disruptions to vital services, economic vitality, and social order resulting from seismic and geologic activities.**

**Policies:**

- 1) Minimize the risk to life and property through the identification of potentially hazardous areas, adherence to proper construction design criteria, and provision of public information.
- 2) Require geologic and geotechnical investigations in areas of potential seismic or geologic hazards as part of the environmental and/or development review process for all structures and enforce structural setbacks from faults that are identified through those investigations.
- 3) Enforce the requirements of the California Seismic Hazards Mapping and Alquist-Priolo Earthquake Fault Zoning Acts when siting, evaluating, and constructing new projects within the City.
- 4) Require that engineered slopes be designed to resist earthquake-induced failure.
- 5) Require removal or rehabilitation of hazardous or substandard structures that may collapse in the event of an earthquake.
- 6) Require that **lifelines** crossing a fault be designed to resist the occurrence of fault rupture.
- 7) Require that new construction and significant alterations to structures located within potential landslide areas (Figure S-2) be evaluated for site stability, including the potential impact to other properties, during project design and review.

**Lifelines:**

Water, sewer, electrical, gas facilities, and communication and transportation facilities that are needed in the event of an earthquake, flood, or other natural disaster. (Figure S-8)



## Urban and Wildland Fire Hazards

Fires can occur in urban environments and can also impact unpopulated areas that may contain brush or grasslands. The central and western portions of Anaheim are highly urbanized and relatively built out, and the Hill and Canyon Area is approaching its buildout potential. As a result, the City must continue to address the growing need to defend both persons and property from urban and wildland fires.



In urban areas, the effectiveness of fire protection efforts is based upon several factors, including the age of structures, efficiency of circulation routes that ultimately affect response times and availability of water resources to combat fires. In wildland areas, taking the proper precautions, such as the use of fire resistant building materials, a proactive Fire Prevention inspection program, and the development of defensible space around structures where combustible vegetation is controlled, can protect developed lands from fires and, therefore, reduce the potential loss of life and property.

Other factors contribute to the severity of fires including weather and winds. Specifically, winds commonly referred to as Santa Ana winds, which occur during fire season (typically from June to the first significant rain in November) are particularly significant. Such “fire weather” is characterized by several days of hot dry weather and high winds, resulting in low fuel moisture in vegetation.

One of the last major wildland fires in the Hill and Canyon Area was the “Stagecoach Fire” in 1993, which burned 700 acres. Prior to that, the Gypsum Canyon fire occurred in 1982 and burned 16,800 acres. In 1967, the Paseo Grande Fire, which began in Corona, burned through portions of this area, and also burned into the Cities of Irvine, Orange, and Villa Park. Many homes were lost in that fire and approximately 48,639 acres were burned. In 1948, the Green River fire burned 47,000 acres. This fire history indicates that wildland fires continue to pose a threat to the Hill and Canyon Area.

The structural fire risk in the Hill and Canyon Area is estimated to be a low probability/moderate consequence event. This means that relatively few fires occur in well-maintained communities with a majority of owner-occupied homes having relatively few occupants compared to the size of the structure. When a fire does occur, it is usually confined to one room (kitchen or bedroom) and does not spread beyond the structure of origin.

Properties within Very High Fire Hazard Severity Zones have been identified by the City. As shown in Figure S-5, Very High Fire Hazard Severity Zones include the ridgeline areas and undeveloped wildland areas located east of the Costa Mesa (SR-55) Freeway and south of the Riverside (SR-91) Freeway. In addition, there is a significant amount of undeveloped land east of the Eastern Transportation Corridor (SR-241) to the Riverside County line. The Anaheim Fire Department has also classified this area as a Very High Fire Hazard Severity Zone.



For additional information regarding "Very High Fire Hazard Severity Zones" refer to Title 16.40 of the Anaheim Municipal Code.

All other areas within the City located east of the Costa Mesa (SR-55) Freeway, and south of the Riverside (SR-91) Freeway, are designated as a Special Protection Area. The City provides safeguards to prevent devastation from fires such as routine inspections of homes and the surrounding areas.

