

# City of Los Angeles

# Draft Safety Element

2021 Update

The Safety Element incorporates the 2018 Local Hazard Mitigation Plan, including future updates or amendments to the LHMP, into the Los Angeles General Plan Safety Element to detail local hazards, vulnerability to hazards, and emergency preparedness.

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# Introduction

Since 1975 State law has required city general plans to include a safety element which addresses the issue of protection of its people from unreasonable risks associated with disasters, e.g., fires, floods, earthquakes. The subject Safety Element provides a contextual framework for understanding the relationship between hazard mitigation, response to a disaster, and initial recovery from a disaster. It replaces the previous Safety Element, adopted in 1996.

An important premise of the Safety Element is that Los Angeles is an urbanized city that is integrally connected to its neighbors geographically and by disasters which recognize no boundaries. Therefore, the Element outlines the historic evolution in Los Angeles of local, State, and federal roles, particularly relative to mitigation of and response to disasters. The last section of the Element contains goals, objectives, policies and broadly stated programs.

The Safety Element is a component of the **City of Los Angeles General Plan**, maintained by the Department of City Planning. The Los Angeles General Plan is a collection of 12 policy documents, or “elements” that serve as a blueprint for the future of the city by informing land use decisions. In addition to the Safety Element, Los Angeles has General Plan elements on topics including: housing, mobility (transportation), noise, growth and infrastructure, and several others.

The **Safety Element** of the General Plan offers a high-level overview of how the City plans for disasters, and references readers to other implementation documents where they can find more detailed information. The General Plan is carried out by several city departments, through the goals and policies (Chapter 3) as well as programs (Chapter 4). City departments draft and implement additional interrelated long range plans and code provisions that address safety and disaster planning. Through this element the City assists readers to navigate this network of resources. This element also makes reference to related General Plan elements that address safety and climate change more broadly. These include the Plan for a Healthy LA (Health, Wellness, and Equity Element), which promotes environmental justice, the Mobility Element, which considers the safety of individuals as they travel between destinations, and the Housing Element, which addresses access to safe and accessible housing.

California Government Code specifies General Plan requirements that pertain to safety, which can be addressed in the Safety Element or the Local Hazard Mitigation Plan. The **Local Hazard Mitigation Plan (LHMP)** guides the City in reducing risks from disasters to people, property, economy and environment. The LHMP complies with federal and State hazard mitigation planning requirements to establish eligibility for funding under the Federal Emergency Management (FEMA) grant programs. The current LHMP was adopted in 2018, and is planned to be updated in 2023. The LHMP is incorporated as a component of the Safety Element to illustrate the element's adherence to State

requirements. As of this update, the 2018 LHMP and subsequent updates of the LHMP, shall be considered incorporated by reference into the Safety Element as a component of the Los Angeles General Plan. Throughout this document numeric references are made to specific sections and figures within the LHMP. These references are based on the 2018 version of the plan. The full LHMP is available on the website of the Emergency Management Department.

A full listing of plans and programs that inform and implement the Safety Element is available in Appendix B. Some of the most closely related plans and programs are detailed below.

The **Emergency Operations Plan (EOP)**, including Appendices and Annexes, outline interdepartmental strategies for a number of specific emergencies and aspects of disaster prevention, response and recovery. This collection of plans is maintained by the Emergency Management Department and available on the department's website. The **2020 Floodplain Management Plan (FMP)** identifies and addresses the impacts caused by flood hazards and provides specific mitigation measures to help protect properties and their occupants. The FMP is maintained by the Bureau of Engineering and updated with corresponding land use regulations adopted by the Department of City Planning. In accordance with FEMA requirements the plan is updated every five years. A separate but related program, the Floodplain Management Ordinance, previously referred to as the Floodplain Management Specific Plan, was updated in April of 2021, consistent with FEMA guidelines for federal floodplain regulation.

Two plans from the Mayor's office also provide background for this update to the Safety Element. The **Green New Deal/Sustainability pLAN (the pLAN)** was first published by the Office of Mayor Eric Garcetti in 2015, formalizing a commitment to addressing the climate emergency. The pLAN includes a series of targets and strategies across different city sectors and departments to reduce greenhouse gas (GHG) emissions, consistent with the Paris Climate Agreement. The plan is updated every four years through an extensive public engagement campaign, with the latest version re-titled "L.A.'s Green New Deal" (GND). Throughout this document this effort is referred to as "the pLAN" or the "GND." By integrating the goals and policies outlined in the pLAN into the Safety Element, Los Angeles will ensure that our ambitious commitment to climate mitigation and adaptation is embodied in the City's General Plan. The **Resilient Los Angeles (Resilient LA)** plan details how individual and regional partners can work collectively to protect themselves against sudden and unexpected events, while also addressing underlying chronic stresses in the region. Many of the hazard planning requirements set by the State are addressed through the Resilient LA plan, last updated in March 2018. Ideas and strategies outlined in this plan, but not yet captured in the 1996 Safety Element, have been incorporated throughout this document.

Finally, regulatory codes implement the Safety Element and demonstrate compliance with more specific state requirements. The **Los Angeles Municipal Code (LAMC)**,

including the zoning code, building code, fire code (which includes the California State Fire Code and Los Angeles provisions), outlines baseline regulations and requirements around hazards mitigations. Specific code provisions that meet State or other requirements for hazard planning are highlighted in Chapter 2. These provisions implement the underlying policy direction outlined in Chapter 3, which includes policy 1.1.6 directing the City to adopt State provisions locally. The **California Government Code (CA Govt. Code)** sets State requirements for local municipalities in the update, maintenance, and implementation of long range planning efforts.

Chapters 1, 3 and 4 of this Safety Element outline the scope of the City's on-going efforts to use experiences and new information to improve the City's hazard management program. Chapter 2 outlines the City's historic commitment to improving its prevention of controllable disasters, mitigation of impacts associated with disasters and response to disaster events.

# Chapter 1: Background

## Planning Area

The Safety Element relates to the entire City of Los Angeles. Within the City's boundaries are approximately 473 square miles of land area, including approximately 214 square miles of hills and mountains. The San Gabriel and Santa Susana Mountains bound the City on the north, the Santa Monica Mountains extend across the middle of the City. The Palos Verdes Hills and Pacific Ocean are on the south and west. Because disaster events, geologic features and potential hazards relate to each other and transcend the City's boundaries, this Element takes into account other jurisdictions and governmental entities. For more information on the geography and physical setting of Los Angeles see Chapter 4 of the Local Hazard Mitigation Plan (LHMP) *City of Los Angeles Profile*.

## Demographics

In 2020, the US Census Bureau reported the estimated population of approximately 3,890,000 persons in the City of Los Angeles. A detailed demographic profile of the City is included in the 2021-2029 Housing Element, *Chapter One: Needs Assessment*. An additional community demographic profile can be found in the LHMP Chapter Four, including the mapping of Vulnerable Communities as identified through the State CalEnviroScreen. More detailed information on demographic data and how it creates different types of vulnerability for communities across Los Angeles can be found in the Plan for a Healthy Los Angeles' Health Atlas maps. Finally, the Department of City Planning maintains detailed demographic reports based on the latest Census data, available online.

## Emergency Operations Organization and Emergency Management Division

The City's emergency response is coordinated through the Emergency Operations Organization (EOO). The EOO is the operational department of the City of Los Angeles responsible for the City's emergency preparations (planning, training and mitigation), response and recovery operations. Unique in design, it is a "department without walls" which comprises all agencies of the City's government. The EOO centralizes command and information coordination to enable a unified chain-of-command to operate efficiently and effectively.

The EOO designates a hierarchy of city staff from among agencies and departments who respond to safety emergencies and other local disasters following pre-established procedures. The EOO, along with other emergency plans and response resources, is administered by the Emergency Management Department (EMD), which includes its own dedicated staff in addition to the EOO. This section provides greater detail on the

current structure and function of the EOO and EMD, as well as their coordination with other departments and agencies at local and higher levels of government.

**Background and History.** After every significant emergency, City personnel evaluate the effectiveness of response, ways to improve response and how to reduce potential loss of life, injury and property damage in future similar events. Natural disasters within the City, as well as disasters in other parts of the world, have added to existing knowledge about disaster preparedness. Historically most jurisdictions rely on emergency personnel (police, fire, gas and water) to respond to and handle emergencies. In many jurisdictions, emergency agencies work independently of one another; situations which can lead to command and effectuation conflicts and inefficiencies.

In the late 1970s it was recognized that Los Angeles enjoyed a significant number of public and private resources which could be mobilized to respond to emergencies and provide assistance to victims. However, most of the services operated independently of each other. To evaluate how to make better use of government and private resources, Mayor Tom Bradley convened a task force to study the situation and recommend a plan of action. The task force recommended establishment of a unified, streamlined chain of command to maximize the limited City resources which were available for response to emergency situations. To accomplish this goal the City, in 1980, adopted the Emergency Operations Ordinance (Ordinance No. 153,772) which established a multi-agency Emergency Operations Organization (EOO) under the direction of the Mayor, and administration of an Emergency Operations Board (EOB) and Emergency Operations Center (EOC). At the time, it was the only city organization of its kind in the United States.

In 2000 the division responsible for coordination of the EOO, EOB, and EOC (then housed in the Office of the City Administrator) was expanded to become an independent department, called the Emergency Management Department (EMD).

**Emergency Management Department (EMD).** The Emergency Management Department has five divisions, comprised of administrative staff and specialists that work with City departments, other municipalities and an array of community-based organizations to ensure that the City and its residents have the resources and information they need to prepare, respond to and recover from emergencies, disasters and significant events.

EMD operates the Emergency Operations Center (EOC) and houses the Emergency Operations Organization (EOO) and Emergency Operations Board (EOB). The EOB is composed of leadership from each of the City Departments that coordinate emergency procedures and implement the programs described in the Local Hazard Mitigation Plan (LHMP) and Emergency Operations Plan (EOP).

The work of EMD is coordinated through its five divisions:

- The **Administrative Services** division manages budgets, grant administration, and EMD personnel. Division staff act as a liaison to other government and non-profit agencies and provide staff support for the Emergency Operations Board and Emergency Management Committee.
- The **Community Preparedness and Engagement** division works with community groups, schools, Council District offices, and the Mayor's Office to promote individual, household, and neighborhood resilience across the city. The division's "Ready Your LA Neighborhood" (RYLAN) program is coordinated through City Departments, outside agencies, and communities to help families and neighbors prepare for disasters.
- The **Operational Readiness** division ensures that the Emergency Management Department and Emergency Operations Center (EOC) are prepared at all times to respond to an emergency by coordinating EOC activations and staffing. The Operational Readiness division rapidly disseminates crisis information and establishes and maintains media relationships and public affairs protocols for Departments.
- The **Planning** Division maintains the City's Emergency Operations Plan (EOP), Local Hazard Mitigation Plan (LHMP) and coordinates with other city Departments on their long range emergency planning efforts. The LHMP qualifies the City to receive Federal Emergency Management Agency (FEMA) funding to reduce vulnerability to disasters. The EOP and its related Plan Annexes and Appendices total 45 documents that detail the operational responsibilities of EMD and the relevant agencies to prepare for specific emergencies and response. The division also ensures that all emergency plans in the City of Los Angeles are ADA compliant, accountable, and provide all possible mitigation measures.
- The **Training and Exercise** division develops programs to ensure EMD staff, other emergency responders, and the EOC are prepared to respond to emergency and disaster situations; conducts training exercises at the EOC; supports City departments' training efforts; and trains City employees in Standardized Emergency Management System (SEMS) and National Incident Management System (NIMS) concepts and practice.

**Emergency Operations Organization (EEO), Emergency Operations Board (EOB), and Emergency Operation Center (EOC).** EMD manages daily operations related to disaster prevention and preparedness in Los Angeles, but in the event of a declared emergency the Emergency Operation Organization (EEO) assumes primary management responsibilities. The EEO was created by ordinance in 1980 as an operational department of the City pursuant to City Administrative Code Division 8, Chapter 3. It is a chain of command and protocols activated by the Mayor and/or declaration of Local



Emergency which centralizes command and information coordination to operate efficiently and effectively in deploying resources.

The Emergency Operations Board (EOB) supervises the EOO (i.e., City) emergency preparedness, response and recovery. It is comprised of the heads of the City's critical emergency operations agencies, e.g., Board of Public Works, Fire and Police departments, etc. The Chief of Police is chair of the EOB, the General Manager of the Emergency Management Department is designated as the Emergency Operations Organization Coordinator, and the City Attorney is the legal advisor to the EOB.

The Mayor, in times of emergency, directs the operational divisions of the EOO. Each division is responsible for carrying out specific tasks for coordinating emergency actions which are essential in abating the impacts and limiting the scope of a catastrophe; responding to life threatening situations and safety needs of the population; maintaining and reestablishing essential services, transportation and communication networks; aiding dislocated people; and planning for recovery. The operational divisions of the EOO currently include Airports, Animal Services, Building and Safety, Fire Suppression and Rescue, General Services, Harbor, Information and Technology, Personnel and Recruitment, Police, Public Works, Public Welfare and Sheltering, Recovery and Reconstruction, Transportation, and Utilities.

An Emergency Management Committee (EMC) provides staff to support the EOB. Over two dozen City agencies, other governmental agencies and private organizations participate in activities of the EMC. The EMC develops plans and programs and conducts training exercises to promote integrated disaster planning, response and mitigation efforts.

An Emergency Operations Center (EOC) of the EOO provides a centralized coordination facility for emergency response activities. The EOC is equipped with vital communications and backup power, food and other supplies necessary to provide for the needs of the EOO emergency response coordinating team. The EOC resources, including the Main Coordination Room with 90 responder work areas, are organized according to National Incident Management System (NIMS) and Incident Command System (ICS) standards and designed for maximum survivability. Also co-located in this facility are a new Fire Dispatch Center, Fire Department Operations Center and the Police Department Operations Center (DOC). A mobile EOC unit is available in the event the primary center is inaccessible or to provide additional disaster response coordination capability. It is comprised of a fleet of vehicles which contain portable offices, communications, self-sustaining power, rest rooms and other resources to enable the mobile EOC unit to operate at any location to which it is sent.

The EOC operates a local and wide-area information management network with backup and satellite communication systems. It is connected to external video systems including LAPD, LAFD, and LADOT and receives frequent seismic and weather updates.

To enhance communications and provide additional communications back-up, the City, as a member of the Operational Area Satellite Information System (OASIS), through the EOO is linked to the Governor's Office of Emergency Services (OES) by satellite.

**Emergency Activation Procedures.** In the event of a major disaster or emergency, the Mayor assumes emergency powers, as defined by law. City agencies follow procedures contained in their emergency plans, under the direction of the Mayor and Chief of Police, pursuant to EOO protocols set forth in the EOO ordinance and plans.

Upon receipt of an official warning of an impending emergency or upon the proclamation of a Local Emergency by the Mayor, the EOO is immediately activated and convened with the EOB. Each department is required to operate as outlined in their Emergency Operations Plan and its related annexes. The Emergency Operations Plan describes the citywide response functions, responsibilities, and capabilities. Each Department's specific plans, the EOP Hazard Specific Annexes, and the EOP Functional Annexes (such as the Evacuation Annex or the Mass Care and Shelter Annex) are written in consideration of all the activities identified in the EMD Emergency Operations Plan. The Declaration of Local Emergency, chain of command should the Mayor be unable to act, and the distribution and powers of the EOO are also outlined in Los Angeles Administrative Code Division 8, Chapter 3.

**Other Interagency Coordination.** The California Office of Emergency Services (CAL OES) is designated by law to provide coordination and State resources to regions or local areas which are declared disaster areas by the Governor. The Federal Emergency Management Agency (FEMA) is designated by federal law to coordinate and provide federal resources to State and local government relative to disasters declared by the President. To facilitate rapid response to wildfires in brush and forest areas, the U.S. Forest Service has agreements with the County and City fire services for simultaneous dispatch of personnel and equipment to fight fires in designated geographic areas. The Public Works Mutual Aid Agreement, conceived by Los Angeles County in the late 1980s, provides for sharing of personnel and public works equipment between signatory cities and counties within the State during times of emergency. In addition, sometimes the City provides a specific service by contract to another jurisdiction. For example, for a set fee, the City provides fire and emergency medical services to the City of San Fernando which is geographically surrounded by Los Angeles.

Jurisdictional infrastructures, such as roads and emergency services, have become increasingly interrelated. Therefore, local jurisdictions are encouraged by the State to coordinate their general plans with neighboring jurisdictions. The Los Angeles County Safety Element includes all of the cities and unincorporated areas within the County and interrelates the critical service systems, evacuation routes, etc. for the entire county. The subject Safety Element and its associated graphic exhibits utilize and are consistent with the County Safety Element.

Mutual aid and other agreements provide for voluntary cooperative efforts and for provision or receipt of services and aid to or from other agencies or jurisdictions when local capabilities are exceeded by an emergency event. Through mutual aid agreements, the EOO and individual City agencies coordinate emergency response planning with adjacent cities, the County of Los Angeles, the State, federal agencies and other public and private organizations, such as the Los Angeles Unified School District and the American Red Cross. In addition they share information so as to improve hazard mitigation efforts and coordinate resources for disaster response and recovery. The current LHMP recognizes the mutual benefit conferred to stakeholders by interagency multi-hazard activities and requests that mutual aid be coordinated in the event that local personnel or equipment is unable to respond to a hazard or emergency.

Following the disastrous Oakland-East Bay Hills fire of 1991 the State legislature directed the OES, in coordination with other State agencies and interested local emergency management agencies, to establish by regulation the Standardized Emergency Management System (SEMS). The SEMS became effective in 1994 (Government Code Section 8607). It is a command management system which is based upon the Incident Command System (ICS). Like ICS, the SEMS is not a physical agency, it is a procedure for integrating emergency response functions. It sets forth a system and framework within which response agencies which utilize the SEMS can function in an integrated fashion, in effect becoming a single response entity. The SEMS outlines a chain of authority (command) for organization of all public emergency response functions within the State. As its name implies, the SEMS provides guidelines for standardization of procedures and approaches to emergency response; facilitation of the flow of information and resources between organizational levels (field, local government, operation area, regional and State); coordination between responding agencies; and rapid mobilization, deployment, use and tracking of resources. Cities and counties are encouraged to utilize the SEMS in order to qualify for State funds for emergency response activities.

In addition to agreements between government entities, private organizations play a key role in disaster planning and response. In particular, the American Red Cross, Salvation Army, churches and other non-profit organizations provide food, shelter, clothing, health care, volunteer labor and other emergency services to disaster victims, in coordination with the governmental agencies. A variety of private sector organizations have been formed to coordinate community emergency preparedness efforts, to heighten public awareness and understanding of the need for disaster preparedness and to encourage private disaster preparedness activities. Los Angeles Unified School District and City park facilities are the designated assembly and coordination locations for emergency sheltering and assistance efforts coordinated by the Red Cross, the State and/or FEMA. In addition, the Red Cross provides interagency emergency response planning and training support.

## California State Safety Element Requirements

**General Plan Requirements.** City and county general plans are required to contain a Safety Element which addresses disaster hazards. This Safety Element, which includes the Local Hazard Mitigation Plan, fulfills this State requirement. A safety element is intended to be the primary vehicle for relating local safety planning to land use planning and decisions.

It should be noted that the term “safety” does not mean “police.” Safety, in the context of the General Plan law and the subject Safety Element, addresses hazards associated with fire, flood, earthquake, landslides and other hazards as described in the Local Hazard Mitigation Plan. The second chapter of this Safety Element details how specific State requirements are satisfied across the Safety Element Local Hazard Mitigation Plan and other Safety Element implementation plans and programs.

Local officials have the authority to declare a local emergency and to invoke emergency regulations to facilitate response to the emergency. Planning and preparedness are critical in mitigating the extent of the impacts of a disaster, through pre-disaster abatement, pre-disaster response preparation and post-disaster recovery plans. The State identifies local safety elements and local hazard mitigation plans as key tools for assisting local jurisdictions in organizing their hazard mitigation, disaster response and recovery efforts.

In 1975, the State mandated that general plans contain safety elements. The general plan law was amended in 1984 to remove seismic elements from the list of required elements and to incorporate seismic provisions within the safety element provisions. CA Government Code Section 65302(g)(1) requires a safety element that protects “the community from any unreasonable risks associated with the effects of seismically induced surface rupture, ground shaking, ground failure, tsunami, seiche, and dam failure; slope instability leading to mudslides and landslides; subsidence; liquefaction; and other seismic hazards identified pursuant to Chapter 7.8 (commencing with Section 2690) of Division 2 of the Public Resources Code, and other geologic hazards known to the legislative body; flooding; and wildland and urban fires.” In addition to policies that address relevant hazards, State law requires mapping of these hazards within the General Plan, including “mapping of known seismic and other geologic hazards.” The City, through the Safety Element and LHMP, has developed integrated long range plans to address local hazards. Therefore, Los Angeles already goes far beyond the intent of the State general plan law and Governor’s guidelines relative to a comprehensive City Safety Element.

As part of the 2021 update to the Safety Element the City Planning Department reviewed the County Safety Element and determined that it did not contain sufficient City-oriented information to be adopted as the City’s safety element. The background data and information relative to the County and its immediate environs provided excellent

technical information. The City will continue to work alongside the County to achieve regional safety goals, especially those goals that require consistent collaboration to mitigate the impacts of climate change.

**Safety Element Update Timeline.** Several recent statutes (SB 1241, SB 1035, AB 747) require local governments to review, and update as necessary, the safety element concurrently with the housing element update. The 2021 Safety Element is being adopted alongside the 2021-2029 Housing Element, with targeted amendments to ensure compliance with all new State legislation.

**State Required Mapping.** The State sets requirements for mapping and information that must be included in relation to specific hazards. More information on these requirements and LA City compliance is available in Chapter 2: *Existing Conditions, Hazard Issues, and Mitigation History*.

**State Required Consultation.** This Safety Element was submitted for review to several State agencies on July 15, 2021, in keeping with State law. The draft element was shared with the California Board of Forestry and Fire Protection, the California Department of Forestry and Fire Protection (CAL FIRE), and local fire agencies, including the Los Angeles Fire Department and LA County Fire Department. The draft element was additionally shared with the California Geologic Survey and California Office of Emergency Services. Finally the draft document was shared with the California Office of Planning and Research, and the California Department of Justice which is not required by State law but serves as a meaningful coordination exercise. The related Environmental Impact Report, which covers both the Safety and Housing Elements, was additionally circulated to several State and local agencies.

The State Board of Forestry and Fire Protection, represented by CAL FIRE staff, reviewed a draft of the Safety Element and submitted comments and suggested revisions to the City of Los Angeles. The City accepted suggestions and submitted a revised draft to CAL FIRE. The Board of Forestry and Fire Protection voted to accept the Los Angeles Safety Element at their meeting on September 21, 2021. No comments were received from other State agencies.