The Special Protection Area provisions emphasize the prevention and control of urban/wildland interface fires through the enforcement of fire regulations such as the removal of combustible vegetation, establishment of wet zones, and preventive building features such as spark arrestors on fire places.

The current vegetation risk in the Special Protection Area is estimated to be a moderate probability/high consequence event. The key to effective control of a vegetation fire is a rapid response by local fire units and providing defensible spaces for firefighters to fight fires. This is especially true during fire season, when fire units may be committed to other fires and are unavailable to respond. To ensure adequate fire protection in times of major fire events, the City participates in the Standardized Emergency Management System (SEMS), which enhances multi-agency coordination for local and regional emergencies. Additional information on SEMS is provided in the section on Disaster Preparedness, Response and Recovery.

Following a major earthquake, availability of water may be limited due to breaks in water lines caused by fault ruptures, liquefaction, or landslides. Reservoirs such as the Walnut Canyon reservoir could be impacted by earthquakes, which could also affect the ability to fight fires.

#### **GOAL 2.1:**

**Protect the lives and property of residents, businesses owners, and visitors from the hazards of urban and wildland fires.**

#### **Policies:**

- 1) Minimize the exposure of residents, business owners, and visitors to the impacts of urban and wildland fires.



- 2) Continue to assess the need for additional greenbelts, fuel breaks, fuel reduction and buffer zones around communities to minimize potential losses.
- 3) Maintain a weed abatement program to ensure clearing of dry brush areas.
- 4) Continue to classify areas of varying fire hazard severity based upon the proximity to open wildland slope, grades, accessibility, water supply and building construction features.
- 5) Continue to conduct long-range fire safety planning, including enforcement of stringent building, fire, subdivision and other Municipal Code standards, improved infrastructure, and mutual aid agreements with other public agencies and the private sector.
- 6) Continue to refine procedures and processes to minimize the risk of fire hazards in the Special Protection Area including requiring new development to:
  - Utilize fire-resistant building materials;
  - Incorporate fire sprinklers as appropriate;
  - Incorporate defensible space requirements;
  - Comply with Anaheim Fire Department Fuel Modification Guidelines;
  - Provide Fire Protection Plans; and,
  - Implement a Vegetation Management Plan, which results in proper vegetation modification on an ongoing basis within the Special Protection Area.
  - Develop fuel modification in naturalized canyons and hills to protect life and property from wildland fires, yet leave as much of the surrounding natural vegetation as appropriate.
  - Require development to use plant materials that are compatible in color and character with surrounding natural vegetation.
  - Provide wet or irrigated zones when required.
  - Use selective trimming and obtain permits when necessary in designated areas to preserve environmentally sensitive native plants.
- 7) Utilize reservoirs, tanks, and wells for emergency fire suppression water sources.

Defensible space can be created around structures by taking precautionary measures such as:

Thinning trees and brush within a minimum of 30 feet of a home. Beyond 30 feet, remove dead wood, debris and low tree branches.

- Keeping lawns trimmed, leaves raked, and the roof and rain-gutters free from debris such as dead limbs and leaves.
- Stacking firewood at least 30 feet away from a home.
- Storing flammable materials, liquids and solvents in metal containers outside the home at least 30 feet away from structures and wooden fences.





*This page intentionally left blank*

- 8) Ensure that fuel modification and controlled fire burns are consistent with the Natural Community Conservation Plan agreement and any adopted habitat conservation plans.
- 9) Encourage owners of homes with wood roofs and flammable siding to replace them with Class-A, non-wood roof systems.
- 10) Ensure adequate fire-fighting resources are available to meet the demands of new development, including the construction of mid- to high-rise structures, by ensuring that:
  - Response times do not exceed desired **levels of service**;
  - Fire flow engine requirements are consistent with Insurance Service Office (ISO) recommendations; and,
  - The height of truck ladders and other equipment and apparatus are sufficient to protect multiple types of structures.
- 11) Continue public education efforts to inform residents, business owners and visitors of fire hazards and measures to minimize the damage caused by fires to life and property.

Fire-related **levels of service** are based on the time it takes for the Anaheim Fire Department to respond to an incident and the ratio of fire personnel employed in relation to the total population.

## Flood & Dam Inundation Hazards

The potential for flooding is a safety concern that Anaheim continues to address. The Federal Emergency Management Agency (FEMA) has determined that floods are the most common and widespread of all natural disasters, except fire. Most communities in the United States have experienced some kind of flooding, after spring rains, heavy thunderstorms, or winter snow thaws.



Since Anaheim is partially located in an alluvial plain, drainage stemming from the mountains to the north and east must cross Anaheim to reach the coast. The Santa Ana River flows through the eastern part of the City entering from Riverside County and the Prado Flood Control Basin. Drainage through the City is controlled and directed via storm drains, channels and the Santa Ana River.



Figure S-6 identifies areas within the City that have the potential to be impacted in the event of a **100-year or 500-year flood**. Due to the elevated topography of the eastern portion of the City, the majority of the Hill and Canyon Area south of Santa Ana Canyon Road is outside of the 500-year flood zone. FEMA's Flood Insurance Rate Maps (FIRMs) provide more detailed flood hazard map information. FIRMs are available for reference from the Anaheim Planning Department, the City's Main Library and FEMA.

**100-Year Floodplain:**

Land that is subject to flooding by a 100-year flood or the flood elevation that has a one percent chance of being equaled or exceeded each year.

**500-Year Floodplain:**

Land that has the potential to be flooded in a storm that has a 0.2 percent chance of occurring every year.

Congress developed the National Flood Insurance Program (NFIP) in 1968 to respond to the elevating cost of taxpayer-funded disaster relief for flood victims and the increasing level of damage that was caused by flooding. According to FEMA, approximately 20,000 communities across the United States, including Anaheim, participate in the NFIP through the adoption and enforcement of floodplain management ordinances. These ordinances help to reduce future flood damage, and in return, the NFIP makes Federally-backed flood insurance available to homeowners, renters, and business owners in participating communities.

Flood inundation resulting from dam failure is a potential hazard for the City. General limits of flood hazard due to dam failure are shown on Figure S-7, *Dam Inundation Map*, for the Walnut Canyon Reservoir, Carbon Canyon Dam and the Prado Dam. Walnut Canyon Reservoir is located in the Hill and Canyon Area of the City. The reservoir became operational in 1963, has a capacity of approximately 920 million gallons, and is man-made with earthen dams.







*This page intentionally left blank*





*This page intentionally left blank*

The Prado Dam and reservoir are located approximately 2.5 miles east of Anaheim in Riverside County. The Prado Dam was completed in 1941 and was intended to provide flood protection to the Lower Santa Ana River Basin. The existing 9,000 cubic feet per second (cfs) limit on controlled releases from the Prado Dam is based upon the original non-damaging capacity of the downstream channel. When the downstream channel improvements that are part of the United States Army Corps of Engineers' Santa Ana River project are completed, the downstream channel capacity will increase dramatically to over 30,000 cfs. Plans are also underway to improve Prado Dam to increase its storage and release capacities. These improvements will enable the dam to take full advantage of the improved channel capacity downstream and will greatly increase the level of flood protection to communities within the Santa Ana River floodplain.



Prado Dam  
Source: United States Army Corp of Engineers Website

The Carbon Canyon Dam is located three quarters of a mile south of Carbon Canyon Road (Route 142) and an eighth of a mile northeast of Rose Drive in the City of Brea. Construction of the dam was completed in 1961. Carbon Canyon Dam is an earth-filled dam, 2,600 feet in length and 99 feet in height, designed to hold 12,000 acre feet of water, with spillways approximately 125 feet in width. The dam is owned and operated by the US Army Corps of Engineers.