**State Guidance on Format.** In addition to State law, the Governor's Office of Planning and Research (OPR) issues "General Plan Guidelines." The document provides guidance for preparation of local general plans. The Guidelines, under which this Safety Element was prepared, advise that a general plan contain goals, objectives, policies, programs and implementation monitoring. According to OPR General Plan Guidelines Appendix A:

*A goal is a general direction-setter. It is an ideal future end related to the public health, safety, or general welfare. A goal is a general expression of community values and, therefore, may be abstract in nature. Consequently, a goal is generally not quantifiable or time dependent.*

*An objective is a specified end, condition, or state that is an intermediate step toward attaining a goal. It should be achievable and, when possible, measurable and time-specific. An objective may pertain to one particular aspect of a goal or it may be one of several successive steps toward goal achievement. Consequently, there may be more than one objective for each goal.*

*A policy is a specific statement that guides decision-making. It indicates a commitment of the local legislative body to a particular course of action. A policy is based on and helps implement a general plan's vision. Programs can be short or long term groupings of projects or services that help achieve policy goals. Actions are specific methods to achieve policy goals.*

The three Safety Element goals parallel three of the primary phases of disaster planning: hazard mitigation (pre-disaster), emergency response (disaster event) and recovery (post-disaster). For the purposes of this Element, planning and training are incorporated under each of these phases. The three categories identify the three steps needed for urban safety relative to potential disasters: (1) pre-disaster mitigation of potential hazards which could cause loss of life and property damage during a disaster, procedures for mitigating disruption, provisions for back-up systems necessary for keeping essential City services and systems operational in the event of a disaster. As of 2021 this also includes efforts to prevent and mitigate climate change and its related impacts; (2) protection of life and property and provision of temporary assistance to disaster victims during and immediately following a disaster; and (3) post-disaster elimination of disaster-created hazards, re-establishment of private and public services and systems and general recovery.

The Element complies with State law by providing a contextual framework and overview of the City's hazards, hazard mitigation and emergency response operations. It is not intended to be as comprehensive as the EOP and associated plans insofar as the Element is an informational rather than operational document. The EOP and its related documents provide comprehensive (including police) operational protocols and plans. They are reviewed and approved not only by the EOO Board but by the Mayor and City Council and are updated continuously.

**Other Legislation and Requirements.** Additional information on legislation that regulates hazard planning, at the Federal, State and local level, is available in the Local Hazard Mitigation Plan, Chapter 4: *City of Los Angeles Profile*.

## Element Scope

**Prior General Plan Elements.** The 2021 Safety Element is similar in scope and content to the 1996 Safety Element. State law required that the Safety Element be updated alongside the 2021-2029 Housing Element, which limited the scope of the update



process by instituting a statutory adoption deadline. Update efforts were focused on removing outdated information and adding in new information to ensure compliance with all current State requirements. Additionally, this update is more concise than the 1996 Safety Element, as text and exhibits that were found to be dated or duplicative with other long range city documents were replaced by reference. Appendix C of this document includes detailed information on revisions by chapter.

**Jurisdiction.** Element implementation programs focus on programs which are within the authority and responsibility of the City of Los Angeles, though State and federal agencies are often involved in the implementation of local programs.

**Land Use.** The City's programs, including the subject Element, emphasize mitigation of potential hazard impacts. In addition to mitigation the City also considers land use strategies to reduce the number of structures in hazard areas. Hazard information informs zoning decisions during the Community Plan update process, and areas with considerable hazards are required to meet additional criteria during the land use entitlement process. As planning for future hazards, particularly those related to climate change and stressors, increases at the State and local level, the City will increasingly look to land use restrictions as preventative measures in hazard prone areas. These measures can also include considerations that advance sustainability and resilience goals.

**Interdepartmental Review.** The Safety Element was prepared by the Department of City Planning, with review and collaboration from other City Departments and agencies. A full draft of the Safety Element was reviewed by the Emergency Management Department, Los Angeles Fire Department, and the Office of Mayor Eric Garcetti. Through the Executive Directive 19 Task Force all City Departments had the opportunity to review and edit the Programs included in Chapter 4.

# Chapter 2: Existing Conditions, Hazard Issues and Mitigation History

Much of the City of Los Angeles is built within old flood plains and mountains or adjacent to the Pacific Ocean. The City is developed with dense centers of population near public transportation hubs and major job centers, connected by lower density, predominantly residential neighborhoods. Most of the flat lands of the City have been developed with some urbanized land use. Remaining undeveloped land tends to be concentrated within floodplains or along steep hillside and drainage water courses which typically have been designated for public park land, recreational, flood control infrastructure or low intensity uses, consistent with State law. Because vulnerability to fire and flood increase when development expands into remaining undeveloped areas the City promotes an infill smart growth strategy as outlined in the Framework Element. The City also employs additional strategies to protect individuals in hazard areas. These existing strategies are detailed below.

## General Disaster Prevention, Response and Recovery

The Safety Element includes the high level framework of Goals, Objectives, Policies and Programs that pertain to the safety of the City. The Local Hazard Mitigation Plan (LHMP) contains information related to hazard identification and planning in Los Angeles. The Emergency Operation Plan (EOP) and related Annexes details strategic information on disaster response and recovery. This update incorporates the LHMP into the City's General Plan by reference and outlines compliance with state regulations across documents. In addition to the hazard specific sections below, these plans include several points of information relevant to hazards more generally:

**Local Context and History.** The LHMP provides an account of the history and physical setting of the Los Angeles area, including a chronology of major federal declared disaster events, in *Chapter 4: City of Los Angeles Profile*. This Chapter additionally details major regulations and regulating bodies at the local, State and Federal level as they pertain to disaster safety. Some of these laws are further referenced below as they pertain to state requirements around specific disasters. A more detailed version of this local history, context, and legislative framework is provided in each chapter, focused on specific hazards, in the LHMP.

**Critical Facilities.** The LHMP discusses three types of critical facilities in *Chapter 4: City of Los Angeles Profile*. "Critical Operating Facilities" are office buildings that house the city personnel required for the day to day operation of the city. "Critical Response Facilities" are necessary for hazard event response. They include fire stations, police stations, hospitals and evacuation centers. "Critical Infrastructure" is divided into two



categories. “Transportation Infrastructure,” such as feeways, streets, bridges, airports and the harbor, are required for evacuation and egress. “Utilities Infrastructure,” which includes water, electric, gas and communications systems, are required to sustain the population during and after an emergency. These facilities are mapped in LHMP Figures 4-2 through 4-15. The City works to locate critical facilities outside of hazard areas (including fire and flood zones) whenever possible, as detailed in Safety Element Policy 1.1.3: *Facility/Systems Location and Maintenance*. Where applicable, the LHMP includes a discussion of when critical facilities are located in designated hazard areas. In addition to the LHMP discussion on critical facilities, the City maintains the EOP Critical Facilities Annex.

**Vulnerable Communities.** The State requires municipalities to identify “disadvantaged communities” that experience unique and compounding health risks as a result of disproportionate exposure to environmental hazards. This is done through several documents in the City of Los Angeles. The LHMP *Chapter 4* details vulnerable communities identified through the Red Cross’ Prepare LA Vulnerable Communities Project, which relies on CalEnviroScreen data. The Plan for a Healthy LA (Health, Wellness, and Equity Element) contains policies and measures related to environmental justice and identifies indicators of community vulnerability through the Health Atlas for the City of LA. The Health Atlas provides different indices of health access and outcomes, which determine a community’s relative vulnerability and resilience. Some maps visualize individual data sets, such as linguistic isolation or air quality, while others overlay data sets to create an index of topics, such as pollution burden and community health.

**Risk Assessment.** In addition to identifying how best to plan for and mitigate many specific disasters, the LHMP includes a risk assessment, which identifies hazards of concern and their likely impact and magnitude. This risk assessment can be found in *Chapter 5: Hazards of Concern, Risk Assessment Methodology*. This Risk Assessment serves as the City’s vulnerability assessment and will be expanded to further address climate change impacts during the next update of the LHMP. Individuals located in areas identified as hazard areas in the risk assessment are also considered “Vulnerable Communities” in the context of the Safety Element.

**Sheltering.** The City has several plans and procedures related to mass sheltering, rebuilding and reconstitution of critical facilities immediately following a disaster. City facilities, including recreation centers, schools and tourism facilities, have been pre-identified as emergency shelters. In addition to sheltering residents the City has planned to shelter animals and ensure access to food and water for all affected populations. The City’s EOP details a citywide, departmental approach to sheltering. Seven annexes are focused on mass care, including traditional and non-traditional sheltering, large and small animal sheltering, feeding and health/medical needs.

**Evacuation.** California Government Code Section 65302(g)(1) specifies the need to plan

for swift evacuation in the event of a fire or other emergency. The City includes a wide range of physical environments and dramatic differences in population density based on the time of day or day of the week. To better accommodate the variety of evacuation scenarios, the City has developed a dynamic approach to evacuation response, one that can respond to different conditions. As specified in the City EOP Evacuations Annex “primary evaluation routes consist of the major interstates, highways, and primary arterials within the City and Los Angeles County.” However, in response to a more localized emergency, such as a hillside wildfire, the LAFD works in coordination with the Los Angeles Department of Transportation and Los Angeles Police Department to identify the most appropriate local egress option and direct individuals to those routes. Potential routes have been pre-selected based on a number of considerations, but potential evacuation routes will vary based on the type and location of hazard/disaster. For instance, Tsunami Evacuation Routes are signed in coastal areas of the city and mapped in the EOP Tsunami Annex. Other routes are shared in real time depending on which disaster and suitable evacuation routes are identified. The related Transportation Appendix and Evacuation Annex of the EOP detail how to facilitate movement of the public and incident related resources during an emergency event.

**Secondary Events.** When a catastrophic disaster strikes, it may trigger secondary events. An earthquake may trigger a landslide or cause rupture of gas mains or hazardous materials enclosures. Disruption of gas mains could contribute to or cause fires. If winds are present, fires could become wildfires. Fires can denude hillsides and, thereby, exacerbate potential flood hazard and inundation conditions. For purposes of evaluating hazards addressed by this Safety Element, the following sections provide a brief history of the measures taken to mitigate individual hazards in Los Angeles.

## Wildland and Urban Fire

Fire was the first hazard to be addressed by El Pueblo de Los Angeles which was founded in 1781. The hot, arid climate, especially during the summer and fall, dried out vegetation. Dry brush was prone to fires caused by lightning strikes and spontaneous combustion. New sources of fire came with the advent of human habitation. By the early 1800s Los Angeles was an agricultural community with a small population. Buildings generally were constructed of adobe and tile. Individual properties experienced fires such as hay mounds igniting spontaneously, roofs being set afire by sparks from cooking stoves or fires due to carelessness. The primary fire hazard was storage of large quantities of hay. As the City grew and buildings were established in close proximity to each other, entire blocks could burn in a matter of hours due to the lack of adequate water storage and delivery systems. Given these potentially catastrophic hazards, it is not surprising that some of the earliest City building regulations addressed fire hazards.

The Los Angeles City Fire Department was established on February 1, 1886. Thirty firefighters, most of them former volunteers, were hired to man four leased firehouses.

In addition, volunteer units were retained in the less populated areas outside the central city, including the San Fernando Valley. From the beginning the Department was an innovative, progressive agency which sought to secure the latest equipment, utilize the latest techniques and to develop better methods for fire fighting and prevention.

After World War II the Department expanded dramatically in response to a commercial, industrial and population boom. Around the turn of the century, insurance companies played a significant role in the improvement of fire standards throughout the nation. Facing high costs from poorly managed fire systems, the fire underwriters joined together in an association which established fire rating systems to assess efficiency and effectiveness of local fire hazard mitigation and fire fighting agencies. Insurance rates were established accordingly. Cities could lower their fire insurance rates if they improved their hazard mitigation and fire fighting systems. This economic incentive spurred nationwide interest in fire prevention and suppression and continues to do so to this day. Today, The City of Los Angeles has a “Class 1” rating, the highest rating possible, which allows for insurers to assess risk at a lower level and thus lower premium rates. These efforts to map and quantify insurance risk also played a role in “redlining” practices that drove systemic disinvestment in communities of color. More information on these practices, and how they continue to shape our housing landscape, is available in the 2021-2029 Housing Element.

Fire prevention measures often were adopted following fires which resulted in loss of life or significant property loss so as to prevent similar occurrences in the future. Sometimes it took more than one tragic event to trigger public support for changes. Below is additional information on these prevention measures, and some history on their passage.

**Mapping.** For many years Los Angeles has identified and mapped areas of greater fire risk. In 1943 the City adopted a series of land use designations, called Fire Districts 1, 2, 3 and 4 to designate geographies with elevated fire risk. In 1944 Fire Districts 3 and 4 were removed from the code, and Fire District 2 was eventually replaced by the “Mountain Fire District.” Today Fire District 1 is still used to designate areas of significant urbanization that face an elevated fire risk. Fire District 1 includes some of the most significant regional centers in the City: Downtown, Hollywood, Century City, the Grove and Farmers Market, Baldwin Hills Crenshaw Plaza, and Wilshire Boulevard. The boundaries of Fire District 1 can be found in Los Angeles Municipal Code (LAMC) Section 91.7201.1.

The “Mountain Fire District” was established in January 1963 as a direct result of the November 1961 Bel Air Fire. In April of 1971, the “Fire Buffer Zones” were established as a direct result of the wind driven Chatsworth Fire. In 1993, as a result of the Oakland Hills Fire, the Bates Bill No.337 was enacted requiring local jurisdictions to identify and establish Very High Fire Hazard Severity Zones. The Los Angeles Fire Department’s Bureau of Fire Prevention and Public Safety joined with the Planning Section to conduct

a survey utilizing the criteria established by the State Fire Marshal.

The “Very High Fire Hazard Severity Zone” (VHFHSZ) was first established in the City of Los Angeles in 1999 and replaced the older “Mountain Fire District” and “Fire Buffer Zone.” The VHFHSZ is determined and updated according to California State Law. The VHFHSZ comprises most of the hilly and mountainous regions of the City of Los Angeles. It includes portions of the following communities: Baldwin Hills, Bel Air Estates, Beverly Glen, Brentwood, Castellammare, Chatsworth, Eagle Rock, East Los Angeles, Echo Park, El Sereno, Encino, Glassel Park, Granada Hills, Hollywood, Lake View Terrace Los Angeles, Los Feliz, Montecito Heights, Monterey Hills, Mount Olympus, Mount Washington, Pacific Palisades, Pacoima, Palisades Highland, Porter Ranch, San Pedro, Shadow Hills, Sherman Oaks, Silver Lake, Studio City, Sunland, Sun Valley, Sylmar, Tarzana, Tujunga, West Hills, Westwood, and Woodland Hills.

Each local fire station has a detailed map showing exactly which parcels of property are in the VHFHSZ. A map of VHFHSZs is available as figures 13-3 through 13-10 in the Local Hazard Mitigation Plan (where they are described as “Wildfire Severity Zones”). The Zoning Information Map System (ZIMAS) also details which parcels are located in a VHFHSZ. Very High Fire Severity Hazard Zones are considered a Fire District per the Los Angeles Building code (LAMC 91.7201.2). The boundaries of the Very High Fire Hazard Severity Zone are set in LAMC 57.4908, contained in Chapter V: *Public Safety and Protection*. These mapping efforts satisfy the requirement of CA Government Code Section 65302, which requires local mapping of State Responsibility Areas.

The State additionally requires cities to detail the location and distribution of existing and planned development in State Responsibility Areas and VHFHSZs. Within the LHMP the City provides estimates for population, structures, land use, and critical facilities and infrastructure within Very High Fire Hazard Severity Zones (tables 13-1 through 13-4).

The City considers hazard designations when making zoning decisions, so land within the VHFHSZ is generally designated for open space or low density residential development. Figure 1 details General Plan Land Use designations within Very High Fire Hazard Zones. The majority of the VHFHSZ is zoned for open space and low density residential development, with limited commercial, medium residential and industrial land located mostly along the periphery of the VHFHSZ.

At the time this update was undertaken, the State adopted SB 99, which directs jurisdictions to map parcels without two means of egress in hazard areas. In response, the City formed a task force led by BOE and including LADOT and LACP to study this situation. See Program 47 on Evacuation Plans in Chapter 4 for more information on how the task force will continue to improve evacuation procedures in the City.

### General Plan Land Use - Very High Fire Hazard Severity Zones

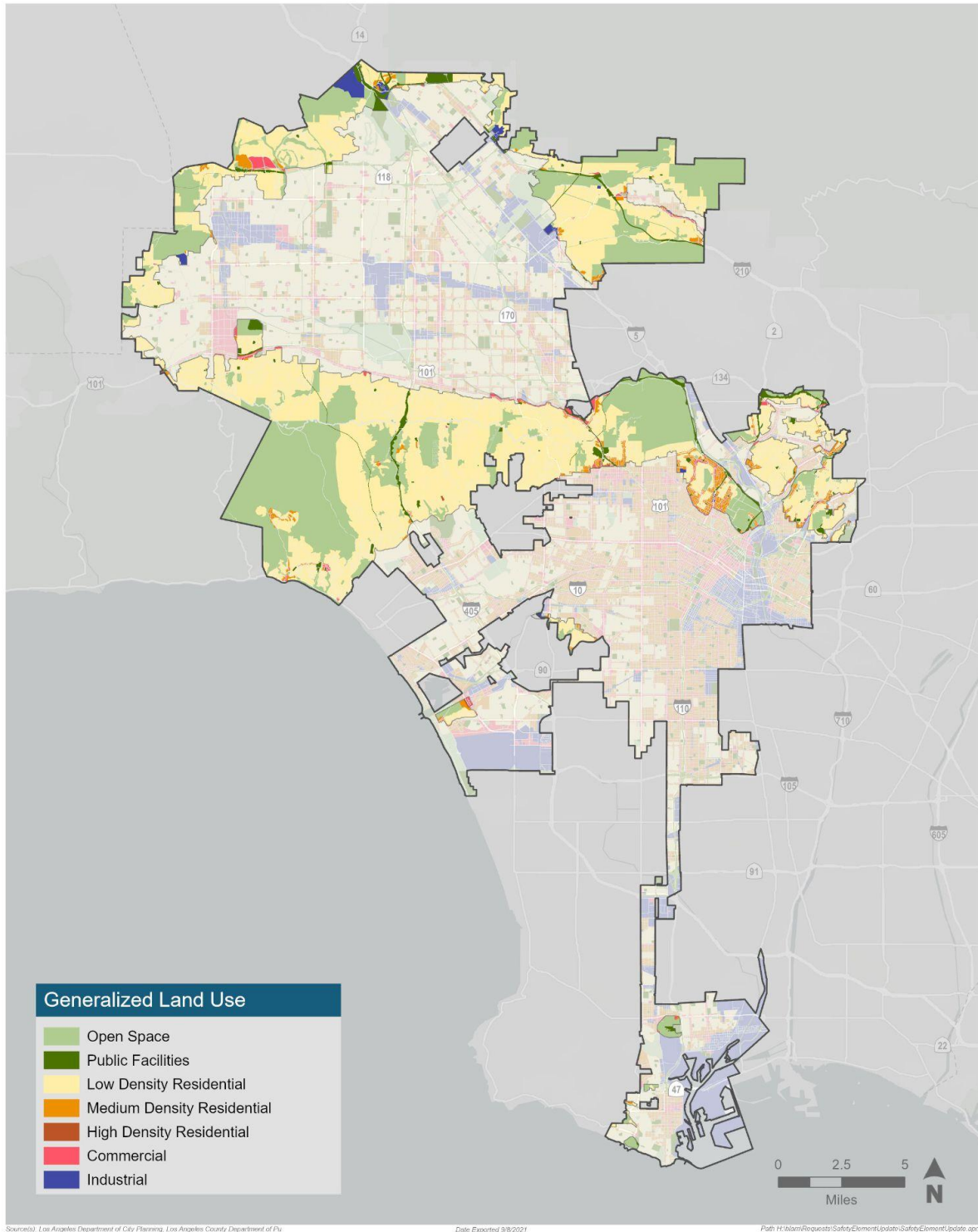


Figure 1: Generalized Land Use in Very High Fire Hazard Severity Zones [Draft]



**Urban Fires.** Improved building engineering, materials and mechanisms has made the construction of increasingly tall buildings possible. The first four-story wood frame building was constructed in Los Angeles in 1882. By 1888 seven story buildings with brick bearing walls were permitted and fire escapes were required for buildings four stories or more in height. With the advent of elevators and minimal masonry reinforcement, the City in 1903 allowed the construction of its first 13-story office building. In 1905 the fire escape ordinance was made retroactive and enforcement was delegated to the Building Department. Subsequently, water connections were required in new multi-story buildings to facilitate fire fighting. In 1910 the height limit was set at 150 feet (13 stories) for steel frame office buildings, the maximum possible under then available engineering techniques, and five stories for residential buildings, including hotels. After building technological advances enabled construction of taller buildings, the height limit was retained to assure that the proposed City Hall would be the City's tallest building. City Hall was dedicated in 1928 and at 452 feet in height (over 28 stories) it remained the tallest building until the 1957 floor area ratio ordinance replaced the height ordinance. The 1957 ordinance allowed unlimited height with a maximum floor area in order to encourage provision of open space and more imaginative building design. In 1962 the 32-story Occidental Tower (later TransAmerica Building) was constructed in the Central City community. It became the first building to exceed the height of City Hall. Hundreds of high rise buildings have since been constructed in the City. This has necessitated entirely new techniques for fire mitigation, suppression and rescue. Today, the city's primary approach to preventing and mitigating urban building fires is through the Municipal Code, which includes the Fire Code (section 57) and Building Code (section 91).

More information on urban fires is available in Chapter 15 of the LHMP: *Critical Infrastructure, High-Rise/High Occupancy Building Fire, Special Events*.

**Wildfire / Brush fires.** Brush fires (also called wildfires) continue to be a major threat to life and property throughout the region due to unique fuel, terrain and climatic conditions. The hazard is especially great when the dry "Santa Ana" winds arrive, usually in the fall and winter seasons. The desert blown Santa Anas turn vegetation to tinder and spread localized fires quickly.

In 1924 a civilian Mountain Fire Patrol was established to improve fire safety in hillside areas. The Patrol counseled private property owners in fire prevention and encouraged them to maintain burlap bags and other fire fighting material to protect their homes which often were distant from fire stations or were not served by adequate roads. Boxes of fire fighting tools were placed at strategic locations along Mulholland Drive and fire breaks, fire trails and fire roads were maintained to slow movement of fires and provide access for fire fighters. However, the fire breaks proved ineffective with major fires. Wind conditions, including those generated by a fire, could carry burning embers and materials far beyond fire breaks.

To date, the 1961 Bel Air fire storm in the Santa Monica Mountains is ranked as one of

the City's most costly brush fires. The 50 mile an hour Santa Ana winds, combined with fire-generated winds, carried burning debris and set new fires far from the main front. The fire lasted two days, destroyed over 500 structures and burned 6,090 acres of watershed within a 19-mile perimeter. Even with this loss, 78% of all the homes within the perimeter were saved. A direct result of the fire was the phasing out of the Mountain Fire Patrol, rebuilding the two existing fire stations and constructing two new stations along Mulholland Drive, the road which runs along the ridge of the Santa Monica Mountains. In addition, the Mountain Fire District and Buffer Zone boundaries (today called Very High Fire Hazard Severity Zones) were expanded to include a greater area.

Between October 25 and November 10, 1993 an unprecedented series of 22 devastating wildfires occurred in the six county Southern California region (from Ventura to San Diego County). The fires were caused by arson (12 fires), arcing power lines (6), campfires (2) and undetermined sources and were fanned by Santa Ana winds and fueled by a combination of dead undergrowth resulting from a seven-year drought and heavy new growth caused by recent rains. The fires burned 197,277 acres, destroyed over 1,170 structures and killed three people. They were battled by a force of 9,476 fire fighting personnel from 458 agencies from around the nation. The last and largest of the fires was in the Topanga-Malibu area.