Carbon Canyon Dam  
Source: United States Army Corps of Engineers Website



As indicated in the City's Emergency Response Plan, should a breach of Carbon Canyon Dam occur, the water released would flow in a southerly direction to Carbon Canyon Creek. The potential flood zone, including the full width of the alternate flood zone, would be west to Imperial Highway, and east to Richfield Road and Orangethorpe Avenue. Travel time would be approximately 15 minutes. The easterly flow would continue south to SR-91 remaining west of Richfield Road. The westerly flow would continue between Commonwealth Avenue on the north and Riverside (SR-91) Freeway on the south reaching the Orange (SR-57) Freeway in approximately 30 minutes. The inundated area would widen north to Malvern (Fullerton), west past Beach Boulevard, the flow westerly between Artesia Boulevard on the north, and SR-91 on the south and empty into Coyote Creek just west of La Palma. Areas in the City that are potentially affected by a Carbon Canyon Dam failure appear to be north of SR-91.



### **Seiche Potential**

A seiche is an earthquake generated wave occurring in an enclosed body of water, such as a lake, reservoir, or harbor. The period of oscillation is dependent on the characteristics of the containing basin's physical dimensions, such as surface shape and subsurface geometry. Oscillation periods may range from a few minutes to an hour or more. A seiche may be caused by earthquake ground shaking. The magnitude of a seiche is related, in part, to the magnitude of the earthquake. A seiche can result in waves and flooding to properties along the shores of lakes, reservoirs, or harbors.



Anaheim Flood of 1938  
Source: Anaheim Colony Webpage

The Walnut Canyon Reservoir is an enclosed body of water in the Hill and Canyon Area, which could be subject to relatively strong earthquake ground shaking. There is a low to moderate potential for seiche hazards affecting properties adjacent to the reservoir.

The following policies are intended to reduce the threat of catastrophic flood damage through aggressive flood mitigation activities.

**GOAL 3.1:**

**Reduce, to the greatest extent possible, the risk to life, property, public investment, and social order created by flood hazards.**

**Policies:**

- 1) Evaluate all development proposals located in areas that are subject to flooding to minimize the exposure of life and property to potential flood risks.
- 2) Provide appropriate land use regulations and site development standards for areas subject to flooding.
- 3) Encourage new development to maintain and enhance existing natural streams, as feasible.
- 4) Continue to participate in the National Flood Insurance Program.
- 5) Continue to comply with the **Cobey-Alquist Floodplain Management Act** requirements and State of California Model Ordinance.
- 6) Continue to work with the Orange County Flood Control District and the United States Army Corps of Engineers to receive and implement updated flood control measures and information.
- 7) Utilize flood control methods that are consistent with Regional Water Quality Control Board Policies and **Best Management Practices (BMPs)**.

The Cobey-Alquist Floodplain Management Act encourages local governments to plan, adopt, and enforce floodplain management regulations.

**Best Management Practice (BMP):**  
A practice that has been defined or adopted as the most effective, practical, economical, and technologically sophisticated means to better manage wastes and prevent or reduce contamination of groundwater.

**Hazardous Materials and Waste**

Anaheim has many businesses that manufacture, transport, store, use and dispose of hazardous materials. Hundreds of miles of jet fuel lines, oil pipelines, gas lines and water mains also traverse the City. The City has, therefore, the potential to be affected by a major hazardous material emergency. The facilities depicted in Figure S-8 have the potential to create, or be severely impacted by, a hazardous emergency if they are damaged or disrupted.

**Hazardous Materials Management Program**

The Environmental Protection Section (EPS) of the Anaheim Fire Department administers the hazardous materials management program for the City. The EPS also administers



the regional hazardous materials response team joint powers agreement under the Orange County-City Hazardous Materials Emergency Response Authority (OCCHMERA). The OCCHMERA is comprised of the County of Orange and the Cities of Anaheim, Huntington Beach, and Santa Ana. The role of the Joint Powers Authority (JPA) is to provide prompt and efficient response to hazardous material emergencies throughout Orange County using hazardous materials response teams from these jurisdictions.

The City is also a Certified Unified Program Agency (CUPA). As described by the State of California, the Unified Program (UP) was created to consolidate, coordinate and make consistent the administrative requirements, permits, inspections, and enforcement activities for environmental and emergency management programs.