Due to climate change the region today is subject to more frequent and severe wildfires. As of 2020, eight of the ten largest fires in California history occurred during the past decade. The 2009 Station Fire is the largest wildfire on record in LA County, with 160,557 acres burned. The 2020 Bobcat Fire burned 115,796 acres and contributed to hazardous air quality across the region, a challenge compounded by the surging Covid-19 pandemic, which kept many from seeking relief in communal facilities.

Today the City's approach to preventing and mitigating wildfire risk includes building standards, brush clearance, roadway requirements, parking restrictions, zoning limitations, and many more interventions detailed below.

More information on wildfire, including a history of major events, a map of Very High Fire Hazard Severity Zones, and details on secondary impacts, can be found in the LHMP Chapter 13: *Urban / Wildland Interface Fires*. Specific operational measures related to brush fires can be found in the Brush Fire annex of the Emergency Operations Plan.

**Brush Clearance.** A brush clearance program was instituted in 1920 using paid civilians to clear vacant lots of debris and rubbish. The program significantly reduced brush fires. In April of 1981 the Los Angeles Fire Department established the Brush Clearance Unit to coordinate and conduct inspection sweeps of the Mountain Fire District (now VHFHSZ) and to contract noncompliant properties to be cleared of hazardous brush.

In April of 1997, section 57.322.1 of the Los Angeles Municipal Code was amended to increase the clearance of hazardous vegetation to a total distance of 200 feet from any structure unless otherwise specified by the Fire Chief. The Amendment further added criteria for maintenance of landscape vegetation in such a condition as not to provide an available fuel supply to augment the spread or intensity of a fire. These criteria included, but were not limited to eucalyptus, acacia, palm, pampas grass, and conifers such as cedar, cypress, fir, juniper, and pine. In February of 1999 section 57.21.07 of the Los Angeles Municipal Code was again amended, this time establishing a fee for inspections of properties in the City of Los Angeles to determine if a violation of this section exists. Brush management requirements apply to all properties in the VHFHSZ, including existing non-conforming structures.

**Building Codes and Infrastructure.** Fire prevention has long been recognized as the best method for reducing fire incidence and devastation. As the Fire Department became more organized and better accepted, the City adopted fire regulations and authorized fire fighters, police and other officials to enforce them. Increasingly comprehensive ordinances were passed to regulate building design, materials and occupancies so as to better contain fires and reduce fire hazards.

The first regulations applied to Fire Districts which were established in 1869 in the most densely developed sections of the City. In the 1880s concern regarding spread of fire and loss of life resulted in requirements for separate exits for large assembly halls, fire walls between adjoining buildings, exit aisles and swinging doors. In some districts, such as what is now the Central City (Downtown Los Angeles), wooden structures were prohibited and masonry structures were required. Wood remained the most common construction material for buildings outside of the fire districts. In 1907 water connections were mandated for new and existing homes. With the advent of electrical wiring, fire hazards increased, leading to the establishment of electrical safety codes.

In 1964 Operation High Rise was instituted. It used empty buildings to study the propagation, effects and spread of fires and to develop systematic response and suppression procedures for high rise fires. Procedures developed by this unique program and subsequent programs have been used by emergency response agencies throughout the world. The first significant local test of Operation High Rise was in 1968 for a fire in the 9-story U.S. Borax and Chemical Corporation building in the Westlake area. Heat activated elevator buttons caused elevators to be called to and to remain at the fire involved floor, resulting in the death of one fire fighter. Emergency alarm systems failed to work and handheld walkie talkies proved ineffective inside the building. Out of this tragedy came new building construction requirements and fire fighting procedures, including banning of heat activated elevator buttons by Los Angeles and establishment of a new Department procedure requiring fire fighters to use stairs instead of elevators to gain access to a fire involved floor. The first major high rise fire in the nation, the One New York Plaza fire of 1970, triggered a national review of hazards associated with high



rise buildings. The California State Legislature in 1974 adopted high rise fire safety regulations which included requirements for automatic sprinkler systems in any new buildings which were 75 or more feet in height.

The 1979 fire on the 11th floor of the Bunker Hill West Tower (Hope and Third Streets, Central City) was the City's first major fire in a residential high rise building. Following this tragedy, rescue procedures were improved and, in 1980, smoke detectors were required in all new residential high rise buildings and any high rise buildings which were issued remodeling permits.

Devastating brush fires have resulted in establishment of more fire stations and facilities in hillside areas and in more stringent requirements for fire hydrant installation, hillside brush clearance, fire access road systems, home sprinklers, fire resistant construction and landscaping materials, and development of improved firefighting strategies and equipment. In 1962 the Department acquired its first helicopter with water dropping capability. Subsequently, aircraft became important equipment for fighting brush fires. They were used for dropping water and chemicals on targeted fire areas. Flammable roofs have long been identified by fire agencies as major contributors to property damage and the spreading of fire storms in developed areas near brush lands. In 1970, following the Chatsworth fire in which 113 homes were damaged or destroyed, the City required that new homes in Mountain Fire Districts (now VHFHSZs) treat combustible roof materials so as to make them more resistant to fire. Following the devastating December 1989 Sesnon (Granada Hills) fire which destroyed or damaged 30 dwellings, combustible roofing material was banned from use in construction of new homes in Mountain Fire Districts (now VHFHSZs).

Today, structures in Fire Districts (including VHFHSZs and Fire District 1) are required to meet specific building and fire code requirements pertaining to fire safety. The provisions of Building Code Section 91.7203, which include standards around projections, fire sprinklers, canopies, and non-conforming buildings, apply to both Fire District 1 and Very High Fire Hazard Severity Zones. Buildings in VHFHSZs are also subject to the requirements of Building Code Section 91.7207, which includes additional restrictions on unenclosed under floor areas, utilities, attic openings and roofing. Additionally, these structures are subject to the Los Angeles Fire Code, which requires a 20 foot width for all access roads, brush management within 200 feet of any structure, and sets minimum standards for the size of address numbers. Within Fire District 1 only Types I, II, and III construction are allowed, while types IV and V, which generally involve more combustible materials, are prohibited. Openings of exterior walls (i.e. windows and doors) must have additional fire resistant protection. There are additional code requirements related to roof coverings and structure, structural fire rating, exterior walls, and architectural details.

Several other factors have helped to bolster safety within Very High Fire Hazard Severity Zones. The Los Angeles Fire Department has acquired equipment specifically to better

fight fires in hillside areas, including smaller fire and response vehicles that are better able to navigate narrow hillside streets. The Los Angeles Fire Department designates “Red Flag Day” curb zones, which prohibit parking on high fire risk days to ensure adequate space for fire fighting equipment and ingress/egress should a fire break out. When feasible, new essential public facilities are located outside of fire zones. Essential facilities that are located in VHFHSZ’s and other hazard areas are prioritized for retrofit and mitigation measures, as detailed in Safety Element Policy 1.1.3 *Facility/Systems Location and Maintenance* and Program 35 *Resilience in Capital Improvements Planning and Facilities Maintenance*.

**Port of Los Angeles (POLA).** With the annexation of San Pedro and Wilmington in 1909, including property which would become the future Port of Los Angeles (POLA), the Fire Department began to develop capabilities for fighting dock and other harbor fires. To facilitate response, the Department has entered into cooperative arrangements with federal, State, and county agencies, as well as the adjoining Port of Long Beach for response to fires, hazardous materials spills and other emergencies in the harbor area.

The Los Angeles Fire Department (LAFD) provides fire protection and emergency services for the Port. Fire protection capabilities are based on the distance from the emergency to the nearest fire station and the number of simultaneous emergency or fire-related calls. In the port area, which includes the Port’s coastal zone boundary, LAFD facilities include land-based fire stations and fireboat companies. Battalion 6 is responsible for all of San Pedro and its waterfronts, Terminal Island and all of the surrounding water, Wilmington, Harbor City, and Harbor Gateway. There are 10 fire stations within these geographical areas, with fire boats, hazardous material squads, paramedic and rescue vehicles, three-truck companies, and urban search and rescue team, and a foam tender apparatus. There are 11 fire stations within these geographical areas, with fire boats, a hazardous material task force, paramedic and rescue vehicles, truck companies, engine companies, an urban search and rescue task force, and a foam tender apparatus.

More information on the Port of Los Angeles fire protection and emergency response service can be found in Port of Los Angeles Master Plan Update.

**Los Angeles World Airports (LAWA).** Airport expansion resulted in the establishment of fire stations at the Los Angeles International (LAX) and Van Nuys airports in 1956 (both of which are managed by LAWA). As with the harbor operations, special equipment, tactics and training were instituted to prevent, suppress and contain fires and to rescue potential victims. Today both the port and airports have on-site fire fighting operations and special equipment designed for the unique needs of those facilities, and maintain separate emergency plans that detail fire prevention and response.

As of 2019 LAWA serves approximately 88 million annual passengers and 2.18 million annual tons of cargo out of LAX. The department maintains the LAX Master Plan

(2017), the Airport Emergency Plan (2020), and the Department Emergency Plan and Continuity of Operations Plan (2020), to guide development of fire emergency response facilities, coordinate chain of command, and provide training and materials to LAWA and non-LAWA responders. Detailed information on airport fire protection and emergency services can be found in the above documents as well as the LAX Master Plan Final EIS/EIR 4.26.1 Fire Protection. LAWA works to implement similar safety regulations at the Van Nuys Airport.

**Rescue/medical (EMS).** Rescue and provision of medical care to victims of fires has been an important function of the Los Angeles Fire Department. A Rescue Squad began operating in 1922 to provide breathing apparatus and to attend to firefighters at fire scenes. In 1930 a fleet of six ambulances was purchased to transport injured firemen to hospitals. The service soon was expanded to serve civilian fire victims. By 1957 the fleet included Department ambulances and ambulances operated by private companies. The first paramedic ambulance service was established in 1970. In that year, other City operated ambulances and their crews were transferred to the Fire Department by executive order of Mayor Sam Yorty. The Department reorganized the service and reassigned ambulances and crews to all areas of the City so as to facilitate efficient response. By 1973 all contract services with private ambulance companies had been phased out and the Department had assumed authority over all first care (response) medical service within the City. The operation was upgraded and became the Bureau of Emergency Medical Services. All of the Department's fire fighting personnel are trained in emergency medical skills so as to enable any fire fighting team to respond to an emergency medical call. By the 1990s more calls were received for medical services than for fire fighting services. Approximately 77 percent of the all calls received in 1993-94 were for medical services. In 2020 approximately 82 percent of all calls were for medical services.

**Fire Department Planning Division.** Long range planning for fire risk is handled across several departments. Every two years the Los Angeles Fire Departments releases a strategic plan that outlines upcoming challenges and priorities, covering both wildfires and urban building fires. The current plan, called "A Safer City 2.0" focuses on strategies to provide exceptional public safety and emergency service, creating a healthy work environment with opportunities for personal growth, and enhancing sustainability and community resiliency. The LAFD is currently working on a Standards of Cover study to assess current performance and plan for future organizational changes required to meet the needs of the City based on population density and demographic changes expected over the next twenty years.

As described previously, the Local Hazard Mitigation Plan includes sections on both wildfires and building fires. The Emergency Operations Master Plan includes a Brush Fire Annex, which details specific response procedures in the event of the brush fire.

**Interagency Coordination.** The State requires that each city identify agencies with responsibility for fire protection (including federal, State, local, special districts, and local offices of emergency services). The City of Los Angeles has its own Fire Department, the Los Angeles Fire Department (LAFD), which handles fire and Emergency Management Services (EMS) response. The LAFD is the primary agency responsible for fire response within the City of Los Angeles. The LAFD regularly coordinates with other agencies that have responsibility for fire protection in these areas, including California Department of Forestry and Fire Protection (CAL FIRE). State guidance also specifies the need for cooperative working relationships among public agencies with responsibility for fire protection. The City's commitment to this principle is articulated in Policy 2.1.1, which focuses on intergovernmental coordination.

Because the City of Los Angeles surrounds other cities, e.g., Beverly Hills and West Hollywood, and adjoins other cities as well as the county, State and federally controlled lands, it has joined in a variety of agreements with other jurisdictions for cooperative response and management of fires and other emergency incidents. Containment and suppression of a fire within an adjoining jurisdiction protects the City from encroachment and damage from the fire, thereby protecting the population as a whole. Most of the agreements are voluntary.

When a major disaster strikes, local, State, federal and private agencies respond under mutual aid agreements and federal, State and local disaster response procedures. The City's Emergency Operations Organization is the primary City organization under which City agencies join together in emergency preparation, response and recovery planning. In addition, the fire and police departments and other emergency response personnel participate with like agencies in other jurisdictions in training exercises and network coordination. More information on interagency coordination as it pertains to wildfire response is available in the Brush Fire Annex of the Emergency Operations Plan.

The fire fighting experiences of the 1970s resulted in establishment by the U.S. Forestry Service of a partnership of local, State and federal fire agencies to develop improved coordination for fire suppression management and emergency response. The partnership evolved into the Fire Resources of Southern California Organized for Potential Emergencies (FIRESCOPE) program. FIRESCOPE developed the Incident Command System (ICS) and Multi-Agency Coordination System (MACS) which were designed to improve multi-agency response to multi-hazard events, including earthquakes, floods and fires. The Los Angeles City Fire Department was a leader in developing these programs and one of the first to make them operational. The programs established plans and procedures for improved interagency coordination, including common terminology, organizational structures (chain of command) and response procedures and for compatible communications (e.g., radio frequencies) and equipment systems (e.g., hose connections). The goal was to make agency personnel and equipment readily interchangeable within and between jurisdictions and command levels so as to facilitate effective deployment and efficient utilization of limited

resources between federal, State, regional, district and local agencies and operational levels. When incidents exceed or are anticipated to exceed the resources at a particular response level, assistance is requested from the next level which in turn evaluates the needs and assembles and allocates personnel and other resources.

**Training.** The Fire Department has long been known for its innovative leadership in the field of fire fighting techniques and strategies. In the early days, firemen responded in an ad hoc fashion to fire incidents. The ad hoc approach to fire fighting was inefficient and sometimes resulted in injury to firemen. To improve efficiency, safety and effectiveness the Department established a unique Fire College. The program included classroom training as well as exercises under simulated emergency and fire conditions. It was the first such educational program in the nation. Instructors were required to have at least seven years of fire fighting experience and a teaching credential from the University of California at Los Angeles. The first class graduated in 1925. The Fire College transformed the Department into one of the most professional in the nation and was credited with a significant reduction in property losses and loss of life due to fire.

In 1957 the Emergency Operational Procedures Manual was developed to provide coordinated ground and air procedures for fighting brush fires. The manual was the precursor of the Incident Command System which provides coordinated procedures for multi-unit response to emergency events. Exercises were conducted to assure that personnel were familiar with the procedures, thereby increasing efficiency and effectiveness.

Unlike fire agencies in many other jurisdictions, all Fire Department emergency personnel, including fire fighters, inspectors and an increasing number of emergency medical personnel, are trained firefighters and all are given emergency medical and other training. This enables an efficient mobilization in event of major emergencies and has resulted in a department in which fire fighters are multi-skilled. Firefighters receive on-going skills training to familiarize them with new techniques and equipment and to refresh their skills. Within the LAFD there are also personnel with specialized training in topics including Urban Search and Rescue and River Rescue.

Following the 1985 Mexico City and 1987 Whittier earthquakes, the City recognized that its personnel alone were insufficient to provide all assistance needed during and following a major disaster. To address this issue a Disaster Preparedness Division was established within the Fire Department to train City and private sector personnel in disaster response techniques and procedures. One of the programs is the Community Emergency Response Program (CERT) which trains volunteer community, business and City employee representatives in earthquake awareness, disaster fire suppression techniques, light search and rescue operations and team organization and management. The goal of CERT is to create a well-trained civilian emergency work force as an adjunct to professional forces. CERT trains people to establish neighborhood self-sufficiency during extended emergencies (such as earthquakes) and in situations

where the numbers and scope of events overwhelms government emergency forces. The volunteers are trained to perform independently, to train other neighborhood or work area volunteers, to operate teams within their work areas or communities and to work with professional forces in other disaster areas to which they might be assigned. As of 1999 the CERT Program had trained over 75,000 people and its techniques had been adopted by other agencies, including FEMA, to train volunteers throughout the nation.

**Safety Element Review.** A city or county that contains a State Responsibility Area and a Very High Fire Hazard Severity Zone must provide a draft of its safety element or amendment of its safety element to the State Board of Forestry and Fire Protection for review before adoption, and the Board may recommend changes regarding uses of land, policies, or strategies for reducing fire risk (CA. Government Code Section 65302.5(b), AB 3065). This Element has been submitted to the California Board of Forestry and Fire Protection, CAL FIRE, and local fire agencies, as detailed in Chapter 1 section on State Required Consultation.

**Policies.** The Safety Element must identify and include policies for the protection of the community from any unreasonable risks associated with wildland and urban fires in State Responsibility Areas within Very High Fire Hazard Severity Zones (CA. Government Code Section 65302(g)(3)). These Policies can be found in Chapter 3, which broadly details how the City prevents, responds to, and recovers from disaster events including fires. Specifically, Policy 1.1.3 and 3.1.4 both reference strategies for redundancy to ensure adequate water in the event of a disaster. Given the prominence of fire risk in this region Policy 2.1.6 focuses specifically on fire suppression, noting the need to regulate peak water supply, the width and clearance of egress roads, fuel modification, and special fire fighting facilities at the Port and Airport. Policy 1.1.5 details the need to reduce potential risk hazards due to natural disasters, including fires. Finally, Policy 1.1.8 directs the city to maintain open space and low density zoning designations within Very High Fire Hazard Severity Zones.

## Flood and other Water Hazards

Water action hazards include major and localized flooding, erosion and landslides as well as potential inundation from water storage facility failure, seiches, mud and debris flows, sea level rise, tsunamis and other ocean wave related hazards. Mitigation of water action hazards is a cooperative, multi-jurisdictional effort. It also is related to geologic conditions, seismic, fire and hazardous materials mitigation. To provide a comprehensive overview, this section includes a summary of the historic evolution of the roles of various levels of government and how Los Angeles City fits into the overall hazard mitigation efforts.

In general, flood control authority can be summarized as follows: (1) the United States Army Corps of Engineers oversees construction of projects associated with navigable



bodies of water, including the Los Angeles River-related flood control systems and ocean harbors; (2) the Los Angeles County Department of Public Works oversees construction of ancillary Los Angeles County Flood Control District facilities and designs and/or maintains the flood control drainage facilities, including the Los Angeles River system to mitigate 100- and 500-year storms; (3) the City Bureau of Engineering oversees construction and maintenance of the City's storm drainage system which is designed to mitigate 50-year magnitude storms; and (4) the Los Angeles Department of Water and Power (LADWP) oversees and manages dams throughout the City in coordination with Los Angeles County Flood Control District. Various City agencies implement development permit, slope stability and watershed protection regulations.

The flood control and storm drainage systems include the following principal features: (1) debris basins at the mouths of canyons to slow the flow of water and trap boulders, rocks and debris and to prevent clogging of the flow channels; (2) flood control basins (dams) at the upstream portions of the rivers to contain water and regulate downstream flow; (3) containment of over 400 miles of river and tributary systems within mostly open concrete flood control channels; (4) streets, gutters and catch basins to collect and route surface flows to storm drains which carry urban run-off to larger tributary systems and, ultimately, to the flood control channels and ocean; (5) spreading grounds in the San Fernando Valley to impound storm water and allow it to percolate into the ground where it replenishes the underground water system; (6) associated bridges, reservoirs and water storage facilities; (7) and soft infrastructure such as parkway bioswales and rain barrels distributed across the city.

Before the flood control system was built, the Los Angeles River and its tributaries flowed freely from the Santa Susana, Santa Monica and San Gabriel Mountains to the sea, flooding large portions of the basins south of the mountains. The Los Angeles basin between the Santa Monica Mountains and Wilmington-San Pedro (future site of the harbor) was dotted with swamp lands and marshes fed by the rivers and streams. Local Spanish names derive from this marshy landscape including "arroyo" (water course), "cienega" (marsh), "zanja" (ditch) and "redondo" (willow). A swamp existed in what is now the Central City. Figueroa Street was called Grasshopper Street and the area became known as "Grasshopper Gulch" due to the insects which lived in the swamp and plagued that part of the community. Today ground water still is very close to the surface in the Wilshire District, feeding the La Brea tar pits, which once entrapped pre-historic animals, and requiring special building design considerations to protect against flooding of subsurface structures. "Brea" is Spanish for "tar."

**Mapping.** California Government Code Section 65302(g)(2) requires municipalities to map areas of elevated flood hazard. Maps of 100 year and 500 year floodplains, in addition to maps of repetitive loss areas, are available in the Local Hazard Mitigation Plan Chapter 10: *Flood*. This chapter also includes maps of critical infrastructure within flood hazard areas. Through the Floodplain Management Plan maps of FEMA 10, 50, 100 and 500 year flood scenarios are available on the Bureau of Engineering website.

Tsunami inundation is mapped in the LHMP Chapter 12 *Tsunami* and the Tsunami Annex of the EOP, which also includes maps of evacuation routes. Dam locations are mapped in Chapter 7 of the LHMP. Data on dam inundation areas is available through the California Department of Water Resources. Levee locations are mapped in the Floodplain Management Plan (Figure 6.1).

**Capital floods.** Major storms which cause a high magnitude of water flow can be devastating to a wide geographic area. They are the most dramatic and potentially the most hazardous water activity confronting the City. The Los Angeles region is a semi-arid region with rainfall that can have dramatic variation from year to year. Rains tend to occur in heavy, short duration storms between November and April. Severe storms are periodic and may not occur for several years. Paving of the City with structures and impermeable surfaces has reduced natural ponding areas which allowed water to percolate into the soil. This has facilitated water run-off and velocity of runoff thereby increasing the potential for flooding. Water rushes from streets and other impermeable surfaces along the path of least resistance to the ocean.

Between 1815 and 1938 seventeen major floods were recorded. The 1815 flood cut across what is now the Central City, diverting the Los Angeles River to the Pacific Ocean via Ballona Creek. The flood of 1825 diverted the river from Ballona Creek to its present course. After the 1825 flood, the City was reestablished in the 1815 flood plain without thought of potential future flooding. The floods of 1867-8 destroyed the City's new water system, including a reservoir and a dam intended to divert water for domestic and irrigation needs, changed the course of the San Gabriel River and convinced the City Council to hire the first City Engineer. The 1865-71 droughts devastated farms and the cattle ranches which had characterized the region for a century. To recover losses, ranches, orchards and farms were subdivided and sold. The smaller plots began to be developed with homes, businesses and urban infrastructure. Railroads were extended into the region in 1865, spurring a development boom and accelerating in-migration from the eastern United States. Prior to 1914 there was little interest in providing protection from flooding because the City was rural in character, development was dispersed and major permanent infrastructures had not been constructed. Flooding tended to be localized or occurred in areas not yet inhabited or utilized. As Los Angeles became more urbanized, permanent structures were installed, the population became more concentrated, impermeable surfaces caused more and swifter runoff and flooding increased the threat to life and property.

The first public program in the area to address flooding was the Los Angeles harbor construction project of 1898 which included flood water and silt diversion to protect the harbor. On December 31, 1898 the Army Corps of Engineers, which was charged with the responsibility of improving navigable waterways of the United States, established a 19 man team to plan and build a deep water harbor for the City.