### **Hazardous Materials Area Plan**

The Anaheim Fire Department has developed the Hazardous Materials Area Plan (Haz Mat Area Plan) to assist agencies in their pre-emergency planning and their emergency response role. The Plan also provides the public with information about facilities that pose a threat or potential hazard to the community's health and safety. The Haz Mat Area Plan is designed to assist in the prevention or mitigation of the damage to the health and safety of persons and the environment from the release or threatened release of hazardous materials into the workplace or environment.

### **GOAL 4.1:**

**Decrease the risk of exposure for life, property and the environment to hazardous materials and hazardous waste.**

---

#### **Policies:**

- 1) Follow the response procedures outlined within the Anaheim Fire Department's Hazardous Materials Area Plan in the event of a hazardous materials emergency.
- 2) Promote the proper handling, treatment and disposal of hazardous materials and hazardous waste.
- 3) Encourage businesses to utilize practices and technologies that will reduce the generation of hazardous wastes at the source.
- 4) Implement Federal, State and local regulations for the disposal, handling, and storage of hazardous materials.
- 5) Promote the recovery and recycling of hazardous materials.







*This page intentionally left blank*

- 6) Employ effective emergency preparedness and emergency response strategies to minimize the impacts to health and safety that can result from hazardous materials emergencies such as spills or contamination.
- 7) Continually update maps of the City's emergency facilities, evacuation routes and hazardous areas to reflect additions or modifications.
- 8) Continue to partner with the County of Orange to provide needed programs such as the Regional Household Hazardous Waste Collection Center to provide disposal of household hazards at no cost to Anaheim residents and participating agencies.

### **Disaster Preparedness, Response and Recovery**

Advance preparation for potential disasters can prevent severe loss of life and property from catastrophic events. The proper preparations improve the City's ability to respond to emergency situations created by catastrophic events.

Preparation, however, is only the first step in the management of hazards and disasters. Once a disaster has occurred, the capability of the City to respond to the situation at hand affects how quickly the City can recover from impacts.

The City of Anaheim has an emerging preparedness plan that complies with State law and interfaces with other cities and counties within Southern California. The plan outlines the operations that shall be taken in the event of a disaster. It also allows for coordination with other agencies in the event that Anaheim is affected by a disaster elsewhere. The plan addresses a warning system, emergency broadcast system (EBS), Emergency Operations Center (EOC), and shelter system. The plan provides a foundation to conduct operations and coordinate the management of critical resources during emergencies. It also provides the framework for which non-governmental agencies and organizations that have resources needed to meet emergency requirements are integrated into the program.

The City of Anaheim also participates in the Standardized Emergency Management System (SEMS). The Governor's Office of Emergency Services administers SEMS and coordinates multi-agency responses to disasters. SEMS is required by the California Government Code and was developed to provide a "common language" for emergency response personnel to request resources and equipment from other agencies. In addition to resource allocation, SEMS was established to minimize the duplication of efforts during emergency response by defining common tactics and identifying a clear chain of command. The SEMS program is developed to respond to incidents as they occur, and does not provide long-term recovery guidelines.



**GOAL 5.1:**

**Minimize the risk to life and property through emergency preparedness and public awareness.**

**Policies:**

- 1) Ensure the availability of both the Safety Element and City emergency preparedness plans to employers and residents of Anaheim.
- 2) Coordinate disaster preparedness and recovery with other governmental agencies.
- 3) Evaluate the adequacy of access routes to and from hazard areas relative to the degree of development or use (e.g. road width, road type, length of dead-end roads, etc.).
- 4) Assess the potential for disruption to evacuation routes from landslide movement, fault ruptures, and failures caused by earthquakes.
- 5) Appropriately locate and coordinate emergency services including fire, police, and ambulance services.
- 6) Continue to conduct public outreach efforts to prepare the community and provide them with guidance on how to respond to natural disasters.
- 7) Train multi-lingual personnel to assist in evacuation and other emergency response activities to meet the community need.
- 8) Apply the procedures outlined in the Homeland Security Advisory System (HSAS) to prepare the City to respond to terrorist attacks.
- 9) Continue to evaluate and practice preparedness through Emergency Operations Center (EOC) exercises.

(Res. 2005-176, August 23, 2005)