Flood control initially was not within the authority of the Corps, except as it pertained to



harbor improvement. The harbor project was completed in 1914. In 1914 over 19 inches of rain fell in four days causing streams and rivers to overflow, turning sections of the Los Angeles basin into islands, severing communications and causing \$10 million in property damage, including damage to the harbor. In response, the State, in 1915, created the Los Angeles County Flood Control District to prepare and carry out a flood control plan. Major flooding in 1916 resulted in passage of a County bond issue for the Army Corps to construct the first phase of the flood control system. The project, the Dominguez Narrows by-pass, was completed in 1921. It diverted Los Angeles River flood waters and eliminated harbor silting by emptying flood waters into what is now the Long Beach harbor. Between 1917 and 1939, dams, reservoirs and debris basins were constructed in local mountains, along with some river channel enclosures, but the construction did not keep pace with the explosion in urban growth and was not sufficient to protect the populace. A series of devastating floods between 1921 and 1938 demonstrated the need to establish and carry out a comprehensive flood control plan and resulted in a series of federal acts which gradually expanded the role of the Army Corps and provided funds to construct local drainage systems. The most devastating flood ever experienced by Los Angeles occurred on March 2, 1938. Two days of flooding caused over \$40 million in damage and the deaths of 113 people, disrupted the City and again severed communications systems. The disaster resulted in the establishment of the first local emergency plan and adoption of the Drainage Act of 1938 which mandated the Army Corps to prepare a flood control plan for the entire Los Angeles County Drainage Area. The plan was adopted by Congress in 1941 and construction of the system was authorized.

Between 1935 and 1970 the Army Corps oversaw the construction of a system of drainage projects designed to contain the Los Angeles, San Gabriel, Rio Hondo and Santa Ana Rivers as well as Ballona Creek, the Dominguez Channel and other waterways so as to prevent future flooding in the Los Angeles basin from 100-year and 500-year magnitude storms. Two three-day storms in 1943 led to enactment of the National Flood Control Act of 1948 which permitted construction of small flood control projects and performance of emergency work without authorization of Congress. As each phase of the flood control system was completed, except for the dams and dam basins, it was placed under the authority of the Los Angeles County Flood Control District which was charged with maintaining the system (including 58 miles of the Los Angeles River which runs through 13 cities from Calabasas to Long Beach). The principal function of this massive system was to prevent flooding by channeling storm waters so they would be carried as quickly as possible to the sea.

Fire-flood cycles in recent years have increased flood hazards. Rains regenerate growth of vegetation on hillside slopes. The hot summer climate dries out vegetation, creating fuel for fires which destroy the vegetation. Lacking vegetation to slow water flow and enhance water absorption, rain water rushes unimpeded down the fire denuded slopes causing erosion and flooding. Such cycles have resulted in flooded and washed out streets, destruction of bridges, loss of life, landslides which destroyed hill- side and

coastal properties, localized but destructive flooding and mud and debris flow inundation of properties below denuded areas.

Since 1940, the City and County have become increasingly urbanized, adding more impermeable surfaces which have increased stormwater runoff which in turn has taxed the capacity of the current system during major storms. In 1980 a levee of the Los Angeles River flood control channel near the City of Long Beach was threatened with overtopping by flood waters. This raised concerns about the adequacy of the capacity of the southern sections of the channel to protect adjacent cities. Destructiveness of recent floods and the issue of system capacity have contributed to a re-evaluation of the flood control system by the Army Corps and County Department of Public Works (which in 1985 took over the Flood Control District). The City's Floodplain Management Plan, updated in 2020, outlines an overall strategy of programs, projects, and measures aimed at reducing the adverse impacts of flood hazards on the community. Furthermore, the City also updated its Floodplain Hazard Management Plan and Flood Hazard Management Ordinance (formerly Specific Plan for the Management of Flood Hazards) to reflect FEMA's most current regulations in line with the National Flood Insurance Program in April 2021. Both of these updates account for the increased stormwater runoff resulting from added impermeable surfaces in our urbanized areas and include strategies to minimize flood risk for new development.

More information on flooding, including a history of major flood events, the local flood control system, and exposure is available in the Local Hazard Mitigation Plan Chapter 10: *Flood*. Specific information on interdepartmental response to flooding events can be found in the Urban Flooding Annex of the Emergency Operations Plan.

**Mud and debris slides and localized flooding.** Watershed protection is a primary concern of the City, especially in hillside areas. Permeable soil soaks up rain and irrigation water, proper grading and drainage systems channel and collect water to protect slopes from saturation and slippage, catch basins divert surface water to street gutters which divert the water to storm drains and flood control channels so as to reduce erosion and flooding. The Bureau of Engineering, Building and Safety Department, Planning Department and Fire Department coordinate development permit review and issuance to assure proper grading, drainage, irrigation and landscaping so as to preserve slope stability, provide erosion control and reduce potential for flooding and fire hazard.

Following major brush fires, federal or State agencies typically seed denuded areas with wild plant seeds which rapidly germinate thereby encouraging regeneration of vegetation which will hold the soil and protect the watershed from erosion. Remedial measures, such as sandbagging and erection of temporary erosion control measures, are instituted in anticipation of storms so as to protect road systems and property from potential landslides, flooding and mud and debris flows. To reduce fire hazards and protect slopes, the City requires vegetation clearance and encourages hillside property

owners to plant appropriate vegetation and to implement proper irrigation and slope maintenance measures.

Specific information on debris flow, including interagency management of debris flow and removal, is available in the Debris Management Appendix and Debris Flow Annex of the Emergency Operations Plan.

**Beach erosion.** Beach erosion mitigation is under the auspices of the Army Corps. Management of flood waters of the Los Angeles River and draining of marshes, dredging, construction of breakwaters and creation of new land masses for development of the harbors changed ocean wave action and reduced the flow of natural sediments (sand) to the sea. Change in wave action and lack of sand to replenish beaches resulted in erosion of the coastline, undermining of cliffs and reducing or eliminating beaches. Undermining of cliffs sometimes resulted in landslides and loss of homes and property. Initially local jurisdictions were responsible for beach protection. In the 1930s the Bureau of Engineering Hydraulic Research Laboratory evaluated sand migration to identify causes of erosion and means of mitigating erosion and protecting roadways and properties. It became clear that the primary cause of beach erosion was due to the breakwaters and other Army Corps constructed modifications of wave action along the coast. Mitigation generally was beyond the expertise and resources of local jurisdictions. In 1956 damage had become so serious that Congress expanded the role of the Corps to include responsibility for beach erosion management, e.g., beach protection and replenishment.

**Sea Level Rise.** With the advancing effects of climate change, sea level rise is an increasing concern in Los Angeles. The Local Hazard Mitigation Plan includes a high level introduction to sea level rise, including an assessment of vulnerability to climate change risks, in Chapter 14 *Climate Change and Sea Level Rise*. There are several localized programs to address Sea Level Rise. The Venice Local Coastal Program will be implemented as part of the Venice Community Plan Update. The Port of Los Angeles has adopted a specific Sea Level Rise Adaptation Plan. Finally, the City of Los Angeles is coordinating with LA County on countywide efforts to evaluate vulnerability and mitigations.

**Tsunamis and large ocean waves.** Tsunamis are large ocean waves which are generated by major seismic events. Storms at sea also can generate heavy waves. Both have the potential of causing flooding of low lying coastal areas. Hazardous tsunamis are rare along the Los Angeles coast. However, storm generated waves have caused considerable damage to property and beaches along the ocean perimeter, a challenge that will be exacerbated as climate change progresses. The City Flood Hazard Management Ordinance sets forth design criteria for development in coastal zones, including increased base building elevations. The Army Corps is responsible for constructing and maintaining the breakwaters which are designed to mitigate damaging wave action, particularly in the harbor area. POLA works cooperatively with the Army

Corps relative to maintenance and protection of the breakwater facilities. Along with the fire and police departments, it participates in the federal tsunami alert program to warn potentially affected properties and harbor tenants of tsunami threats and to advise them concerning protective response actions.

More information on the response to a tsunami event can be found in the Tsunami Annex of the Emergency Operations Plan. This annex includes a map of LAPD tsunami evacuation routes, which are also noted through a system of publicly posted signage.

**Seiches, dam failure and inundation (water storage facilities).** A seiche is a surface wave created when a body of water is shaken. Seiches are of concern relative to water storage facilities because inundation from a seiche can occur if the wave overflows a containment wall, such as the wall of a reservoir, water storage tank, dam or other artificial body of water. Mitigation of potential seiche action has been implemented by the Department of Water and Power through regulation of the level of water in its storage facilities and providing walls of extra height to contain seiches and prevent overflow. Dams and reservoirs are monitored during storms and measures are instituted in the event of potential overflow. These measures apply to facilities within the City's borders and facilities owned and operated by the City within other jurisdictions.

Inundation due to water storage facility failure also is a potential hazard. The Baldwin Hills dam failure of December 14, 1963 and near collapse of the Van Norman Dam during the 1971 San Fernando earthquake resulted in strengthening of the federal, State and local design standards and retrofitting of existing facilities. Thirteen dams in the greater Los Angeles area moved or cracked during the 1994 Northridge earthquake. The most seriously damaged was the Pacoima Dam which was located approximately eight miles from the epicenter. However, none were severely damaged. This low damage level was due in part to completion of the retrofitting of dams and reservoirs pursuant to the 1972 State Dam Safety Act following the San Fernando quake. The Act also required the preparation of inundation maps.

Data on dam failure, including history, regulatory oversight and exposure, is available in the LHMP chapter 7: *Dam Failure*. More information can also be found in the Dam Reservoir Failure Appendix of the Emergency Operation Plan. Dams and dam inundation areas are mapped by the California Department of Water resources.

**Drainage.** Within the broad context of regional flood control the City's primary role is the construction and maintenance of a storm drainage system within the City's boundaries. The first drainage system was constructed by settlers after the City was established in 1784. Zanjias (ditches) were dug to trap and guide water for drinking, irrigation and drainage. During the 19th Century, wooden (typically redwood) and pottery pipes were added. The first large publicly constructed drainage system may have been the system installed by the Army Corps during the Civil War to drain ponds and wetlands and supply water to the Army's Drum Barracks at Wilmington.

Los Angeles City committed itself to construction of a drainage system after the devastating floods of 1867-68. Contrary to common practice of the time, the storm drainage system was separated from the sewer (i.e., waste water) system and remains separate today, except for treated waste water which is discharged into the flood control system or directly into the ocean. The separation was established following an 1870 report by Frank Lecouvreur, the City's first Engineer, that separation would prevent overwhelming of the sewer system by flood waters associated with periodic major storms. By 1879 a sewer system to take waste water from what is now the civic center to the ocean was under construction. In addition, Lecouvreur designed an east-west street system to assist the flow of rain waters via a street gutter system. The gutters carried storm and daily run off water via the zanjas to ponds and other natural collection areas or to rivers.

The City has used various methods of obtaining dedications for public streets and facilities that support drainage. Some decisions were challenged in court and resulted in the most current approach to how the City obtains new public dedications, easements, facilities and access.

A City's right to withhold building permits for non-compliance with public dedication requirements was upheld by the California Supreme Court in 1966 (*Southern Pacific Railroad versus the City of Los Angeles*). This decision strengthened the City's ability to secure drainage facilities in conjunction with new development. Local authority was further strengthened by the California Environmental Quality Act of 1971, which required development projects to mitigate potential environmental impacts of proposed projects. Under the State Subdivision Map Act (California Government Code Section 66410), environmental mitigation and City regulations, the City in recent times has required owners of proposed development projects to construct drainage systems to accommodate runoff associated with a project and/or to protect a project and adjacent properties from storm water related hazards associated with the project. This has resulted in a systematic construction of drainage facilities in association with new development projects.

Drainage facilities are built to design specifications determined by the City's Bureau of Engineering. The Bureau in the 1920s established a hydrologic testing laboratory, later called the Hydraulic Research Laboratory. Using mathematical models and dynamic physical models, the lab developed and refined drainage system design and design standards. For specific projects its models were designed to take into account particular site specific factors such as degree of slope, susceptibility to flooding, anticipated velocity of water. The lab also designed associated equipment, including an efficient grate configuration for catch basin grates so grates would not be hazardous to bicyclists, and developed engineering aids such as hydraulic tables, charts and graphs. In the 1980s and 1990s the lab focused on designing wastewater related hydraulic structures. The laboratory incorporated computer technology to assist in hydraulic

analysis. The lab's design innovations and standards have been used not only in development of the Los Angeles stormwater and wastewater systems and by the City's engineers but have been used by other jurisdictions and private engineers.

**Land use planning.** Land use planning is important in protecting the public from storm water related hazards. The State Subdivision Map Act allows local jurisdictions to disapprove permits for construction of structures in flood hazard or inundation areas if the hazards cannot be mitigated adequately. The Flood Control Act of 1960 authorized the Army Corps to provide flood maps and information to local jurisdictions to assist them in land use planning. Subsequent federal and State (Cobey-Alquist Flood Plain Management Act, Water Code Section 8401c) legislation encouraged local land use planning, regulations and enforcement in flood prone areas by linking insurance rates and flood management funding to the adequacy of local regulations.

Flood hazard areas are mapped by the Federal Emergency Management Agency (FEMA), and detailed in the Floodplain Management Plan. The LHMP includes maps that detail FEMA flood zones and estimates of structures currently located within flood zones. To comply with the Flood Disaster Protection Act of 1973, which increased the insurance rates set forth in the National Flood Insurance Act of 1968 and required local floodplain regulations to have enforcement provisions, the City of Los Angeles first adopted the Floodplain Management Ordinance (originally named the Floodplain Management Specific Plan) in 1980 (amended in 1988 by Ordinance 163,913; amended in 1998 by Ordinance 172,081 and then again in 2021 by Ordinance 182,952). The ordinance establishes annexation procedures and permit review and mitigation procedures for issuance of development permits in areas prone to flooding, mud flow or coastal inundation. It also specifies the responsibilities of City agencies which process the permits. Mitigation measures include relocation of structures within a property, increased base elevation, additional structural reinforcement, anchoring, and installation of protective barriers. A permit can be denied if mitigation is deemed insufficient to protect human life. Compliance with the National Flood Insurance Act makes the City eligible for FEMA funds and reduced federal flood insurance rates. Flood inundation areas generally are classified in the lowest density zoning categories.

**Ecological systems.** Environmental considerations are an important part of flood control systems. As the Los Angeles flood control system neared completion and public demand for water supplies, recreation and beautification increased, Congress provided for multiple use of facilities. By the 1960s watershed protection, electrical power, recreation, agriculture and water storage were integral secondary uses of flood control systems and considerations in flood control systems planning. Paving of the Los Angeles River bottom, and City in general, reduced groundwater recharge. To compensate for the loss, water spreading grounds were established to replenish underground aquifers. Three sections of the Los Angeles River have unpaved bottoms partially due to the existence of natural springs. These sections and dam basins provide natural habitats for wild animals and birds. The dam basins also provide land for



recreation and agricultural uses. Sand bars, trees and heavy marsh growth provide protected habitats for water birds. Fish live in the river channel. Until 1984, the Los Angeles River channel, except for the unpaved sections, virtually was dry except during the rainy season. Upon completion of the San Fernando Valley Donald C. Tillman Wastewater Reclamation Plant (1984) a continuous flow of reclaimed water was sent down the channel creating a year round stream which has regenerated plant and animal life along the entire channel. Some hiking, equine and bicycle trails exist and are planned for expansion along the edges of some flood control channels.

In recent years, the City has explored ways to better use ecological processes to prevent flooding, treat runoff, and recharge ground water supplies. This approach has been articulated primarily through the LA Sanitation One Water LA 2040 Plan. The Plan identifies projects, programs and policies that will yield sustainable, long-term water supplies for Los Angeles and will provide greater resiliency to drought conditions and climate change. Under this direction the City has started to explore more resilient solutions to localized flooding, such as bioswales and improved onsite storage of rainwater. The Los Angeles River is the project that most vividly illustrates this shift in thinking. For decades the River was used primarily as flood control infrastructure. Today, the River is undergoing a transformative shift to offer additional public benefits including open space and recreation, ecological habitat, sustainable development along river frontages and bicycle and pedestrian connectivity. More information on the Los Angeles River is available in the LA River Master Plan, managed by Los Angeles County.

**Water quality.** Water quality relative to drainage was an early consideration of the City. Public funds began to be expended in the late 1880s for construction of public works, including streets with gutters and associated drains. The sewage and water drainage systems were separated so as to keep storm and drainage water from entering the sewage system and to enable large quantities of rain water to be carried rapidly to the ocean without necessity of treatment. In the 1920s sewer maintenance hole covers near gutters were sealed to keep out storm water and an inspection unit was established to identify and cite property owners for illegal connections from roofs, yards, wash racks and the like into the sewer system. In recent years pollution of drainage water has become an increasing concern.

Prior to 1958 the primary concern relative to water pollution related to pollution of ocean and beaches due to oil tanker spills. Such spills were regulated by federal agencies. Beginning with the Water Pollution Control Act of 1956, the federal government began to address the problem of pollution discharge into navigable waters, such as the Pacific Ocean. Initially, this resulted in regulations of discharge of waste water (sewage). More recently, federal regulations have focused on storm water, urban runoff and dumping of pollutants into storm drainage systems. Daily runoff in dry or wet periods washes residues from the land, including deposits from vehicles, pet waste, pesticides and street litter. Illegal dumping of waste into the storm drainage system adds to the run-off stream. The first rains of the season wash accumulated pollutants

from streets, vegetation and roof tops into the drainage system. Even natural seepage, such as from the La Brea tar pit area or other oil and gas deposits which underlay large sections of the City, or from microorganisms in the soil, contribute pollutants. Pollutants also are washed from the air onto the land and into the run-off stream. Air quality aspects of pollution are addressed in the General Plan Air Quality Element. Increasingly, cities are looking to the expanded use of ecological infrastructure to treat stormwater through organic processes to address this threat.

Storms result in inflow and infiltration into sewage systems and have caused release into the ocean of partially treated sewage. Sometimes discharge washed into the ocean during storms has resulted in temporary beach closure due to potential health hazards associated with harmful bacteria from human and animal waste and decomposed plant material which is washed from land surfaces into the ocean by storms or which results from leak incidents. There also is concern that storm related residues may contribute damage to the ecology of the local bays, estuaries and natural water supported habitats.

To address potential hazards of discharge and run-off, the Federal Clean Water Act (i.e., Water Pollution Control Act) was amended in 1972 making it unlawful to discharge water borne pollutants into navigable waters of the United States from any point source, except as allowed by a National Pollutant Discharge Elimination System (NPDES) permit. A "point source" being an identifiable source of discharge such as from a ship, pipe, fissure, or container, as opposed to non-point sources, such as water borne run-off containing pollutants from sources which are not readily identifiable. In 1973 the Federal Environmental Protection Agency (EPA) issued regulations to implement the Act and specifically exempted urban runoff that was not contaminated by industrial or commercial sources. The State Water Resources Control Board and its regional boards were charged with enforcing the regulations and issuing the permits. In Los Angeles, the regulations were interpreted to apply to City sewage and industrial waste water discharges into the Pacific Ocean and not to storm water or urban runoff.

To more clearly address the issue of stormwater and urban runoff, the Clean Water Act was amended in 1987 to require NPDES permits for any discharge into navigable waters of the United States. The intent of the amendment was to address non-point sources and general urban and storm water runoff, especially residues from routine industrial and commercial activity. Such residues are washed by storm water from surfaces and the land and are carried via the drainage systems to the ocean. There was recognition in broadening the regulations that it was difficult to assess non-point source pollution and that further data and evaluation of run-off was needed.

In 1988-90 the EPA issued storm water discharge regulations to implement the 1987 amendments. The 1987 amendment to the Clean Water Act required that the Environmental Protection Agency (EPA) issue National Pollutant Discharge Elimination System (NPDES) Municipal Stormwater permits for discharges from large Municipal



Separate Storm Sewer Systems (MS4s), which are systems serving a population of 250,000 or more.

An NPDES permit allows clean stormwater discharges into rivers, lakes or the ocean. The California State Water Resources Control Board (Los Angeles Region) issues NPDES permits in the Los Angeles area with the permit requiring a decrease in pollutants in stormwater and urban runoff. The City of Los Angeles is in compliance with the requirements of the NPDES Municipal permit. More information on the City of Los Angeles's NPDES permit can be found on the Los Angeles Water Resource Control Board website.

## Slope Failure and Subsidence

Los Angeles is a part of the Pacific Coastal Region, a huge geologic region which stretches from Alaska to the tip of South America. The region consists of young geologic areas in which the mountains still are in the process of growing and shaping the California landform. Los Angeles is one of the few major cities in the world with a mountain range (the Santa Monica Mountains) bisecting its land area. In addition, it is bounded by the Santa Susana and Verdugo Mountains and the Palos Verdes Hills. The Beverly Hills and Baldwin Hills bound or cross other sections of the City. The Pacific Ocean interacts with the coastal boundaries of these ranges to create seaside cliffs and beaches. Under natural conditions, slopes often give way, resulting in landslides. As City development spread from the flat lands of what is now the Central City and the San Fernando Valley into the hillsides and along the bases of slopes, unstable soil and erosion sometimes contributed to landslides and mud and debris flows which impacted development, especially following rain storms. Landslides can be triggered by natural causes such as earthquakes, ocean wave action or saturation by storm, or can be induced by the undercutting of slopes during construction, improper artificial compaction or saturation from sprinkler systems or broken pipes.

The principal tools for mitigation of geologic hazards is the City's Municipal Code, including the Building and Zoning Codes. In 1929 the Building and Safety Department began to compile and correlate data on soil conditions for distribution to realtors, builders and prospective property buyers. In 1952 hillside grading provisions were added to the Building Code. Los Angeles was the first city in the nation to have such provisions. Storms of 1957- 58 caused extensive damage in hillside areas and led to adoption of the 1963 Grading Code, which has since been integrated into the Building Code. It was the first such legislation in the nation and served as a model for other jurisdictions. A unique feature of the Code was a requirement that professional geologists supervise hillside grading. Under the Code the Department of Building and Safety has the authority to withhold building permit issuance if a project cannot mitigate potential hazards to the project or which are associated with the project. A property owner may be required to install pilings to anchor a structure to bedrock, to construct retaining walls, build drainage systems or implement other mitigation measures. If, after

a project is constructed, potential slope stability hazards are identified, the City can require implementation of stabilization measures.

For more than half a century, Los Angeles has issued and revised ordinances attempting to control the development of this sensitive hillside region, focusing on issues such as lot sizes, grading, density, street access, and the preservation of the natural terrain. The motivating force behind this legislative activity has been the belief that the City's hills and mountains are a valuable asset for those that live in them, and for those that view them from below, and should be preserved for the public.

In the late 1950s, demand to subdivide tracts in the city's mountainous areas grew as most of the flat land was already nearly completely subdivided. However, many of these hillside areas were zoned as R1, which allowed for lot sizes as small as 5,000 square feet. In response, the City passed an urgency ordinance to protect the hills in 1960, designating certain areas as "H" Hillside or Mountainous Areas. This appears to be the first time a hillside regulation was placed in the Zoning Code. At the time, the "H" designation mandated the minimum size for lots in future subdivisions to be 15,000 square feet. This resulted in lower density, as it reduced the number of dwelling lots permitted in the mountains. However, some lots were allowed to be as small as 9,000 square feet if the average size for all lots in a tract was 15,000. (For more information on this action see Ordinance No. 17,155) In 1964, the "H" designation was permitted to be added to RA and RE zones in addition to R1. In 1967, the City reduced flexibility regarding lot averaging: below average lots could only be no more than 20% of the total, and only if the reduced size resulted in less grading, improved lot design, or other environmental benefits. Limits were put in place to encourage higher quality development and reduce density.

In 1968, residents of the Benedict Canyon area objected to the extensive trucking of earth and other materials as a result of a subdivision occurring in their neighborhood. In response, regulations on the export and import of earth materials were created for hillside areas to protect public health and safety.

In 1970, it was decided that these regulations should apply city-wide, not just in hillside areas. Now known as the Haul Route Approval process, grading plans had to be submitted for review, and if the difference between export and import quantities was greater than 1,000 cubic yards, applicants had to submit other information as well, such as the proposed haul route, total weight, and disposal site. Applications could then be approved, disapproved, or required to abide by conditions of approval designed to mitigate negative effects of the haul routes. Conditions could include limits on truck length, weight, or speed, as well as limits on the time of day trucks could access roads so as to minimize conflicts with peak-hour traffic and children walking to and from school.

In the early 1970s, the Mayor's Ad Hoc Landslide Committee issued recommendations to increase safety-related grading requirements for subdivisions in hillside areas. In addition to ensuring that individual sites can be graded safely, this ordinance also required that geologic and soils engineer reports be submitted that listed all relevant geologic data and solutions to possible hazards. If any parcel contained existing or potential geologic hazards without effective solutions, the preliminary Tract or Parcel Map could be disapproved.

The City passed its first Slope Density Ordinance in the mid-1970s, with the intent to limit construction where slopes were steepest. This action established a relationship between density, slope and a variety of factors, including grading, erosion, flooding, added cost of public services, stability of land, inadequate access, and the aesthetic impact of development. Initially, the ordinance only applied to areas designated "Minimum Density" Housing on an adopted Community Plan. Developers filed two unsuccessful lawsuits against the City, hoping the courts would declare slope density invalid. In 1986, the ordinance was expanded and made applicable city-wide.

In 1989, the City Planning Commission instructed staff to prepare an ordinance to regulate development on substandard lots, specifically those located in the hillside areas of the City. In response, the City Planning Department formed an in-house hillside committee to identify common problems and recommend solutions to these concerns. After these were presented to the Commission in 1990, it was determined that a more comprehensive measure, covering standard lots in addition to substandard lots, was necessary to better address the problems of inappropriate development in hillside areas. The current hillside regulations (LAMC Section 12.21 A.17, enabled by the Baseline Hillside Ordinance) were passed in 1992 and most recently updated in 2017. That action focused primarily on tailoring development more appropriately for hillside areas with narrow streets and established more restrictive development standards, as well as addressed fire and safety problems for properties fronting onto these streets.

The citywide Baseline Hillside Ordinance replaced many individual Interim Control Ordinances that temporarily regulated development in various specific hillside communities until the official ordinance passed. The ICOs were a temporary solution to the problems that resulted from out-of-scale development on "infill" lots. Such lots became a problem as technology advanced and allowed construction to occur in particularly steep areas that were originally deemed unbuildable and left undeveloped at the time the land was subdivided. The previous Hillside Ordinance established regulations for height, front and side yards, lot coverage, parking, fire protection, street access, sewer connection and grading related to required parking. Uniform setbacks were established in order to provide a necessary visual safety zone for incoming emergency equipment, as well as improving access to light and air for new development sites and adjacent properties. Maximum lot coverage was determined in order to minimize excessive grading and allow for more usable open space. Heights limits were

established to protect the views provided by ridgelines and vistas. Sewer connection became a requirement for new construction to provide uniform methods of waste disposal, and help to protect and help preserve the water table from possible contamination by antiquated disposal systems.

**State Requirements and Mapping.** CA Government Code Section 65302(g)(1) requires municipalities to address slope instability leading to mudslides and landslides. The City's Baseline Hillside Ordinance (BHO) limits the quantity of grading or the amount of earth one can import or export from a property that result in major alterations of the City's natural terrain, the loss of natural on-site drainage courses, increased drainage impacts to the community, off-site impacts, and increased loads on under-improved hillside streets during construction, except where needed to remediate unsafe conditions. While still allowing for reasonable construction and grading activity, the Baseline Hillside Ordinance caps the amount of grading allowed on a property based on the size of the lot and restricts the volume of earth allowed to be imported and exported from a property. More information on the City's grading requirements for developments in the hillsides can be found in LAMC Section 12.21.

The goals, objectives and policies in Chapter 3 broadly consider prevention, response and recovery as it pertains to all disaster events, including slope instability. The LHMP details Maps of Landslide Hazard Areas by Area Planning Commission, included as figures 11-6 through 11-12. Chapter 11 of the LHMP details different types of landslide events, their causes, secondary impacts, and an analysis of buildings and population in moderate, high and very high landslide risk areas, including a valuation of potential property damage. This analysis demonstrates that the vast majority of parcels in Landslide Hazard Areas are designated as open space or single family residential, resulting in less development when compared to the rest of the city. The chapter also evaluates critical facilities and infrastructure in a landslide risk area.

## Seismic Events

The programs associated with this Safety Element emphasize seismic safety issues because seismic events present a significant threat of devastation to life and property. With an earthquake, there is no containment of potential damage, as is possible with a fire or flood. Unlike a fire or flood whose path often can be generally measured and predicted, quake damage and related hazard events may be widespread and, at present, are unpredictable. Related hazard events could occur anywhere in the quake area including inundations from damaged reservoirs or release of hazardous materials, such as gas, which in turn could lead to fires or form toxic clouds.

The greater Los Angeles area has experienced a number of moderate seismic events which have resulted in considerable disruption of the infrastructure, impact on social and economic life, loss of lives and extensive property damage within the City, the greater metropolitan area and the adjacent region. The most recent of these was the 6.7

magnitude 1994 Northridge earthquake which was centered in the northwest part of the City, in the general vicinity of the 1971 San Fernando (aka Sylmar) quake.

The U.S. Geological Survey has estimated the probability of a ten to thirty percent potential for a 7.5 or more magnitude quake along the southern portion of the San Andreas fault within the next five to thirty years. The Alquist-Priolo Act requires the State Geologist to map active earthquake fault zones. Those faults in the Los Angeles area typically are visible, above ground faults, e.g., the San Andreas fault. However, it is the quakes along the unmapped faults, such as the blind thrust fault associated with the Northridge earthquake, that increasingly are becoming the focus of study and concern.

Seismic mitigation is relatively new, compared to flood and fire mitigation. Every major seismic event in the United States and abroad has provided valuable data for evaluating existing standards and techniques and improving hazard mitigation. The 6.3 magnitude Long Beach earthquake of 1933 killed 115 people and caused approximately \$48 million in property damage. It demonstrated the vulnerability of unreinforced masonry structures and the hazards of parapets and unanchored facade decorations. In response, the State legislature adopted the Field Act of 1934 which set seismic building standards. Locally the reinforcement and parapet standards were adopted for new construction. The nature of damage to Seattle, Washington, due to the 1949 earthquake, persuaded Los Angeles to require removal of parapets and decorative appendages so as to prevent unreinforced masonry and concrete from falling onto streets and sidewalks during a quake. The ordinance was applicable to some 30,000 pre-1933 buildings which were located predominantly in the Central City area. The 1985 Mexico City earthquake prompted the City to upgrade and expand its urban search and rescue program (see Fire Section). Following the 1971 San Fernando quake, the City required improved anchoring of new tilt-up (concrete walls poured and tilted-up on the site) structures and retroactive reinforcement of unreinforced masonry structures. A seismic retrofit tilt-up ordinance was developed and made retroactive two weeks after the 1994 Northridge earthquake. Subsequently, the City adopted a series of ordinances which required retrofitting of certain existing structures (e.g., foundation anchoring of hillside dwellings) and for new construction, as well as an ordinance which required evaluation of structures by a structural engineer during the construction process. The Northridge quake underscored the need for thorough, on-going building inspections to assure construction of buildings according to Code.

Although the Northridge earthquake was listed by seismologists as a moderate quake, it was the most costly seismic event in the United States since the 1906 San Francisco earthquake. Within the City and surrounding region, approximately 72 people died as a result of the quake (including by heart attack associated with the quake experience), thousands were physically injured, and the direct and indirect psychological toll was incalculable. Property damage was in the billions of dollars. An estimated 3,000 (as of June 1996) buildings were damaged in the City, some requiring demolition. Approximately 5,800 buildings had to be partially or totally vacated, including

approximately 25,640 mostly multiple-residential dwelling units. By the autumn following the quake, some 27,000 units were deemed in danger of being lost because owners had difficulty financing repair costs.

In addition, the infrastructure of the metropolitan area was severely disrupted. Freeways collapsed, the power systems for the City and linked communities as far away as Oregon were temporarily “blacked out” and communications were disrupted. Due to abatement measures, planning, training and interagency and inter-jurisdictional coordination, response was much more efficient than in 1971 following the San Fernando quake. Stronger building codes and required retrofitting following the San Fernando quake contributed to a reduction in damage to structures and buildings and resulted in better containment of hazardous materials. Coordinated response resulted in more rapid identification of damage sites, extinguishing of fires, addressing of fire hazards, administering, often from battle-field like temporary facilities, to the injured and displaced and initiation of work to restore the disrupted cities and region. Closure of businesses, disruption of services and dislocation of people had a significant domino effect on the economy of the region, State and nation. The economic impact would have been greater had the quake been more severe or had disruption of the infrastructure continued for a longer period of time.

The fact that the Northridge event occurred at 4:31a.m. January 17, 1994 on the Martin Luther King Jr. national holiday may have been the primary reason for so little loss of life and human injury. A low number of commuters were traveling on the freeways and streets and few people were in offices, industrial, commercial buildings, public garages and shopping centers, many of which suffered severe structural and non-structural damage. Many emergency and seismic experts believe that had the quake occurred at midday, instead of during the predawn, the loss of life and injury figures would have been substantially higher. Nevertheless, emergency forces were severely challenged by the event.

The Northridge quake was one of the most measured earthquakes in history due to extensive seismic instrumentation in buildings and on the ground throughout the region. Information from seismological instruments, damage reports and other data provided a wealth of information for experts to analyze. Traditional theories about land use siting and existing building code provisions were called into question. It is known that the complex Los Angeles fault system interacts with the alluvial soils and other geologic conditions in the hills and basins. This interaction appears to pose a potential seismic threat for every part of the City, regardless of the underlying geologic and soils conditions. Structural damage does not occur due to any one factor. The duration and intensity of the shaking, distance from the epicenter, composition of the soil and type of construction, all are factors in determining the extent of damage which may occur. Alluvial and artificially uncompacted soils tend to amplify the shaking. Shallow groundwater, combined with uncompacted soils can result in liquefaction (quicksand effect) during a strong quake. Therefore, it is difficult to escape the impacts of a quake.



During the Northridge quake, damage appeared to have a more direct relationship to building construction than did proximity to the epicenter. Largely as a result of the Northridge earthquake, the national Uniform Building Code was amended in 1994 to require that new development projects provide geotechnical reports which assess potential consequences of liquefaction and soil strength loss and propose appropriate mitigation measures, e.g., walls supported by continuous footings, steel reinforcement of floor slabs, etc. These provisions were incorporated into the Los Angeles City Building Code, effective January 1996.

These are important findings for Los Angeles because Los Angeles is a built city. Few large tracts of land remain which have not already been developed with some use. Many key facilities, such as freeways, already follow fault lines through mountain passes. Buildings already are built on uncompacted and alluvial soils. Part of the downtown center, including its many high rise buildings, is built near the Elysian Park blind thrust fault which many seismologists believe could be the source of a major seismic event in the not so distant future. Physical expansion and change in the City will occur primarily through rehabilitation of existing structures and infill development of existing neighborhoods. The City's biggest challenge is how to protect an existing city and its inhabitants from future damage. Many believe this should be accomplished through improved building design instead of prohibition of construction. Over the past several decades the City has retrofitted critical facilities, such as City Hall and some Port of Los Angeles facilities with base isolators to make the structures less prone to failure during strong ground shaking. Most recently, the City has embarked on an ambitious soft story retrofit program, which requires all vulnerable multi-family properties to undertake mandatory retrofitting to ensure safety during and after a seismic event. The Non-ductile Concrete Retrofit Program may require concrete buildings with a roof and/or floor supported by concrete submitted for plan check before 1977 to complete a review, submit plans for retrofit, and complete retrofits. As of 2021, about 18% of the 1,337 non-ductile concrete buildings then identified had submitted their initial review to the Los Angeles Department of Building and Safety.

Pre-seismic event land use planning with a view to reconfiguring the devastated areas though post-event changes in land use, intensity of development, etc. generally are not included as programs of this Safety Element. It has been the City's experience that the unpredictability of seismic events, both as to location and damage, renders such planning impractical. Devastation, while widespread, generally does not completely destroy entire blocks, neighborhoods or large geographic areas. Therefore, rebuilding tends to be more of an infill activity than an urban clearance and reconstruction enterprise. However, redevelopment programs are included in the optional tools available for reconstruction of severely damaged areas and are being used to rebuild neighborhoods devastated by the Northridge quake. Today, there is a much stronger emphasis on mitigating the effects of displacement after a disaster and protecting individuals who might have social and economic vulnerabilities that are exacerbated by a disaster event. Expanding on this commitment will drive many of the Safety Element

work programs over the next several decades.

More information on the local history and context of seismic events in Los Angeles can be found in Chapter 9 of the Local Hazard Mitigation Plan: *Earthquake*, including a detailed write up on historic events. Information on specific response procedures to an earthquake event can be found in the Earthquake Annex of the Emergency Operations Plan.

**State Requirements and Mapping.** The State Public Resources Code Section 2699 requires that a safety element “take into account” available seismic hazard maps prepared by the State Geologist pursuant to the Alquist-Priolo Earthquake Fault Zoning Act of 1972. The Alquist-Priolo Act was established as a direct result of the 1971 San Fernando earthquake. It requires that the State Geologist map active faults and seismic hazard areas throughout the State. Today, the provisions of CA Government Code section 65302(g)(1) require cities to address seismically-induced surface rupture, ground shaking, ground failure, tsunami, seiche and dam failure (all covered under Flood and Water Hazards), subsidence (covered in Slope Failure and Subsidence) and other seismic hazards.

A map of major fault locations is included in the LHMP as Figure 9-2. The LHMP includes maps of peak ground acceleration on the Newport-Inglewood Fault (Figure 9-3), Palos Verdes Fault (Figure 9-4), Puente Hills Fault (Figure 9-5), the San Andreas Fault (Figure 9-6), and the Santa Monica Fault (Figure 9-7). The LHMP also includes a description of soil classifications and their ability to maintain ground shaking, according to the National Earthquake Hazard Reduction Program (NEHRP). These soil classifications are mapped by Area Planning Commission (APC) in Figures 9-8 through 9-14. Additionally, the LHMP Maps Liquefaction Zones by APC in Figures 9-15 through 9-21. Collectively these maps satisfy the requirements of Government Code Section 65302(g)(1). The LHMP also includes information on critical facilities, including the likelihood of significant damage and estimated timetables to reestablish function, in Tables 9-17 through 9-26.

The Hazard Mapping Act requires the State Geologist to map areas subject to amplified ground shaking (or conditions which have potential for amplified ground shaking), liquefaction and landslide hazard areas. Following the 1994 Northridge earthquake, the hazard mapping program was revised and accelerated. Today these maps are available through the California Department of Conservation website. Policy 1.1.6, which focuses on consistency with State and Federal regulations, ensures that the City of Los Angeles will continue to reference and integrate these State mapping efforts. In addition to the hazard mapping provisions, the State requires that property sellers or agents disclose to potential property buyers geotechnical reports and their contents.

## Hazardous Materials

Hazardous materials have been a concern since 1900 when the City experienced its first major oil industry fire. Extraction of oil and gas deposits began in 1896 when Edward Doheny discovered oil at Second Street and Glendale Boulevard (Westlake community). By 1900 he had erected over 600 wooden oil rigs and installed hundreds of storage tanks and related facilities. In that year a family bonfire ignited the oil field at Bixel Street. An estimated 10,000 gallons of blazing oil spilled down the hills but was diverted and suppressed before it reached the densely built Central City. The saving of the downtown from a potential disaster prompted the City to purchase more fire suppression equipment and to expand the number of fire stations and personnel. Subsequent oil field fires in the Doheny and other fields throughout the City resulted in regulations to assure containment of oil fires in oil fields, refineries and oil and gas storage facilities.

**Oil and Natural Gas.** Much of the area south of the Santa Monica Mountains is underlain by gas and oil deposits. Natural gas, crude oil and hydrogen sulfide can work their way to the surface or infiltrate structures, causing potential fire and health hazards. To regulate the extraction, production, and storage of oil and natural gas, the City established Oil Drilling District procedures in 1948 that amend the zoning designations of specific areas in the City with an "O" suffix. The procedures are codified in Chapter 13, Section 1 of the Los Angeles Municipal Code. That specific chapter remains in the jurisdiction of the Office of Zoning Administration of the City's Planning Department. LAMC 13.01 chapter outlines operating and safety requirements and compliance measures for oil and gas activities. These provisions are intended for both stand-alone oil wells and for controlled drill sites whose operations may encompass the refining and processing of oil or gas for production purposes. The conditions also address land use impacts such as hours of operation, noise, and traffic. On September 19, 2016, the Chief Zoning Administrator issued Zoning Administration Memorandum No. 133, which outlines specific instructions and requirements for proposed projects that involve drilling, re-drilling, or maintenance of an oil well. These procedures also require an environmental assessment of each project to determine the type of CEQA clearance. The Office of Zoning Administration works closely with the Office of Petroleum and Natural Gas Administration and Safety in the Public Works Department to address compliance measures with City and State requirements.

In addition, landfills are sources of methane gas. The existence of underground gas and hazardous materials deposits requires monitoring of excavations and known seepage areas. A major incident occurred in 1971 during the tunneling for the Feather River Project when a methane explosion killed 18 workers. Incidents relating to the gas seepage caused temporary safety shutdowns of the Metro Rail subway tunneling in 1993-95.

The Fire Department works cooperatively with the United States Coast Guard, the State and Los Angeles County in responding to off-shore emergency incidents including responding to, containing and cleaning-up off-shore oil spills. The City's authority is to

protect the shoreline (on-shore). In accordance with a mutual aid agreement with the U.S. Coast Guard, the Fire Department provides the initial response to any spill in the harbor or off-shore. Its responsibility is to contain the initial spill and keep the situation from getting worse. The County is responsible for coordinating clean-up efforts.

The previous Safety Element included a map of Oil Field and Oil Drilling Areas. Today, the most current information on oil extraction is available from the State, specifically the California Department of Conservation Geologic Energy Management Division (CalGEM).

**Other Hazardous Materials.** In the 1920s the use of chemicals and hazardous materials in the City's expanding manufacturing and commercial sectors increased the hazards for both workers and the general populace. A series of movie studio back lot fires and film processing laboratory fires occurred in the late 1920s. These incidents led to the enactment of City regulations to protect workers and the public from fires and fumes associated with highly flammable film and chemicals used in film processing as well as from hazards associated with flammable movie sets.

Today hazardous materials are used in commercial, industrial, institutional and agricultural enterprises as well as households throughout the City. Los Angeles operates both a major international airport and a major harbor within its boundaries and operates other airport facilities within and outside its boundaries. Hazardous and highly flammable materials are shipped through, stored and used (especially fuels) at these facilities. They also are transported along freeways and highways and are stored in facilities throughout the City. Many hazardous materials, if released by accident or catastrophic event, could cause severe damage to human life and health and to the facilities and could disrupt activities within a radius of several miles around the release site.

Currently, the Port of Los Angeles proactively conducts due diligence evaluations, site investigations, environmental oversight and audits, remedial design plans. As part of the overall cleanup process, the Port of Los Angeles performs and coordinates health and environmental risk assessments, conducts regulatory reviews, and negotiates restoration levels for contaminated sites with local, State, and federal agencies, including the U.S. Coast Guard, U.S. Environmental Protection Agency (EPA), California Department of Fish and Wildlife, California Department of Toxic Substances Control, California Regional Water Quality Control Board, County of Los Angeles Fire Department, City of Los Angeles Fire Department, and Los Angeles Port Police. The Port also oversees emergency response and waste management programs by responding to emergency and non-emergency chemical spills, releases of hazardous materials, and abandoned waste in Los Angeles Harbor. More information on POLA emergency response programs can be found in the POLA Master Plan.

During the 1994 Northridge earthquake, over 100 incidents of quake related release of

hazardous materials were reported. Of these, 23 involved release of natural gas, 10 involved release of gases and liquid chemicals at educational institutions and 8 involved release of hazardous materials at medical facilities. Gas leaks or chemical reactions triggered fires which destroyed or damaged nine university science laboratories. Rupture of a high pressure natural gas line under Balboa Boulevard in Granada Hills resulted in a fire which damaged utility lines and adjacent homes. Petroleum pipeline leaks released 4,000 barrels of crude oil into the Santa Clara River north of Los Angeles and caused fires in the Mission Hills section of the City. Most recently, in 2015 and 2016, a natural gas leak in the Aliso Canyon storage facility triggered a State declared State of Emergency that threatened nearby residents of the Porter Ranch community. More information on past hazardous materials incidents is available in LHMP Chapter 17: *Hazardous Material, Transportation and Radiological Incidents*.

Fires can damage labeling and warning signs which are posted on chemical and fuel containers and on structures to identify presence of hazardous materials. Identification of hazardous materials, storage and handling sites and information about containment facilities and/or procedures are important to protect emergency personnel as well as employees and the adjacent community during a spill incident and incident clean-up.

Hazardous materials management is regulated by federal and State codes. Within the City, the Fire Department is designated as the enforcement agency for the City, State and federal hazardous materials regulations. City regulations include spill mitigation and containment and securing of hazardous materials containers to prevent spills. In addition, the State Fire Marshall enforces oil and gas pipeline safety regulations and the federal government enforces hazardous materials transport pursuant to its interstate commerce regulation authority. More information regarding the oversight of hazardous materials, including their transport, is available in the LHMP Chapter 17.

As noted above, this Safety Element primarily addresses hazardous materials relative to other potential natural hazards. Landfill monitoring is addressed separately within the General Plan and by the City's Solid Waste Integrated Resources Plan, more commonly known as the City's Zero Waste Plan, in keeping with citywide sustainability goals.

In recent years the City has dedicated more resources to environmental justice, working to minimize land use conflicts that bring vulnerable populations into contact with hazardous materials. In 2013 the City adopted the Clean Up, Green Up pilot, which works to address the cumulative health impacts of industrial land uses adjacent to homes, schools, parks and other sensitive areas. The program is currently active in portions of Boyle Heights, Pacoima, and Wilmington. In 2015 the City released the Plan for a Healthy LA, an Element of the General Plan focused on health and wellness that meets the requirements of SB 1000. Brownfield remediation is a citywide priority, but the need still exceeds the available funding. Additional guidance on the regulation of hazardous materials is also often found in Community Plans, especially in geographic areas with compounding concerns regarding hazardous materials. For example, recently adopted

Community Plans for the West Adams - Baldwin Hills - Leimert Park, South Los Angeles, and Southeast Los Angeles areas include additional guidance on oil drilling and processing, as much of the area is located over an active oil field.

**State Requirements and Mapping.** The State lists hazardous materials as a topic that can be included in the Safety Element at the discretion of a local jurisdiction. Therefore, there are no specific requirements set by the State. Because hazardous materials are a critical concern locally they are discussed at length in Chapter 17 of the LHMP, which focuses on *Hazardous Materials, Transportation and Radiological Incidents*.

## Climate Change

Since the Safety Element was last updated in 1996, Climate Change has emerged as a paramount challenge for the City of Los Angeles. As a result of climate change Los Angeles can expect to see several of the hazards above increase in severity and frequency. This is especially true of wildfires, flooding, drought, extreme heat and sea-level rise.

In addition to increased frequency and severity of existing hazards, the City must grapple with some emerging hazards. As discussed in the fire section, large scale fires can have regional air quality impacts, requiring municipalities to provide temporary shelter to residents without access to good air filtration. While the Los Angeles climate used to be relatively temperate, we can now expect to see many more days of extreme heat. More information on extreme heat can be found in the Adverse Weather Annex of the Emergency Operations Plan and in Chapter 6: *Adverse Weather* of the LHMP. While flooding presents an acute hazard, the lack of availability of water is also a chronic threat to the Los Angeles region as a result of climate change. Information on how Los Angeles monitors and responds to a drought emergency is available in Chapter 8: *Drought* of the LHMP. Efforts to plan and manage water supply to ensure continued access to water are addressed through planning efforts including the One Water LA 2040 Plan (produced by LA Sanitation) and Urban Water Management Plan (produced by LA Department of Water and Power).

Two plans produced by Mayor Garcetti's administration, Resilient Los Angeles and the Green New Deal (Sustainability pLAn), recognize climate change as a real threat and have prioritized the need to build the capacity of individual families and businesses to prepare for and recover from emergency events and build long-term financial security. Long-term response networks and recovery strategies are key to keeping local communities safe. There is a need to modernize aging infrastructure for the future, and develop ways to provide more safe and affordable housing to improve the economic security of Angelenos. The most recent strategies involve further empowering and engaging neighborhoods and organizations to foster local resilience and social cohesion. Additional background information on how the City is building resilience can be found in the Resilient LA and Green New Deal Plans. Policy language developed



through these planning efforts has been directly incorporated into Chapter 3 of the subject Safety Element, particularly Objective 1.2.

These local networks also play a critical role in climate adaptation for our most vulnerable communities as the City takes action to reduce local health and wellness disparities while increasing economic security for all Angelenos. As part of the preparation and response to disasters and climate change, the Mayor's Resilient Los Angeles Plan sets measurable goals to build city leadership in resilience, integrates tools and technology to prioritize the most vulnerable population in decision-making, and is focused on fostering faster and more efficient disaster preparedness and recovery.

**State Requirements and Mapping.** The most recent additions to CA Government Code, section 65302(g)(4), requires municipalities to address climate change adaptation and resilience strategies.

Government Code section 65302(g)(4)(A) requires a vulnerability assessment that identifies climate change risks. This requirement is met by the LHMP Risk Assessment, which evaluates climate impacts including wildfire, flooding, extreme heat and sea level rise. Data for these calculations is taken from Cal-Adapt tool and other local data sources, as required by Government Code section 65302(g)(4)(A)(ii). Future updates to the LHMP will continue to expand on this knowledge, bringing in additional information from the Cal-Adapt tool and California Adaptation Planning guide. In addition, there are several other documents that detail vulnerability in Los Angeles, including: the 2020 Floodplain Management Plan, Port of Los Angeles Sea Level Rise Adaptation Strategy, Metro Climate Action Plan (CAAP), and One Water LA 2040. These documents serve as additional local data sources in keeping with California Government Code section 65302(g)(4)(A)(ii)(III) and (IV).

Government Code section 65302(g)(4)(B) directs cities to create a set of adaptation goals, policies and objectives, which is satisfied by Objective 1.2 and related policies 1.2.1 through 1.2.13, found in Chapter 3. These policies were developed using language originally drafted for the Los Angeles Sustainability pLAN, which draws from the California Adaptation Planning Guide and Cal-Adapt.

Government Code section 65302(g)(4)(C) requires municipalities to create a set of feasible implementation measures designed to carry out the goals, policies and objectives that relate to climate change. This Element has been updated to include a chapter on implementation programs, most of which were developed through related planning efforts. The program list in Chapter 4 details the City's approach to building on the existing mitigation measures discussed above to better address climate change.

## Other Hazards

This chapter has focused primarily on the hazards that are most cited in California State Laws pertaining to the Safety Element of the General Plan. There are several additional hazards of local concern that are discussed in other long range plans, primarily the LHMP. Readers are encouraged to reference the LHMP for more detailed information. While these hazards are not discussed in this chapter, they are considered in the breadth of hazards covered by the Goals, Objectives and Policies.

Hazards not discussed above but included in the LHMP include:

- Cyber Attack and Space Weather (LHMP Chapter 16)
- Public Health Hazards, including Pandemics (LHMP Chapter 18, also covered in the Pandemic Annex and 2019 and Mass Care Health Medical Annex of the Emergency Operations Plan)
- Terrorism and Weapons of Mass Destruction, Civil Unrest (LHMP Chapter 19, also covered in the Terrorism Prevention and Protection Annex and Civil Disturbance Annex)

# Chapter 3: Goals, Objectives and Policies

The Safety Element goals, objectives, policies and programs are broadly stated to reflect the comprehensive scope of citywide emergency planning and disaster response. In most instances the goals, objectives and policies are not specific to a particular disaster. Rather, they aim to address the City's approach to any number of disaster events, including but not limited to: adverse weather, climate change and sea level rise, dam failure, drought, earthquake, flood, landslide, tsunami, wildland fire, technology impacted hazards, hazardous material incidents, public health hazards, and terrorism. Details on each of these disaster categories can be found in the Local Hazard Mitigation Plan.

Because City codes and regulations contain standards for water, streets, etc. the Safety Element goals, objectives, policies and programs generally do not contain specific standards.

Goals, objectives, policies and programs are intended to be carried out to the greatest extent feasible and within the resources available. Implementation of these goals, objectives and policies is accomplished through the work programs of the various city departments, the most safety specific of those are included as implementation programs in Chapter 4.

## Goal 1: Hazard Mitigations

A city where potential injury, loss of life, property damage and disruption of the social and economic life of the City due to hazards is minimized.

### Objective 1.1

Implement comprehensive hazard mitigation plans and programs that are integrated with each other and with the City's comprehensive emergency response and recovery plans and programs.

### Policies

**1.1.1 Coordination.** Coordinate information gathering, program formulation and program implementation between City agencies, other jurisdictions and appropriate public and private entities to achieve the maximum mutual benefit.

**1.1.2 Disruption Reduction.** Reduce potential disruption due to disaster, with an emphasis on critical facilities, governmental functions, infrastructure and information resources.

**1.1.3 Facility/Systems Location and Maintenance.** Locate new critical facilities and infrastructure outside of hazard areas, especially VHFHSZs, when feasible. If no feasible alternative site exists, ensure that these facilities incorporate all necessary protections to allow them to continue to serve essential community needs during and after disaster events. Provide redundancy (back-up) systems and strategies for continuation of adequate critical infrastructure systems and services so as to assure adequate circulation, communications, power, transportation, water and other services for emergency response in the event of disaster related systems disruptions and the growing climate emergency.

**1.1.4 Health/Environmental Protection.** Protect the public and workers from the release of hazardous materials and protect City water supplies and resources from contamination resulting from release or intrusion resulting from a disaster event, including protection of the environment and public from potential health and safety hazards associated with program implementation.

**1.1.5 Risk Reduction.** Reduce potential risk hazards due to disaster with a focus on protecting the most vulnerable people, places and systems.

**1.1.6 State and Federal Regulations.** Assure compliance with applicable state and federal planning and development regulations. Regularly adopt new provisions of the California Building Standards Code, Title 24, and California Fire Code into the LAMC to ensure that new development meets or exceeds State and National standards. Facilitate existing non-conforming structures and evacuation routes coming into compliance with new standards.

**1.1.7 Building Community Capacity.** Build social cohesion and increase local resilience through community collaboration and education. Provide outreach and education on topics including: local hazards, disaster prevention and preparation and evacuation procedures with an emphasis on reaching vulnerable communities.

**1.1.8 Land Use.** Consider hazard information and available mitigations when making decisions about future land use. Maintain existing low density and open space designations in Very High Fire Hazard Severity Zones. Ensure mitigations are incorporated for new development in hazard areas such as VHFHSZs, landslide areas, flood zones and in other areas with limited adaptive capacity.

#### Objective 1.2

Confront the global climate emergency by setting measurable targets for carbon reduction that are consistent with the best available methods and data, center equity and environmental justice, secure fossil free jobs, and foster broader environmental sustainability and resiliency.

## Policies

**1.2.1 Environmental Justice.** In keeping with the Plan for a Healthy LA, build a fair, just and prosperous city where everyone experiences the benefits of a sustainable future by correcting the long running disproportionate impact of environmental burdens faced by low income families and communities of color.

**1.2.2 Renewable Energy.** Aggressively pursue renewable energy sources, transitioning away from fossil based sources of energy and toward 100% renewable energy sources.

**1.2.3 Local Water.** Continue to lead in water conservation and smart water policy through improvements to per capita water use, watershed management, and wastewater and stormwater recycling, incorporating more ecological, systems-based approaches to water management.

**1.2.4 Clean and Healthy Buildings.** Design, build and rebuild buildings using passive energy principals, advanced efficiency and safety measures, and on-site renewable energy.

**1.2.5 Housing and Development.** In keeping with the Housing Element, create housing opportunities that enhance affordability, equity, livability, sustainability and resilience.

**1.2.6 Mobility.** In keeping with the Mobility Plan, build a comprehensive and integrated transportation network that changes how Angelenos get around and reduces car dependency.

**1.2.7 Zero Emissions Vehicles.** In keeping with the Mobility Plan, work toward zero emissions transportation and goods movement and increase zero emissions infrastructure including charging.

**1.2.8 Industrial Emissions and Air Quality Monitoring.** In keeping with the Air Quality Element, ensure that every Angeleno can breathe clean, healthy air by addressing air pollution from all sources, with a particular emphasis on prioritizing the health and wellbeing of overburdened families and delivering environmental justice.

**1.2.9 Waste and Resource Recovery.** Harvest waste as a resource, stimulate economic innovation, and create green jobs by improving and expanding existing systems of trash and recycling.

**1.2.10 Food Systems.** In keeping with the Plan for a Healthy LA, ensure access to healthy, sustainable food in a changing climate, especially in communities already facing food access disparities.

**1.2.11 Urban Ecosystem and Resilience.** In keeping with the Conservation and Open Space Elements, create a more temperate biodiverse city with more green space for

people and habitats.

**1.2.12 Prosperity and Green Jobs.** Leverage investments in green infrastructure and systems to create inclusive economic opportunities for the city's workforce.

**1.2.13 Lead by Example.** Leverage government owned properties and publicly-driven investments to realize broader climate change goals.

## Goal 2: Emergency Response

A city that responds with the maximum feasible speed and efficiency to disaster events so as to minimize injury, loss of life, property damage and disruption of the social and economic life of the City and its immediate environs.

### Objective 2.1

Develop and implement comprehensive emergency response plans and programs that are integrated with each other and with the City's comprehensive hazard mitigation and recovery plans and programs.

### Policies

**2.1.1 Coordination.** Coordinate program formulation and implementation between City agencies, adjacent jurisdictions and appropriate private and public entities. Continue to participate in mutual aid agreements with surrounding jurisdictions to achieve the maximum mutual benefit for emergency response.

**2.1.2 Health and Environmental Protection.** Develop and implement procedures to protect the environment, sensitive species and public from potential health and safety hazards associated with disaster events, hazard mitigation and disaster recovery efforts.

**2.1.3 Information.** Develop and implement training programs and informational materials designed to assist property owners, tenants and the general public in understanding and mitigating disaster risks and regulations that may impact their homes and businesses, with an emphasis on reaching vulnerable communities.

**2.1.4 Interim Procedures.** Develop and implement pre-disaster plans for interim evacuation, sheltering and public aid for disaster victims displaced from homes and for disrupted businesses. Plan to utilize park space and other public facilities in emergency situations. Plans should include provisions to assist businesses which provide significant services to the public, plans for reestablishment of the financial viability of the City and assistance for residents to remain in the city.

**2.1.5 Response.** Develop, implement and continue to improve the City's ability to



respond to emergency events. Participate in regularly scheduled disaster exercises to better prepare Police, Fire, Public Works and other City employees with disaster responsibilities.

**2.1.6 Standards/Fire.** Continue to maintain, enforce and upgrade requirements, procedures and standards to facilitate more effective fire suppression and safety.

- A. Enforce peak water supply requirements.
- B. Enforce minimum roadway widths and clearances for evacuation and fire suppression.
- C. Maintain special fire-fighting units at the Port of Los Angeles, Los Angeles International Airport, and Van Nuys Municipal Airport capable of responding to special emergencies unique to the operations of those facilities.
- D. Coordinate with CALFIRE, local fire agencies, fire safe councils, private landowners, and other responsible agencies to identify the best method(s) of fuel modification to reduce the severity of future wildfires, including: Prescribed fire; Forest thinning; Grazing; Mechanical clearing; Hand clearing (piling, burning/chipping); Education; and Defensible space.
- E. Maintain mutual aid or mutual assistance agreements with local fire departments to ensure an adequate response in the event of a major earthquake, wildfire, urban fire, fire in areas with substandard fire protection, or other fire emergencies.

**2.1.7 Building Community Capacity.** Develop and implement strategies for involving volunteers, community groups, and civic organizations in emergency response activities.

### Goal 3: Disaster Recovery

A city where private and public systems, services, activities, physical condition and environment are reestablished as quickly as feasible to a level equal to or better than that which existed prior to the disaster.

#### Objective 3.1

Develop and implement comprehensive disaster recovery plans which are integrated with each other and with the City's comprehensive hazard mitigation and emergency response plans and programs.

#### Policies

**3.1.1 Coordination.** Coordinate between city departments, county and state agencies, local jurisdictions and with appropriate private and public entities prior to a disaster to plan and establish disaster recovery programs and procedures which will enable cooperative ventures, reduce potential conflicts, minimize duplication and maximize the available funds and resources to the greatest mutual benefit following a disaster.

**3.1.2 Health/Safety/Environment.** Develop and establish procedures for identification

and abatement of physical and health hazards which may result from a disaster. Provisions shall include measures for protecting workers, the public and the environment from contamination or other health and safety hazards associated with the hazard in addition to abatement, repair and reconstruction programs.

**3.1.3 Historic/Cultural.** Develop procedures which will encourage the protection and preservation of historic and cultural resources during disaster recovery.

**3.1.4 Interim Services/Systems.** Develop and establish procedures prior to a disaster for immediate reestablishment and maintenance of damaged or interrupted critical infrastructure systems and services so as to provide communications, circulation, power, transportation, water and other necessities for movement of goods, provision of services and restoration of the economic and social life of the City and its environs pending permanent restoration of the damaged systems.

**3.1.5 Restoration.** Look to the future and rebuild based on the lessons of the past. Prior to a disaster, develop and establish procedures for securing assistance and expediting inspection and permitting activities to facilitate the rapid repair and rebuilding of those parts of the private and public sectors which were damaged or disrupted as a result of the disaster with an added consideration of future safety. Develop and establish procedures to enhance the resilience of buildings and infrastructure that are rebuilt following a disaster. Develop tools to ensure that vulnerable residents and business owners are included in community rebuilding efforts.

# Chapter 4: Programs

The following table of Programs reflects the implementation of Safety Element Goals, Objectives, and Policies by various departments of the City government. The list synthesizes hundreds of programs and projects described in existing long-range and safety specific planning documents including: the 1996 Safety Element, the 2018 Local Hazard Mitigation Plan, the 2020 Floodplain Management Plan, Resilient Los Angeles, LA’s Green New Deal, and hazard-specific and operational Annexes maintained by city departments and the Emergency Management Department.

The Programs are organized to align with the Goals of Hazard Mitigation, Emergency Response, and Disaster Recovery. Some are currently implemented by the entities indicated in the table while others are aspirational, representing safety and resilience best practices to be achieved or put in place on an ongoing, short, medium, or long timeline. The Programs are synthesized and generalized from among many specific department or agency actions in order to holistically and comprehensively address all aspects of safety and disaster response by the City; as such each Program is assigned at least one, but in some cases many agencies and departments that are responsible for its implementation.

Generally short term goals are targeted for 0-5 years, medium term goals are 5-10 years, and long term goals are expected to take 15+ years to implement. A listing of department abbreviations is available in appendix A.

#	Program Description	Policies	Time Frame	Responsible Department (s)
1	<b>Emergency Operations Master Plan.</b> Maintain and implement the City's Emergency Operations Master Plan and procedures, including staff training and exercises for emergency procedures. Implement citywide data integration systems to support first responders and City departments in identifying the most urgent and highest need situations. Provide resources for people with disabilities that include preparing emergency preparedness manual, assessment of disability needs, and disaster preparedness online planning tool. Expand and maintain	1.1.1, 2.1.1, 2.1.4, 2.1.5, 3.1.1, 3.1.2, 3.1.4	Ongoing	EMD, DOD, DOA, LADOT, RAP, LAPD, LAFD

	communication outreach, including outreach to identified vulnerable populations, for hazards such as tsunamis, wildfires, and earthquakes.			
2	<b>Implement and Maintain Local Hazard Mitigation Plan (LHMP).</b> Maintain, update and implement the Local Hazard Mitigation Plan (next update scheduled for 2023) and incorporate the most up-to-date, available risk and vulnerability assessment information for all climate hazards and actions and projects designed to mitigate or reduce the impacts of identified hazards (including for planned development) and increase community resilience. Maintain and update modeling, as necessary, and develop and share updated hazards mapping, leveraging future climate data such as from Cal-Adapt to support LHMP updates and other appropriate uses. Develop an urban heat vulnerability index and mitigation plan to prepare vulnerable assets, resources and communities for higher temperatures and more frequent extreme heat.	1.1.5, 1.1.8	Short, Ongoing	EMD, DPW, LACP
3	<b>Expand Homeless Services.</b> Expand mobile City services for vulnerable populations. Expand access to City services for homeless, marginalized, and vulnerable communities such as homelessness programs within the Housing Element and a comprehensive homelessness strategy. Coordinate a homeless housing service provider preparedness program to fortify systems and services to withstand future natural disaster related or climate related challenges. Connect people experiencing homelessness near the LA River and in other hazard areas, such as VHFHSZs, with better access to services and housing. Ensure that there are provisions to locate and evacuate homeless individuals in hazard areas during a disaster event. Expand access to temporary shelter, particularly during climate events including extreme heat and poor air quality days. In keeping with Program 25, expand access to transitional subsidized jobs and competitive unsubsidized jobs through the City's LA:RISE program. Partner with LA County and Goodwill in the "Hired and Hopeful" Initiative to provide unsubsidized employment opportunities to 16,000 people experiencing homelessness over the next three years.	1.2.1, 1.2.5	Medium	LAHSA, CAO, EMD, LAFD, RAP, DPW, LAPD, LADOT, DONE/EmpowerLA, EWDD
4	<b>Los Angeles River.</b> Actively pursue grant funding to build out the bicycle network, greenway trail system, and other improvements identified in the 2007 LA City Council adopted Los Angeles River Revitalization Master Plan (LARRMP), and support campaigns, such as Greenway 2020, that pledge to help fund and raise awareness for this effort which will increase opportunities for access to nature, multigenerational community gathering spaces, physical activity, and psychological respite. Use the LA River as a case study to advance other greening and disability inclusivity projects around riverways that also serve as	1.2.11	Medium	LA County, BOE, USACE, LACP, RAP, Metro, DOD, LADOT, LASAN, LADWP

	stormwater infrastructure, such as the Pacoima Wash, Arroyo Seco, and the Ballona Creek. Continue the use of signage, demonstration projects, and public art to use the LA River as a space to educate visitors about sustainability and resilience best practices.			
5	<b>Drinking Water Quality and Access.</b> Identify funding, prioritization, and approach to improving water delivery facilities in order to improve the quality of drinking water. Test and provide ongoing assurance about the quality of drinking water. Identify and retrofit/install priority permanent hydration stations to ensure access across the city. Prioritize large municipal buildings, public properties, and LADWP customer service centers.	1.1.3, 1.1.2	Medium	LADWP, LASAN, GSD, RAP
6	<b>Identify, Analyze, and Mitigate Local Oil and Gas Risks.</b> Collaborate across city, county, and state agencies concerning oil & gas facilities within the City of Los Angeles, primarily on non-compliance issues and nuisance activities. Support the Office of Petroleum & Natural Gas Administration and Safety (within the Department of Public Works) with annual reports for the 17 neighborhood drill and production sites and assist in identifying any potential risks from their permitted scopes of work. Support the OPNGAS and relevant agencies in annual on-site inspections for the City's 17 neighborhood drill and production sites. Investigate nuisance complaints and alleged violations. If necessary, request an operator file for a discretionary review so that the City Planning department can assign corrective measures in the interest of public health concerns.  Facilitate broader community engagement in oil and gas discretionary review under the provisions of ZA Memorandum No. 133. Evaluate the feasibility of requesting operators to cease operations based on an amortization study. Explore the feasibility of deeming all existing oil & gas extraction activities as non-conforming uses that cannot be expanded or intensified. Phase out ministerial approvals of oil & gas extraction and production sites and require discretionary approval with mitigating environmental conditions. Work with state enforcement agencies that oversee oil & gas facilities and review public records to ensure that operators are abiding by all regulatory standards.	1.1.4, 1.2.1, 1.2.8	Medium	DPW (OPNGAS), LAFD, LACP, Mayor, AQMD, LA County, LA SAN, LADBS
7	<b>Floodplain and Watershed Management.</b> Maintain, update, and implement the Floodplain Management Plan. Provide information annually to the Flood Hazard Mitigation Coordinator for the preparation of the Annual Floodplain Management Plan Evaluation Report that includes mitigation action progress, compliance actions taken during reporting period, and number of permits approved in designated flood	1.1.5, 1.1.6	Ongoing	DPW, LACFCD, LADBS, LACP, LAHD, LAUSD, RAP, LASAN

	hazard areas and granted waivers. Maintain a current list of City-owned or City-leased properties located in FEMA-designated flood zones and evaluate floodplain management alternatives. Maintain and enhance the City's classification under the Community Rating System (CRS) to mitigate impacts from flood insurance reform. Coordinate floodplain management program with the Enhanced Watershed Management Plan and integrated water management plans such as the Integrated Resource Plan and One Water LA 2040 plan. Provide education programming to maintain a healthy watershed and keep Angelenos safe. Update hillside area maps as needed to identify urban flooding hot spots for maintenance and future stormwater management projects in order to improve watershed health and slope stability, limiting land disturbance and maintaining vegetation. Incorporate floodplain management information into the Zoning Information and Map Access System (ZIMAS) and NavigateLA.			
8	<b>Evaluate and Improve Reservoirs.</b> Evaluate reservoirs and dams for earthquake safety and make improvements, as needed. Dispatch reservoir inspection and damage teams following natural disasters to inspect and report condition of facilities. Collect and analyze water volumes and pumping capability to ensure facilities are functioning properly to reduce potential hazards and routinely monitor structural conditions.	1.1.2	Long, Ongoing	DPW, LADWP
9	<b>National Flood Insurance Program.</b> Maintain, comply with, and meet the requirements of the National Flood Insurance Program to protect property owners and recover more quickly after a flood. Conduct trainings for City staff related to hazard prevention topics such as compliance with the National Flood Insurance Program. Conduct outreach to property owners about the benefits of compliance with the National Flood Insurance Program.	1.1.6, 2.1.3 2.1.4	Short, Ongoing	BOE, LADBS, EMD
10	<b>Increase Stormwater Capture.</b> Expand stormwater capture throughout the city using green infrastructure to combat climate change and drought. Capture stormwater runoff to replenish local groundwater supplies. Construction of new and retrofitting of existing stormwater facilities should prioritize areas with vulnerable populations that are disproportionately impacted by climate change and areas favorable to groundwater replenishment. Encourage stormwater capture on public and private properties, including projects not subject to the LID ordinance and in open spaces areas, to install permeable pavement, green roofs, trees, bioswales, rainwater catchment and infiltration systems. Maintain and implement the One Water LA 2040 Integrated Water Management Plan to facilitate a transition to a more ecological,	1.2.3, 1.2.11	Medium	LADWP, DPW, LADOT, LASAN, BSS, CAO



	systems-based approach to stormwater and flood management. Capture stormwater runoff to replenish local groundwater supplies consistent with LADWP's 2020 Urban Water Management Plan. Administer funding programs to improve stormwater capture, including Prop O and Measure W.			
11	<b>Facilities Flood Risk Reduction.</b> Develop and maintain a citywide list of priority maintenance-related flood problem sites, conduct necessary inspections and prioritize maintenance to address problems prior to wet season and after significant storms. Maintain a list of critical facilities in the city as identified in the City's Local Hazard Mitigation Plan, provide information to operators of critical facilities in FEMA-designated flood zones and encourage flood protection measures at those facilities, prioritizing natural infrastructure, where feasible. Ensure new essential public facilities will be located outside of at-risk flood areas when possible.	1.1.2, 1.1.3	Ongoing	LASAN, EMD, BOE
12	<b>Local Water Supply Resilience.</b> Reduce LADWP dependence on purchase of imported water by 50% from FY 13/14 baseline. Expand and protect local water sources in areas of water conservation and use efficiency, stormwater capture, water reuse, and groundwater remediation to help reduce dependence on purchased imported water and strengthen the City's local water supplies. In keeping with Program 10, leverage flood mitigation infrastructure to enhance local water availability and construct stormwater capture infrastructure in areas favorable to groundwater replenishment. Update and report on the Urban Water Management Plans and Integrated Resources Plans every five years to set and evaluate water supply resilience goals. Continue to explore expanding the remediation and use of groundwater.	1.2.3	Medium	LADWP, MWD, LASAN, LA County, BOE
13	<b>Expand Recycled Water for Beneficial Reuse.</b> Expand Indirect Potable Reuse (IPR) and Direct Potable Reuse (DPR) water recycling projects. Recycle water at the Hyperion Water Reclamation Plant (WRP) and Donald C. Tillman WRP for IPR by recharging into groundwater basins. Develop DPR recycled water projects under Operation NEXT and the Headworks Direct Potable Reuse Pilot Project.	1.2.3, 1.2.11	Medium	LADWP, LASAN, LA County, BSS, BOE, MWD
14	<b>Water Conservation:</b> Expand existing programs and develop targeted campaigns to increase awareness on L.A.'s water policy goals. Expand low water use/drought tolerant native landscaping and Low Impact Development (LID) programs. Expand municipal and proprietary buildings retrofits. Support the use of water efficient appliances in residential units through appliance rebate programs.	1.2.3	Short	LADWP, LASAN, RAP, GSD, LADBS, BOE, DPW, CAO, LAWA, POLA

15	<p><b>Land Use Regulations in Hazard Areas.</b> Use hazard information to shape zoning decisions during the Community Plan update process and include feasible methods to avoid or minimize climate change impacts associated with land use change. Evaluate ordinances such as the baseline hillside ordinance, hillside construction ordinance, floodplain management ordinance, wildlife protection ordinance (proposed), ridgeline ordinance (proposed), and conduct updates to enhance safety and improve resilience based on updated risk and vulnerability information to protect people, property, water quality, and native habitat. Expand the use of land use tools established through the Clean Up Green Up ordinance to apply citywide. Explore the provision of additional building, fire and zoning code requirements in areas that are likely to be more severely impacted by climate change, for example requiring cooling features and additional open space in residential developments subject to extreme heat, or requiring elevated building height in areas subject to sea level rise and flooding. Develop and integrate sustainable grading standards in building and land use regulations to reduce potential for surface erosion, soil instability or landslides by limiting disturbance on steep slopes. Regularly convene a hillside task force with representatives from relevant departments to address the unique land use challenges of hillside communities, including the egress requirements of Program 47. Reconcile local, state and federal mapping procedures so that any changes to the boundaries of hazard areas, especially VHFHSZs and FEMA flood zones, is reflected on platforms including ZIMAS and Navigate LA.</p>	1.1.5, 1.1.8	Long, Ongoing	LACP, LADBS, LASAN, BOE, LADOT
16	<p><b>Resilience in Wildfire Safety.</b> Continue to implement wildfire safety programs including brush management, fire road and utility corridor maintenance, red flag parking restrictions, evacuation response, addressing requirements, wildland operation planning, and defensible space landscaping restrictions. Explore integrating more sustainable practices into existing fire prevention strategies that minimize fire hazard, such as prohibiting planting of invasive and fire hazardous vegetation, promoting native landscaping and biodiversity and retaining native trees and native vegetation to support habitat preservation, biodiversity, wildlife connectivity, stormwater infiltration, landscape succession, and carbon sequestration. Revise and enhance plans and programs as risk scenarios change due to climate change. Continue to implement LADWP’s Wildfire Mitigation Plan, which includes standards, vegetation management programs and an inspection and maintenance program.</p>	1.1.5	Short, Ongoing	LAFD, LADBS, LADWP, LACP, LASAN, LADOT

17	<p><b>Urban Forest.</b> Continue the City Plants initiative to develop an Urban Forest Healthy Environment Strategic Plan that will target increased tree plantings to reduce air pollution, with a priority for vulnerable communities near truck routes, manufacturing, warehousing, distribution, refineries, chemical plants, and the Port. Prioritize communities with the highest heat island vulnerabilities and insufficient tree canopy based on “Los Angeles 1 Million Tree Canopy Cover Assessment” prepared by the Forest Service of the U.S. Department of Agriculture. The Urban Forest Healthy Environment Strategic Plan should target tree plantings in public spaces such as public rights of way, parks, and similar locations. Continue to implement tree planting requirements and replacements, such as the Protected Trees Ordinance, to retain mature and native trees, throughout the city and in particular, in ecologically sensitive areas to promote climate adaptation, provide shade and cool temperatures on extreme heat days and to reduce urban heat island effect, air pollution, noise pollution, and electricity consumption.</p>	1.2.1, 1.2.11	Medium	LASAN, Mayor, LADWP, LA County, RAP, LADOT, LACP, BSS
18	<p><b>Cool Neighborhoods.</b> Reduce the urban heat island effect by installing cooling features such as innovative shade design, water features, and cooling centers at parks. Identify opportunities to implement cool corridors and other interventions to improve pedestrian comfort on routes to high-volume transit stops and cooling spaces. Install cool pavement material on city streets. Pilot cool neighborhoods in vulnerable communities with severe heat island effects. Explore climate-adapted urban design principles particularly for high heat areas, such as cross-ventilation, enhanced open space, use of cool material, green roofing, and requirements for both heating and cooling of buildings.</p>	1.2.1, 1.1.8 1.2.11	Medium	LADOT, LADBS, Mayor, LACP, BOE, LASAN, BSS, Metro, LA County
19	<p><b>Retrofit, Acquisition, or Relocation of Existing Non-Conforming Structures.</b> Support retrofitting, purchase, or relocation of existing non-conforming structures in hazard-prone (high risk) areas to prevent future structure damage, giving priorities to properties with exposure to repetitive losses and areas with greatest economic need. In keeping with programs 47 and 48, Identify best practices and building code amendments to retrofit existing buildings to withstand specific disasters. Track and implement State legislation related to building retrofit in hazard areas. Explore the feasibility of a buy-out program to reduce development in hazard areas.</p>	1.1.5, 1.1.8 2.1.3	Long	LADBS, LAHD, HACLA, Mayor, LACP

20	<b>Seismic Retrofits.</b> Retrofit all structures to mitigate seismic hazards such those identified by the LADBS soft-story and non-ductile retrofit program. Identify financing strategies and retrofit residential and non-residential structures, including public facilities, and also mitigate non-structural seismic hazards. Conduct outreach to property owners and tenants to connect them with resources to identify financial support for seismic retrofits.	1.1.5, 2.1.3	Medium, Ongoing	LADBS, LAHD, HACLA
21	<b>Zero Waste in City Government.</b> Transition to paperless personnel files. Ensure all City facilities are equipped with appropriate recycling, including recycling for machining material and organics collection. Adopt and implement a sustainable technology policy across all City departments.	1.2.9, 1.2.13	Short	Mayor, GSD, Personnel, LASAN, ITA
22	<b>Decarbonize Buildings.</b> Design and implement policies to decarbonize existing buildings. Complete building electrification study and develop supporting programs for building electrification. Facilitate and incentivise green building projects for new and existing buildings by proactively identifying permit processes for emerging green technology such as the addition of EV charging stations, solar panels and cool roofs. Implement net zero energy projects at City facilities. Implement GHG performance standards for material procurement for purchasing by City Departments.	1.2.2, 1.2.4	Short	LADBS, GSD, Mayor, LAHD, HACLA, LADWP
23	<b>Advance Planning for Disaster Response.</b> Implement regulations allowing flexible reuse of privately owned property following a disaster and explore the use of transfer of development rights away from vulnerable areas. Incorporate resilience in land use planning in community plans to improve the ability to recover following disasters, and adapt to climate change and economic shifts, using available data on risk exposure and vulnerability to guide Community Plan updates. Develop programs and tools to ensure that vulnerable communities are given additional support during and immediately following a disaster, including tenant protections. Expand provisions for vulnerable populations in the next update of the Emergency Operations Plan (EOP) Recovery Annex. Pre-establish procedures to expedite bureaucratic processes and programs (such as building inspections and permits, tenant protections including eviction moratoriums, and financial assistance) immediately following a disaster. Evaluate insurance regulations that will apply immediately following a disaster and incorporate likely scenarios into disaster recovery plans.	2.1.5, 3.1.5	Ongoing	EMD, LACP, LADBS, LAHD, HACLA, LAFD, DOD, DOA, CAO
24	<b>Citywide Economic Resilience:</b> Establish a capital project pipeline that creates living-wage jobs for Los Angeles' most disadvantaged	1.2.12	Medium	LADOT, LADWP,

	populations. Collaborate with anchor institutions to target investment from diverse sectors of employment. Increase access to free wi-fi to help reduce technology disparities. Update the Citywide Growth Strategy to leverage land use as a tool to better connect accessible housing and employment opportunities. Explore tax incentives and other financing tools to create interconnected districts with housing and employment accessibility (see Housing Element programs for more information on financing tools).			LAWA, Metro, LA County, LAHD, HACLA, CTD
25	<b>Increase Prosperity.</b> Continue to deliver and promote comprehensive financial literacy programs that advance equity to empower people on saving, budgeting, credit, and investment to improve financial skills. Collaborate with local educational institutions to ensure job training and preparedness for positions that offer a living wage and career advancement. Work to define and ensure universal basic mobility.	1.2.12	Medium	EWDD, LAPL, RAP, LAHD, HACLA, LADOT, DOD
26	<b>Climate Adaptation and Preparedness Plan.</b> Building upon the Green New Deal, complete a Climate Adaptation and Preparedness (CAP) plan. Complete a risk assessment and develop specific reduction measures and monitoring programs. Work with Climate Resolve, the Los Angeles Regional Collaborative for Climate Action and Sustainability and local community partners to inform City efforts to identify and respond to the health impacts of climate change and to develop strategies that incorporate community-driven mitigations with expert-led solutions; targeting implementation in the neighborhoods that are most disproportionately impacted by the effects of climate change.	1.1.5, 1.1.6 1.2.1, 2.1.2	Medium	LACP, Mayor, LADWP, BPW, LADOT
27	<b>Implement Resilience and Sustainability Actions with Communities.</b> Create a commission that empowers impacted communities in implementation of sustainability and resilience actions, such as those identified in the Plan for a Healthy Los Angeles, Resilient LA, and the Green New Deal. Convene citywide forums through the Department of Neighborhood Empowerment, inviting participation from Neighborhood Councils on critical sustainability issues. Increase education and training through City science, water and power outage notifications, emergency item discounts, household safety, arts, and cultural programming offered by departments. Expand climate resilience and emergency preparedness in collaboration with community groups and nonprofit organizations. Develop the next generation of stewards of Los Angeles to be leaders in climate and disaster resilience. Engage communities that have been most impacted by historic planning	1.1.1, 1.1.7	Short	Mayor, DONE, DCA, LAFD, LAPD, EMD, Neighborhood Councils, LAUSD, LAFD, LADWP, BOS, RAP, LAHD, HACLA, LACP

	injustices in future climate change planning through approaches such as Dignity Infused Community Engagement.			
28	<b>Increase Renewable Energy Sources.</b> Invest to upgrade power system infrastructure and ensure power system reliability and energy resilience. Identify and prioritize solar and microgrid backup power projects. Streamline permitting and interconnection processes for energy storage projects. Expand combined solar and energy storage pilot projects in vulnerable communities. Require newly built parking structures to incorporate solar and EV charging. Create a standard plan for carport solar. Install solar at the Port and at City facilities.	1.2.2	Short	Mayor, LADWP, LACP, LADBS, BOE, POLA, LASAN
29	<b>Increase Access to Renewable Energy.</b> Establish community solar programs that expand access to solar savings to low-income and renter households which include solar rooftops and shared solar programs, as well as the Virtual Net Energy Metering pilot program. Seek opportunities for third-party clean energy service providers to leverage private property for distributed generation. Implement a communication network to enable use of smart meters.	1.2.1, 1.2.2	Short	LADWP, Mayor, CAO, LACP, LADBS, BOE, LAHD
30	<b>Reduce Port-related GHG Emissions.</b> Transition to zero-emissions technology at the Port. Develop a suite of emissions reduction programs for ocean going vessels at the Port of Los Angeles, such as expanding the use of shore power (AMP) or other emissions capturing technologies. Deploy 100% zero emission on-road drayage trucks. Install 100% zero emission cargo handling equipment. Maintain and implement the Actions to Reduce Greenhouse Gas Emissions by 2050 Plan.	1.2.8	Short	POLA
31	<b>Increase Waste and Resource Recovery.</b> Require at least 80% recycling of construction and demolition waste. Implement a ban on expanded polystyrene. Increase participation in residential recycling and composting. Establish a residential food scraps collection program, including drop off-locations throughout the city. Establish a food recovery (of discarded edible food) and distribution program. Identify food recovery partners and develop cold storage infrastructure to scale food recovery efforts.	1.2.9	Short	LASAN, Mayor
32	<b>Urban Agriculture.</b> Develop a comprehensive urban agriculture program that removes barriers and supports the development of a local urban agriculture system (including community gardens). More information on specific strategies is available in the Plan for a Healthy LA Program 50.	1.2.10, 1.2.11	Medium	LASAN, Mayor, LACP, LA County, DPW



33	<p><b>Building Social Cohesion and Community Preparedness.</b> Build social connection between neighbors and increase participation to encourage welcoming neighborhoods with efforts such as launching the “neighborly” microgrants program. In keeping with Program 43, continue to offer training programs and provide informational materials designed to assist the general public in handling disaster situations, such as the Ready Your LA Neighborhood Program (RYLAN), as carried out by the EMD, and the Community Emergency Response Team (CERT) program run by LAFD. Increase community education around topics including defensible space for fire prevention and evacuation procedures. Integrate educational content into existing outreach programs, such as including information on defensible space best practice in the annual Brush Clearance mailers sent by LAFD. In keeping with Program 44, encourage community members to engage with emergency resources through social media and digital applications to ensure communities know where to access information in the event of an emergency. Ensure all City staff are prepared to assume a disaster assistance role through the Disaster Service Worker (DSW) program.</p>	1.1.7, 2.1.7	Medium	EMD, LAFD, DONE/EmpowerLA
34	<p><b>Leverage Investments for Major Events.</b> Leverage infrastructure investments leading up to major events, such as the Olympic and Paralympic Games, to advance resilience goals, increase health and wellness, and prevent displacement of vulnerable Angelenos.</p>	1.2.6, 1.2.13	Medium	Mayor, DPW, LADOT, LAWA, LADWP, POLA, ITA, Metro, RAP, DOA, DOD, DCA, LASAN, BSS, LAHD, CAO
35	<p><b>Resilience in Capital Improvements Planning and Facilities Maintenance.</b> Identify vulnerable critical infrastructure and increase resilience of these facilities. Critical infrastructure is defined in the LHMP and includes potable water systems, wastewater systems, electric power systems, oil refineries, natural gas systems, freeways, streets, bridges, railroads, airports and the harbor, communication systems. Integrate resilience and sustainability principles into City capital improvements planning. Make resilience-building a permanent part of the City of Los Angeles’ systems and services. Maintain threat recognition systems or warning systems for critical infrastructure such as the flood threat recognition system and flash flood warning system. Restore critical infrastructure as quickly as possible immediately following a disaster event.</p>	1.1.2, 3.1.4	Long, Ongoing	DPW, EMD, LADWP, DPW, CAO, LAWA, POLA, LADOT, LASAN, BSS

	Increase resiliency of the City's potable water supply and distribution system through the LADWP asset management and project delivery process. Assess, target and prioritize the most vulnerable facilities including pipelines, treatment facilities, reservoirs, and pump stations for improvement. Implement strategies including the use of earthquake resistant pipe, improving system and facility redundancy, strengthening infrastructure to critical facilities, and backup power systems. When necessary, design critical spaces to Occupancy Risk Category IV standards per the latest building codes. Risk Category IV buildings and structures are designated as essential facilities and are required to be fully operational after a major earthquake, similar to police stations and fire stations.			
36	<b>Resilient Flow of Goods and Services.</b> Fortify critical transportation infrastructure and supply chains through continued assessments, coordination, and investment. Partner with key transit agencies to facilitate the exchange of data and information to coordinate and prioritize critical transportation infrastructure and transit investments to develop a robust system, capable of withstanding shocks and stresses. This includes critical transportation infrastructure such as freeways, streets, bridges, railroads, airports, and the harbor.	1.1.2, 3.1.4	Long	LADOT, EMD, LADWP, LAWA, POLA, LADOT, BOS, SCAG Metro, Caltrans
37	<b>Pursue Academic Partnerships.</b> Integrate new and emerging science into policy through partnerships with academic, local, state, and federal scientists. Continue to partner with leading scientists, researchers and resilience experts to foster the integration of City policies and programs with current and future science discovery. Launch the Campus Resilience Challenge.	1.2.13	Short	Mayor, Academic Institutions
38	<b>Airport Safety.</b> Leverage airport safety, efficiency, accessibility, and modernization improvements to increase resilience at L.A airports. Maintain and update the LAX Master Plan to consider an appropriate range of scenarios due to natural disasters and climate change.	1.1.2	Short, Ongoing	LAWA
39	<b>Hazardous Materials Management.</b> Continue to employ staff with special training and equipment for hazardous waste collection, spill prevention, storage and use oversight, and other activities to manage hazardous materials and hazardous waste, consistent with applicable State and federal regulations.	1.1.4	Short, Ongoing	LASAN, LAPD, DPW, LAFD
40	<b>Advance Counter-terrorism Efforts.</b> Continue surveillance and monitoring for terrorism. Continue the terrorist early warning group. Expand and strengthen communities to combat all forms of violent extremism. Continue to maintain technological, chemical, and biological	1.1.4	Short, Ongoing	LAPD

	detection devices to address hazardous materials and explosive devices and provide staff training on the use of those devices.			
41	<b>Disaster Response for Animal Care and Control.</b> Continue coordination with Emergency Management Department on identification of hazards and risk reduction projects for animal care and control. Maintain the EOP annexes related to the sheltering of small and large animals. Address the needs of service animals in emergency shelters and temporary housing sites. Expand provisions for the mass care and sheltering of animals/wildlife during a disaster event.	1.1.1, 2.1.2	Short, Ongoing	DAS, EMD, LA Zoo, RAP, DOD
42	<b>Emergency Sheltering.</b> Develop and implement the interim evacuation, sheltering, and public aid for disaster victims displaced from homes. Maintain the EOP annexes related to emergency shelter, which detail provisions for temporary shelter, traditional and non-traditional shelter, and reconstitution.	2.1.4	Ongoing	EMD, RAP, DOD, DOA, Red Cross, FEMA, CTD, LAPL, LAUSD, CalOES, LADOT, LAHD, CIFD
43	<b>Community Response.</b> Grow partnerships between the public, private, and nonprofit sectors to provide critical services to vulnerable Angelenos in times of crisis. Involve volunteers, Neighborhood Councils, and civic organizations in emergency preparedness and response activities. Offer training and provide preparedness information to businesses and Angelenos directly, i.e, RYLAN, with a focus on ensuring coverage for the most vulnerable communities. Provide Angelenos access to additional trauma resources. Grow partnerships that expand support for animals after a major shock.	2.1.7	Short	EMD, LAFD, CDFW, Mayor, LAFD, LAPD, DMH, DAS, LA Zoo, DOD, DOA, LAHD, DONE
44	<b>Emergency Preparedness Communication.</b> Maintain the City's Emergency Management Department website, emergency alert systems NotifyLA and Nixle, and social media sites to provide emergency preparedness information and tools to the general public and media. Expand workforce preparedness i.e, Disaster Service Worker program, to restore services quickly following a disaster. Promote neighborhood preparedness plans. Ensure effective communications during disaster response such as providing multilingual interpretation, including sign language, with an emphasis on protecting linguistically isolated populations. Launch and promote adoption of earthquake early warning system applications. Develop a system to alert visitors to the city of disaster risk and response. Ensure that tenants and landlords in multi-family buildings receive critical information immediately following a disaster.	2.1.5	Short	EMD, LADWP, CalOES, Mayor, LAFD, LAPD, CTD, EWDD, DOD, DOA, LAWA, LAUSD, LAHSA, DONE/Empo werLA, LAHD

45	<b>LAPD Disaster Response Role.</b> Continue LAPD disaster response activities such as providing ingress and egress for emergency response vehicles, providing security at critical infrastructure, promoting safety through timely and reasoned response (including identification of households with individuals with disabilities and other access and functional needs), and deploying the mobile command response unit and informing it of the risks identified for hazards.	2.1.5	Short, Ongoing	LAPD
46	<b>Backup Power for Critical Facilities.</b> Retrofit critical assets with backup power to maintain operational capacity during all hazard events to prevent the interruption of power supply. Invest to upgrade power system infrastructure and ensure power system reliability. Equip new and existing water system facilities with an emergency backup power generator.	1.1.3, 3.1.4	Short, Ongoing	LADWP, DPW, GSD, POLA
47	<b>Evacuation Plans.</b> Maintain and update evacuation plans for areas potentially affected by hazards as a part of the Emergency Operations Plan, Evacuation Functional Support Annex, including procedures related to residential developments in a Very High fire Hazard Severity Zone (VHFHSZ) or other hazard areas that do not have at least two emergency evacuation routes and/or are located on streets less than 20 feet in width. Utilize Hillside Task Force/working group (which is convened by BOE and includes LACP, LADOT, LADBS and other relevant departments) to study hillside access, develop procedures and advance recommendations to be coordinated with appropriate agencies (LAPD, LADOT, Access Paratransit, LACP, LA Country, etc.). Evaluate how best to regulate infill and retrofit existing non-conforming development when creating a 20 foot wide improved access road is not feasible (per LAMC 12.21 C.10(i)(3)). Collaborate across key agencies to provide emergency transportation, traffic control, parking enforcement, and other services during planned incidents and emergencies. Identify infrastructure that can assist in provisioning emergency response and evacuation in these areas, such as specialized vehicles.	2.1.4	Ongoing	EMD, LAFD, LAPD, LADOT, LADBS, LAHSA, BOE
48	<b>Fire Standards and Procedures.</b> Maintain and update, as needed, the City's procedures and standards to facilitate fire prevention, preparedness, response and recovery, including more effective fire suppression. Continue to ensure adequate peak load water supply in all areas. Determine necessary fire suppression infrastructure needs, including the need for special equipment and technology to address conditions within hillside communities and encampments of unhoused individuals. Develop a Standards of Cover study to assess current performance and plan for future organizational changes required to meet the needs of the City based on population density and	2.1.6	Ongoing	LAFD, DPW, LADWP

	demographic changes expected over the next twenty years. Explore opportunities to better fund fire infrastructure, such as a special assessment district or development fee. In keeping with Program 47, identify additional measures that can assist in fire suppression and evacuation, such as expanding the existing Red Flag parking restrictions to sub-standard streets, fire protection plans specific to a neighborhood or development, and other strategies as identified by LAFD and CAL FIRE.			
49	<b>Cooling &amp; Smoke Relief Centers.</b> Upgrade cooling and smoke relief (poor air quality relief) centers to better meet the needs of the elderly and persons with disabilities. Expand and ensure accessible communications on types of cooling and smoke relief resources and available relief spaces, including through notification of homeless populations, and others with access and functional needs, to increase usage and deployment. Increase access to, and communication on the availability of cooling and smoke relief centers on poor air quality days and facilitate access to air purifiers and air filters focusing on low-income, high smoke-risk communities.	2.1.2, 2.1.5	Medium	RAP, LAPL, Mayor, City Council, DOD, DOA, LAHSA, LADWP, DPW, LASAN, LACP, EMD, LADOT
50	<b>Cyberattacks.</b> Enhance protection of critical digital assets from cyberattacks by continuing the Emergency Cyber Incident Response Program. Teach Angelenos how to protect themselves from cyberattacks. Lead development of a cross-sector cybersecurity innovation incubator. Facilitate partnerships with Los Angeles businesses through the cybersecurity platform, LA Cyber Lab.	1.1..2	Short, Ongoing	LAPD, ITA
51	<b>Historic Resources Recovery.</b> Immediately following a disaster, utilize historic preservation tools including Survey LA and formal designations of Historic-Cultural Monuments, Historic Preservation Overlay Zone, and Mills Act properties to carefully consider how best to preserve the cultural legacy of the city in rebuilding and recovery efforts.	3.1.3	Ongoing	LACP, LADBS, LAHD
52	<b>Pre-Disaster Housing Recovery Strategy.</b> Maintain and update, as needed, the City's pre-disaster housing recovery strategy to ensure immediate assistance to displaced residents and a smooth transition from mass care/shelter to housing. Leverage existing resources, including funding and private insurance, for rehousing and reconstruction. Ensure equitable access to post-disaster housing for the most vulnerable Angelenos. Ensure that displaced residents are given extra support to allow them to return to reconstructed housing.	3.1.5	Short	LAHD, EMD, HACLA, LADBS

53	<p><b>Mutual Aid Agreements.</b> Continue to take advantage of the California Master Mutual Aid Agreement (CMMA). Coordinate with surrounding municipalities to ensure efficient and effective sharing of resources in responding to disaster events, especially disasters likely to cross jurisdictional lines such as wildfires, floods and earthquakes.</p>	1.1.1, 2.1.1, 3.1.1	Ongoing	EMD, LAFD, Mayor, LADWP
54	<p><b>Mobility.</b> As outlined in the Mobility Element and LA's Green New Deal, direct improvement to transportation infrastructure to bolster the use of low emissions transportation options, including public transit, pedestrian and bike infrastructure, and carpooling. Develop infrastructure to support the wider adoption of zero emissions vehicles. Improve and expand the network of public transportation options. Support the delivery of regional mobility projects and programs, including Metro 28 by '28 transit projects, the Metro NextGen Bus Plan, Metro Bike Share, and Metro Congestion Pricing study.</p>	1.2.6, 1.2.7	Medium	LADOT, Metro, BSS



# Appendix A: Listing of Responsible City Departments

<b>AQMD</b>	South Coast Air Quality Management District	<b>LA County</b>	Los Angeles County
<b>BOE</b>	Department of Public Works - Bureau of Engineering	<b>LACFCD</b>	Los Angeles County Flood Control District
<b>CalFire</b>	California Department of Forestry and Fire Protection	<b>LACP</b>	Los Angeles City Planning
<b>CalGEM</b>	California Department of Conservation Geologic Energy Management Division	<b>LADBS</b>	Department of Building and Safety
<b>CalOES</b>	California Office of Emergency Services	<b>LADOT</b>	Los Angeles Department of Transportation
<b>CAO</b>	Chief Administrative Officer		
<b>CAO</b>	Office of the City Attorney	<b>LADWP</b>	Los Angeles Department of Water and Power
<b>CTD</b>	Department of Convention and Tourism Development	<b>LAFD</b>	Los Angeles Fire Department
<b>CDTSC</b>	California Department of Toxic Substances Control	<b>LAHD</b>	Los Angeles Housing Department
<b>DAS</b>	Department of Animal Services	<b>LAHSA</b>	Los Angeles Homeless Service Authority
<b>DCA</b>	Department of Cultural Affairs	<b>LAPD</b>	Los Angeles Police Department
<b>DMH</b>	LA County Department of Mental Health	<b>LAPL</b>	Los Angeles Public Library
<b>DOA</b>	Department of Aging	<b>LASAN</b>	Department of Public Works Bureau of Sanitation and the Environment
<b>DOD</b>	Department of Disability	<b>LAUSD</b>	Los Angeles Unified School District
<b>DONE</b>	Department of Neighborhood Empowerment	<b>LAWA</b>	Los Angeles World Airports

<b>DPW</b>	Department of Public Works, including the following bureaus: Sanitation and the Environment (LASAN), Street Services (StreetsLA), Engineering (BOE), Contract Administration (BCA), Street Lighting (BSL)	<b>Mayor</b>	Office of the Mayor (LA City)
<b>EMC</b>	Emergency Management Committee	<b>Metro</b>	LA County Metropolitan Transportation Authority
<b>EMD</b>	Emergency Management Department (LA City)	<b>MWD</b>	Metropolitan Water District of Southern California
<b>EMS</b>	Emergency Medical Services (LAFD)	<b>OEM</b>	Los Angeles County Office of Emergency Management
<b>EOB</b>	Emergency Operations Board	<b>POLA</b>	Port of Los Angeles
<b>EOC</b>	Emergency Operations Center	<b>RAP</b>	Department of Recreation and Parks (LA City)
<b>EOO</b>	Emergency Operations Organization	<b>SCAG</b>	Southern California Association of Governments
<b>EWDD</b>	Economic and Workforce Development Department	<b>SoCal Gas</b>	Southern California Gas Company
<b>GSD</b>	General Services Department	<b>BSS</b>	Department of Public Works - Bureau of Street Services
<b>HACLA</b>	Housing Authority of the City of Los Angeles	<b>USACE</b>	U.S. Army Corps of Engineers
<b>ITA</b>	Information Technology Agency		

## Appendix B: Related Plans

The plans referenced in this Element are included here for reference. Plans are subject to frequent update, and are provided here as they were active in 2021.

	Name and Link	Description
<b>BHO</b>	<a href="#">Baseline Hillside Ordinance</a>	The Baseline Hillside Ordinance (BHO) (Ordinance No. 181,624) addresses the issue of out-of-scale development in hillside neighborhoods by establishing regulations for projects in the hillside areas, including limitations on residential floor area and the amount of allowable grading based on lot size;
<b>BMO</b>	<a href="#">Baseline Mansionization Ordinance</a>	The Baseline Mansionization Ordinance (No. 179,883), establishes regulations for properties citywide zoned single-family residential not located in a Hillside Area or Coastal Zone, and primarily focuses on size and height limitations
	<a href="#">Cal-Adapt</a>	Cal-Adapt provides a view of how climate change might affect California. Find tools, data, and resources to conduct research, develop adaptation plans and build applications.
	<a href="#">CalEnviroScreen</a>	The CA Office of Environmental Health Hazards Assessment creates this screening methodology with environmental, health, and socioeconomic information that can be used to help identify California communities that are disproportionately burdened by multiple sources of pollution.
<b>CGC</b>	<a href="#">California Government Code</a>	The California Government Code contains State laws and bills affecting local jurisdictions to which they apply and which may adopt part or all of a standard, such as the Building Code, in place or in addition to local code.
<b>CAAP</b>	<a href="#">Clean Air Action Plan (POLA)</a>	The Port of Long Beach and Port of Los Angeles introduced the Clean Air Action Plan (CAAP) Update in 2017, to serve as high-level guidance for continued emission reduction activities in collaboration with industry stakeholders, regulatory agencies, local communities, and environmental groups.
<b>CUGU</b>	<a href="#">Clean Up Green Up</a>	In 2016, the LA City Council approved Ordinance (No.184246) which authorizes the establishment of Clean Up Green Up (CUGU) Supplemental Use Districts. The purpose of the CUGU District is to reduce cumulative health impacts resulting from land uses which are incompatible with the sensitive uses to which they are in close proximity.
<b>CAAP</b>	<a href="#">Climate Action</a>	This plan from Metro, LA County's preeminent transit agency,

	<a href="#">and Adaptation Plan (Metro)</a>	lays out actions to limit climate change, ways to increase climate resilience, implementation recommendations, and how Metro’s sustainability and resilience work impacts the County.
<b>CERT</b>	<a href="#">Community Emergency Response Team</a>	CERT trains community members to be prepared for and respond to safety emergencies, including natural disasters, when local agencies may not be immediately available.
<b>EOP</b>	<a href="#">Emergency Operations Plan</a>	The Emergency Management Department maintains the EOP which outlines government, civic, and private sector roles and responsibilities in emergency preparedness, response, and recovery. It is meant to work in conjunction with the individual emergency plans maintained by other City departments.
<b>FIRESCOPE</b>	<a href="#">Firefighting Resources of California Organized for Potential Emergencies</a>	FIRESCOPE is a working partnership among local, rural, and metropolitan fire departments, the California Department of Forestry and Fire Protection, and federal fire agencies.
<b>FMP</b>	<a href="#">Floodplain Management Plan</a>	The FMP was completed in 2020 on behalf of the Los Angeles Department of Water and Power. It includes risk assessment and mitigation strategy for the City. The Plan also includes creditable actions for the Community Rating System (CRS) of the National Flood Insurance Program.
<b>GND</b>	<a href="#">Green New Deal / Sustainability pLAN</a>	The Office of Mayor Eric Garcetti created L.A.’s Green New Deal Sustainable City Plan in 2019 to promote sustainability, resilience, and green economy jobs in Los Angeles. Many of its programs are synthesized and summarized into the updated Safety Element.
<b>LADWP</b>	<a href="#">LADWP Wildfire Mitigation Plan</a>	The Los Angeles Department of Water and Power released its Wildfire Mitigation Plan in 2021 (initiated in 2008) to clarify the responsibilities of the Department’s infrastructure, procedures, and maintenance to address and mitigate wildfire hazards. The plan includes construction standards, vegetation management programs and an inspection and maintenance program.
<b>LABC</b>	<a href="#">Los Angeles Building Code</a>	The LA Building Code contains City laws and regulations pertaining to development and building practices, including as relates to safety.
<b>LAFC</b>	<a href="#">Los Angeles Fire Code</a>	The Fire Code is a component of the overall Los Angeles Municipal Code and is a combination of the California Fire Code and the Los Angeles amendments.
<b>LAMC</b>	<a href="#">Los Angeles</a>	The LA Municipal Code includes the rules, roles, and regulations

	<a href="#">Municipal Code</a>	including zones and ordinances that govern development and establish requirements and reliefs for the preservation of the public peace, health and safety. It includes the Building Code, Zoning Code and Fire Code.
	<a href="#">Los Angeles River Master Plan</a>	In 2016 Los Angeles County Public Works began work with other County Departments and the City of LA to update the LA River Master Plan. The plan process engages the community to explore approaches to providing more community assets in and along the LA river and identifies potential displacement risks associated with improvements to the river environment.
	<a href="#">Los Angeles River Revitalization Master Plan</a>	DPW released this river revitalization plan in 2007. It identifies risks and opportunities associated with different improvements and developments in and around the LA River.
	<a href="#">LAX Plan (LAWA)</a>	Plans and maps included as part of the General Plan of the City of Los Angeles to promote an arrangement of airport uses within the context of the City and region. The Plan includes goals, objectives, and policies to move passengers and cargo, promote safety, and adapt to changing conditions and technologies.
	LAX Airport Emergency Plan	Emergency Plan maintained by LAX/LAWA and coordinated with the Emergency Management Department (EMD).
	LAX Continuity of Operations Plan	Guides emergency response facilities, coordinate chain of command, and provide training and materials to LAWA and non-LAWA responders.
<b>LHMP</b>	<a href="#">Local Hazard Mitigation Plan</a>	The Local Hazard Mitigation Plan (LHMP) guides the city in reducing risks from disasters to people, property, economy and environment. The LHMP complies with federal and State hazard mitigation planning requirements to establish eligibility for funding under the Federal Emergency Management (FEMA) grant programs.
<b>LID</b>	<a href="#">Low Impact Development Ordinance (LASAN)</a>	The LID Ordinance and Handbook were prepared by LA Sanitation through a series of stakeholder driven workshops to develop sustainable water practices for all development and redevelopment projects that have a land disturbance activity and add, create or replace 500 square feet or more of impervious area.
<b>MS4</b>	<a href="#">Municipal Separate Storm Sewer System</a>	MS4 permits regulate discharge from medium and large municipal separate storm systems and are issued through the National Pollutant Discharge Elimination System (NPDES) Program

	<a href="#">One Water LA 2040 Plan (LASAN)</a>	The Plan is a roadmap to arrive at better and fiscally-responsible water planning solutions. The Plan identifies projects, programs and policies that will yield sustainable, long-term water supplies for Los Angeles and will provide greater resiliency to drought conditions and climate change.
<b>OASIS</b>	<a href="#">Operational Area Satellite Information System</a>	The Operational Area Satellite Information System (OASIS) is a network of over 80 terminals located statewide that provide broadband internet and telephone access immune to regional failures in the terrestrial network. The inventory of terminals includes both fixed and transportable terminals.
<b>PHLA</b>	<a href="#">Plan for a Healthy Los Angeles</a>	The Health Element of the General Plan which provides high-level policy vision, along with measurable objectives and implementation programs, to elevate health and environmental justice as a priority for the City's future growth and development.
	<a href="#">Port of Los Angeles Master Plan</a>	The Plan guides the future development of the Port consistent with the provisions of the California Coastal Act and focuses on local and national economic development, management of the port area and facilities for commerce, fishery, and recreational interests, and alignment with other City of LA programs and policies.
	<a href="#">Port of Los Angeles Sea Level Rise Adaptation Strategy</a>	This plan identifies the areas of the nation's leading seaport that are projected to be exposed to sea level rise by years 2030, 2050, and 2100, provides an overview of the port's asset vulnerabilities, and presents a suite of strategies to both adapt over time and become more resilient to sea level rise.
<b>RYLAN</b>	<a href="#">Ready Your LA Neighborhood</a>	RYLAN provides tools to prepare and organize neighborhoods to respond together in the first hour after a disaster to reduce injuries, protect property and the environment, and save lives.
	<a href="#">Resilient Los Angeles</a>	The Resilient LA plan contains strategies at the household, neighborhood, and city scale for sustainability, resilience, capacity-building, and growing the local green economy.
	<a href="#">A Safer City 2.0 (LAFD)</a>	This three-year plan includes LAFD goals and strategies to align with the Mayor's plan for a safe, well-run, sustainable, and prosperous City including firefighting techniques and technology, emergency response, community resilience, and LAFD workplace culture and professional development opportunities.
<b>SEMS</b>	<a href="#">Standardized Emergency Management System</a>	SEMS is a State-standardized structure for the response phase of emergency management. The system unifies all elements of California's emergency management community into a single integrated system and standardizes key elements of response,



		logistics, and coordination.
<b>SWIRP</b>	<a href="#">Solid Waste Integrated Resources Plan</a>	Commonly known as the City's Zero Waste Plan, it lays out a long term plan through 2030 for the City's solid waste programs, policies and environmental infrastructure.
<b>UWMP</b>	<a href="#">Urban Water Management Plan (LADWP)</a>	The City is required to adopt an Urban Water Management Plan every five years to comply with California's Urban Water Management Planning Act. It serves as the City's master plan for reliable water supply and resources management, including supply and demand forecasting, conservation and maintenance, and emergency and climate change planning.
<b>VLCP</b>	<a href="#">Venice Local Coastal Program</a>	The Local Coastal Program is a policy and regulatory document required by the California Coastal Act that establishes land use, development, natural resource protection, coastal access, and public recreation policies for the Venice Coastal Zone.

# Appendix C: Summary of Changes from 1996 Element

Amendments made in 2021

Recent State law requires that an updated Safety Element be adopted alongside the 2021-2029 Housing Element. As a result the City of Los Angeles has produced a targeted update to the 1996 Safety Element, focusing on revising information that is out of date, and adding in additional information as necessitated by new state requirements. Below is a high level summary of amendments to each chapter of the Safety Element.

## Overall

- The City adopted its first Local Hazard Mitigation Plan (LHMP) in 2004 as an implementation action of the Safety Element, with subsequent updates in 2010 and 2018. This is the first update to the Safety Element since the LHMP was adopted. References to the LHMP have been added throughout this document to clarify that the LHMP is a part of the Safety Element and reduce duplication.
- Several other long range plans have also been adopted since the Safety Element was last updated. These plans implement the Safety Element, carrying out policies by providing details pertaining to a specific hazard or procedure. For example, a Floodplain Management Plan for Los Angeles was first adopted in 2001, then updated in 2010 and again in 2020. An Emergency Operation Plan was adopted in 2018, with topic specific appendices and annexes added in subsequent years. The 2021 Safety Element includes references that help readers access and understand these related resources.
- Some edits have been made to reflect more modern and inclusive terminology. Where the 1996 Element referenced “natural disasters,” the 2021 Element has been revised to speak to “disasters” more broadly.
- The Element has been formatted and revised to include photos and visual exhibits. This improves readability and standardizes the visual identity across General Plan Elements.

## Introduction

- Edits were made to reflect this current update effort, noting that the 2021 Element replaces the 1996 Element and that the updates were limited in scope to

reflect targeted amendments to comply with state law and reflect current city practice.

- Background on related plans has been added to clarify the Safety Element's role in a larger network of plans that detail how the city plans for, responds to and recovers from disaster events.

### **Chapter 1: Background**

- Many aspects of this chapter are repetitive with the Local Hazard Mitigation Plan. Background information on the City of Los Angeles and historic information on emergency events that is included in both plans has been replaced by a reference to the relevant chapter and section of the Local Hazard Mitigation Plan.
- The 1996 Element references the Emergency Operations Organization, or EOO, founded in 1980 as an operational department of the City of Los Angeles. In addition to the EOO the City now also has a staffed department, the Emergency Management Department (EMD). References to the EOO have been revised to speak more broadly to the emergency operations of the City, as carried by the EOO, EMD, and other city departments.

### **Chapter 2: Existing Conditions**

- The naming conventions for disasters have been updated to naming conventions consistent with state law, specifically those used by the Office of Planning and Research. For example, a section titled "Fire and Rescue" in the 1996 Element will now be called "Wildland and Urban Fire," in keeping with state guidance. Naming conventions have also been standardized across the Safety Element and LHMP where possible.
- The City has added new measures and code provisions to better plan for disaster events since the Safety Element was last updated. These new measures and provisions have been added to the Existing Conditions chapter. A few examples are detailed below:
  - The Very High Fire Hazard Severity Zone designation and related fire code provisions, were adopted in 1999, replacing older designations such as the Mountain Fire District.
  - The Baseline Line Hillside Ordinance adopted in 2011, regulates grading and hillside development, and was revised in 2017.
  - In the past several years requirements around earthquake retrofits for soft-story and non-ductile concrete structures have been passed and implemented.
  - Zoning Administrator Memo 133 was adopted in 2016, providing for stronger regulation of oil sites.

- Over the past few decades the City has adopted a more ecological approach to disaster management. This is especially true of the approach to flooding and drought, which increasingly emphasizes the retention and capture of stormwater. This approach is reflected in recent plans such as OneWater2040 and the Integrated Water Management Plan. The background chapter has been amended to reflect this approach.
- Language has been added to detail state requirements as they pertain to specific hazards. The chapter now includes additional references to these government code provisions, along with a summary of local compliance measures.
- A section on General Disaster Prevention, Response and Recovery has been added to detail programs that relate to all disasters, like the provision of temporary shelter and evacuation procedures.
- A specific section on climate change has been added. Additional content on climate change impacts, including more frequent wildfires, sea level rise, and flooding, have been added to relevant hazard sections.

### **Chapter 3: Goals, Policies and Objectives**

- Clarification that policies will be achieved “to the extent feasible within the available resources” has been added to the introduction and removed from each individual policy to improve readability.
- Language has been added to clarify that the goals, policies and objectives speak to all hazards, as determined by the LHMP.
- A new objective was added to address climate change under Goal 1, mirroring the language of the Green New Deal. This includes new policies following from the policy guidance of each chapter within the Green New Deal.
- Equity language has been added across several policies, underscoring the need to protect our most vulnerable residents and build community capacity. Much of this language was drawn from the existing Resilient Los Angeles Plan.
- Policy 2.1.6, which focuses on fire standards, previously included very specific details that relate to fire flow and other standards. This policy has been revised to be more high level, in keeping with other General Plan policies. Information on where to find specific fire standards has been added to the Existing Conditions chapter as background.
- Policy 1.1.8 has been added to describe the City’s approach to considering hazard designations when making decisions about future land use.

### **Chapter 4: Programs**

- The 1996 Safety Element did not include programs, including instead a reference to the implementation actions of the EOO at the end of each policy.

- A program list has been developed through this update in an effort to better describe the specific actions the City is taking to implement the Safety Element.
- This compilation stemmed primarily from the documents referenced herein, as well as review from the participating departments.

#### Chapter 5: Exhibits

- The previous Safety Element included a series of hazard mapping exhibits, as required by State law. These exhibits are now available in the LHMP in more detail and updated with greater frequency than the Safety Element, and have been replaced by a reference to relevant figures in the Existing Conditions chapter.